Southington Board of Education Meeting

Thursday, October 29, 2026 6:30 PM
John Weichsel Municipal Center Public Assembly Room
200 North Main Street
Southington, CT 06489

COMMITTEE OF THE WHOLE

1. CALL TO ORDER
2. Executive Session
   a. Student Matters
3. Reconvene Meeting - Regular Session 7:00 p.m.
4. Pledge of Allegiance
5. Approval of Minutes - October 15, 2026
6. Public Communications
   a. Communications from Student Board Representatives
   b. Communications from Board of Education
   c. Communications from Administration
   d. Communications from Public - Agenda Items Only
7. Committee Reports
   a. Curriculum & Instruction Committee Meeting - October 21, 2026
8. Old Business
   a. Town Government Communications
   b. Review Policy 3542.1 - Purposes and Facilities - Food Service - Revised - Second Reading
   c. Review Policy 4215 - Emergency Action Plan for Athletic Events - NEW - Second Reading
   d. Review Policy 5114 - Student Discipline - Revised - Second Reading
   e. Review Policy 5123 - Promotion and Retention - Revised - Second Reading
   f. Review Policy 5141.8 - Students with Special Health Care Needs - NEW - Second Reading
9. New Business
   a. SHS Physical Education - Unit 2, Recreational Lifetime Activities - Revised - First Reading
   b. SHS Energy in the Environment - Unit 2, Energy Flow from Earth's Systems - NEW - First Reading
   c. SHS Accelerated General Chemistry - Unit 1, Illuminating Matter - NEW - First Reading
   d. SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACC - Revised - First Reading
   e. SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACA - Revised - First Reading

f. SHS Earth Science - Unit 2, Climate Change and Human Impact ACC - NEW - First Reading
g. SHS History - Current Issues - Revised - First Reading
h. SHS History - American Culture - Revised - First Reading
i. District Data Presentation
j. Adoption of 2027 Board of Education Meeting Dates

10. Public Communications
    a. Public
11. Adjournment

The minutes presented within the document provide a summary of the discussion that took place at the Board of Education meeting. For the complete discussion of the agenda items, please view the video of the Board meeting on our website at https://www.southingtonschools.org. These minutes are considered a draft until approved at the following regular Board of Education Meeting.

SOUTHINGTON BOARD OF EDUCATION, SOUTHINGTON, CT
Regular Meeting
Committee of the Whole
October 15, 2026, at 6:30 p.m.
John Weichsel Municipal Center Public Assembly Room
200 North Main Street Southington, CT 06489

1. **CALL TO ORDER**
   Mr. Oshana, Board Chairperson, called the meeting to order at 6:30 p.m.
   Board Members Present: Mr. Robert Brown, Ms. Lisa Cammuso, Mrs. Terri Carmody, Mrs. Colleen Clark, Mrs. Dawn Derynoski-Anastasio, Mr. Zaya Oshana
   Board Members Absent: Mr. Joseph Baczewski, Mr. Sean Carson, Mr. Cecil Whitehead

2. **Executive Session**
   MOTION made by Ms. Cammuso and seconded by Mrs. Clark, "Move to go into Executive Session, excluding the public and the press, for the purpose of discussing Student Matters; upon conclusion reconvene to public session." Motion carried 6-0.
   a. Student Matters
      Mr. Madancy was invited to join the meeting.
      Mr. Whitehead arrived and joined executive session at 6:33 p.m.
      Executive session concluded at 6:38 p.m.

3. **Reconvene Meeting - Regular Session 7:00 p.m.**
   Mr. Oshana called the regular meeting to order at 7:00 p.m.
   Board Members Present: Mr. Robert Brown, Ms. Lisa Cammuso, Mrs. Terri Carmody, Mr. Sean Carson, Mrs. Colleen Clark, Mrs. Dawn Derynoski-Anastasio, Mr. Zaya Oshana, Mr. Cecil Whitehead
   Board Members Absent: Mr. Joseph Baczewski
   Cabinet Members Present: Mr. Steven Madancy, Superintendent; Mrs. Jennifer Mellitt, Director of Business & Finance
   Student Board Representatives Present: Mr. Murad Alkatib, Miss Alexa Nowakowski, Miss Arshi Roy

4. **Pledge of Allegiance - Moment of Silence**
   Gary Thompson passed away on September 14, 2026.
   Mr. Thompson was hired in July 2005 as a custodian and retired in January 2016.

Katherine “Katie” Reeves passed away on October 7, 2026.
Mrs. Reeves was Principal of Thalberg Elementary School from July 2018 until she retired in June 2022.

Mr. Oshana recognized the elementary school shooting in Oregon that occurred and offered thoughts and prayers for those affected.

5. Approval of Minutes

a. September 24, 2026
MOTION made by Mrs. Carmody and seconded by Mrs. Clark, “Move to approve the BOE Minutes for September 24, 2026.” Motion carried 8-0.

b. September 30, 2026
MOTION made by Mrs. Clark and seconded by Mrs. Carmody, “Move to approve the BOE Special Meeting Minutes for September 30, 2026.” Motion carried 3-0. 5 abstentions.

MOTION made by Mrs. Colleen Clark and seconded by Mrs. Carmody, “Move to add item 10.g. to the agenda for Student Expulsion 2026-27-1.” Motion carried 8-0.

Mr. Baczewski arrived at 7:04 p.m.

6. Public Communications

a. Communications from Student Board Representatives
Miss Roy gave the District Report:

- South End Elementary will host its annual Halloween Carnival with games thanks to high school volunteers from the Key Club and National Honor society.
- Karen Smith Academy took a field trip to Southington Bread for Life and met Missy Cipriano who spoke about what Bread for Life offers for our community and building a partnership with Bread for Life. Allowing students to volunteer there throughout the school year.
- South End 5th graders travel to Sturbridge Village to participate in a day of hands-on learning in the Old Sturbridge Village.
- JFK's 8th graders participated in Grit and Wit last Friday, a team building activity with mental and physical challenges.
- September 15th through October 13th, the morning announcements highlighted influential Hispanic Americans in honor of National Hispanic Heritage Month.
- Unity Day will be recognized on October 21st for National Bullying Prevention Month where students and staff will wear orange to stand up against bullying.

- Flanders students are looking forward to the annual PTO Trunk or Treat event scheduled for October 23, 2026. The Flanders staff has a surprise in store for our students on Halloween day.
- Students at DePaolo began volunteering at the Calendar House, serving lunch to senior citizens and enjoying their conversations. Two students each day assist as part of the Leadership Program.
- Students at DePaolo were busy at the Apple Harvest Festival raising money for pediatric cancer research.
- Students from DePaolo were busy last night at the Bread for Life Annual Soup night fundraiser.
- Community Service Volunteers at DePaolo had their first meeting last week. Students will be completing various projects throughout the year to support Southington Community Services.

Miss Nowakowski gave the School Report:

- Southington High School's Sophomores and Juniors took the PSATs today.
- The Pep Rally was held on October 9, 2026.
- October 20, 2026, SHS will hold its annual fall concert featuring Symphonic Band, Chamber Singers, and Orchestra.
- October 21, 2026, the Math Team will be competing at Avon High School.
- The first quarter for SHS ends on October 29, 2026.
- National Honor Society and World Language Honor Society have inductions on October 22, 2026. There will be a first-generation college info session on how to navigate through the college process for students to be the first in their family to attend college.
- A Robotics competition (the Cyberknight Invitational) will be hosted at SHS this weekend. There will be teams from all over New England combined with STEAM offering free actives for kids.

Mr. Alkatib gave the Sports Report:

- Last week, the track teams held their senior meet, celebrating their seniors alongside their families.
- The girls' volleyball team hosted a Pink Out game in support of breast cancer awareness and came away with a great win against Maloney.
- The Marching Band continues to impress, earning outstanding results across multiple competitions these last few weeks.
- The girl's swim team had a successful week, defeating Conard yesterday while demonstrating their support for breast cancer survivors.
- The girls' soccer team battled to a tie against Berlin on Tuesday and will take on Wethersfield today.
- The boy's golf team is preparing to compete in the CCC Championship tomorrow, and Coach McAloon won CCC Golf Coach of the Year.

- The undefeated football team added another win to their season, defeating Manchester in their Pink Out game last Friday.

Mrs. Clark commented that the waiters and waitresses did an awesome job at the soup night; there service was amazing.

b. Communications from Board of Education

Mr. Brown reported that a committee was working to reestablish Southington High School's Sports Hall of Fame, which had been discontinued in 2015. Applications and bylaws are expected to be shared publicly in December.

Mr. Brown also mentioned the upcoming Wall of Honor celebration at the Aqua Turf on December 8, 2026, which will induct five new honorees and recognize past inductees in celebration of the program's 20th anniversary. Tickets are available for $60, and donations are being accepted.

Mr. Oshana mentioned that Mr. Pepe was absent from the meeting because he was attending a Principal of the Year celebration honoring Chris Palmieri, Principal of DePaolo Middle School.

Mr. Oshana wanted to give the public some facts about the upcoming elementary schools referendum; the goal is to provide factual information rather than advocate for or against the proposal. Mr. Oshana will publicize the information.

- How many meetings has the Facilities Committee held on this issue?
  20 meetings were held; all meetings were welcome to public. The public was welcome to come and speak at Board of Education meetings.
- What are the voters being asked to actually authorize?
  whether the Town should appropriate and authorize up to $86,675,560 in bonds and notes for the elementary facilities plan:
  - Construction of a new Kelly Elementary School
  - Completion of the lower level of South End Elementary School.
  - Closure of Flanders Elementary School property for the repurposing for municipal and community use.
- Is the ballet authorization the same as the current project estimate?
  Not exactly. The ballet question authorizes $86,675,560 and the phase one project estimate is $86,400,000.
- What does the work include if this referendum passes?
  - Construction of a new Kelly Elementary School, slightly larger than the current school, with four sections per grade and approximately 494 students.
  - Completion of five classrooms at the lower level of South End Elementary School. These classrooms would have exterior windows.

    - Closure of Flanders Elementary School no earlier than fall 2030, followed by repurposing the building and property for municipal and community use.
    - Attendance zones – redistricting finalizing in the Fall of 2029 being implemented in the Fall of 2030.
- How would the referendum affect the number of elementary classrooms?
  If the referendum passes, the district will net an increase of 3 elementary available classrooms. 15 classrooms would be lost with the closing of Flanders Elementary. There are currently 10 elementary classrooms available in the district, 6 additional classrooms would be added at the new Kelley Elementary, and five classrooms at South End Elementary. Students would move from the childhood center at Hatton and Strong to Kelley; this would open up seven classrooms. This would be a total gain of 18 classrooms.
- How much is the town expected to pay after reimbursement?
  The estimated local cost would be $39.7 million after state funds would come in. If the state approves the full state standard variance waivers, and the applicable pre-kindergarten reimbursement, the estimate to the local town would be $33,900,00. Mr. Madancy indicated there are some ineligible costs for the reimbursements with school construction projects.
- When would taxpayers see an estimated increase?
  The estimated impact would begin in 2029 and increase in 2030 as borrowing is phased in.
- What does the $900,000 annual savings estimate mean?
  the $900,000 annual per year figure has been described based on estimates in reductions in the annual Board Operating Costs if consolidations occur. This would be an estimated gross school district operating savings not verified net taxpayer savings.
- Has a final use for Flanders Elementary School been selected?
  No, the referendum states that the building and the property would be repurposed for municipal and community use, but no final program design, operating plan, or budget has been adopted yet.
- Are the costs of retaining and repurposing Flanders known?
  Not yet.
- What happens to the property of Flanders if the referendum is passed?
  The ballet language states that the building and the property would be repurposed for municipal and community use, not for sale for residential development.
- Why is the project being proposed now?
  The planning process we intended to modernize the three remaining older schools while considering enrollment, capacity, educational needs, existing building conditions, state reimbursement, and the town's ability to schedule major capital projects and debt.

- What do the district materials say would occur if the referendum does not pass?
  The district sites that the approximate 105.8 million to 116.4 million of identified capital improvements would need to be done for Kelley, Flanders, and Derynoski. This is based on the 2025 facilities condition assessment report. This would be repairing work alone.
- Does the proposal address every elementary school need.
  No, the referendum is described as phase 1 and focused on Kelley, South End and the consolidation associated with Flanders.
- If the referendum does not pass, would the district still move forward with redistricting or closing an elementary school?
  The Board would need to address the question at the time and determine the timing and format through formal action at public meetings. The imbalance in school utilization rates would continue if the referendum does not pass, this would need to be addressed at some point.
- Why was Flanders chosen as the school to close?
  Among the three buildings remaining needing significant capital work, Flanders was the most under utilized based on the facilities and enrollment studies.
- If the town still plans to use Flanders, how does closing it lead to capital improvement and savings?
  Beyond addressing underutilization, completing a new or fully renovated Flanders will require major work at once and could cause debt services to exceed the town's 9.5% policy limit. As a municipal building, capital improvements can be phased in overtime. The town could also consolidate agencies located in other buildings, potentially selling the other buildings and avoiding future capital needs for those buildings.
- Are class sizes in the district going to increase if Flanders closes?
  Class sizes are expected to remain within the Board of Education's guidelines as they are now.
- Will taxes increase if the project is approved?
  The first estimated tax increase would be in 2029.
- Is there enough capacity in the remaining schools to close one without the proposed additions to Kelley and South End?
  This answer is not definite yet. The enrollment projections used peak enrollment assumptions. Current enrollment is 2,599 students, 164 fewer than the projected 2,763. At 25 students per classroom, that difference is equivalent to at least 6 classrooms. In addition, 10 elementary school classrooms were eliminated through last year's budget. The ability to close a school would depend on grade level distribution, school locations, program needs, attendance boundaries and formal Board of Education action.
- What is the expected timeline if voters approve the referendum?
  2027-2028 the project development construction period, no tax increases.

2029, estimated tax impact begins, attendance zones expected to be finalized. 2030 anticipated opening of the new Kelley facility, the completion of South End and the closure of Flanders; consolidation would then be implemented.

- What facts are settled and which still remain as estimates or future decisions?
  The maximum appropriation is settled along with the inclusion of a new Kelley, South End build-out and the Flanders closure for the property to be used for municipal and community purposes. Current estimates known are the total project cost, state reimbursement, local share, tax impact, opening dates, capital needs, annual school operating savings.
  Future unknown decisions are final design and eligible costs, final attendance boundaries, the specific use of Flanders, renovations and operating costs for the reuse and the resulting net taxpayer's savings.
- What information should be updated publicly as the project advances?
  People need to be kept informed on the final state reimbursement and eligible cost determination, updated total and local share estimates, after design milestones and bidding is done, changes to the borrowing schedule and taxpayer impact, public processing criteria for the final boundaries, documented Flanders reuse plan, one time capital costs, annual operating costs, and expected offsets savings and a reconciliation of estimated gross school savings with municipal costs to show projected and net taxpayers savings.

Mr. Whitehead inquired about whether the referendum doesn't pass.
Mr. Oshana spoke about the 2025 facilities assessment and indicated we may not have the money for capital improvements, but we would need to find the money from the community.

c. Communications from Administration

Mr. Madancy spoke on the following:
Governor's Blue-Ribbon Commission on Connecticut Career Pathways.
The discussion focused on preparing students for occupations facing workforce shortages and helping students earn industry-recognized credentials. The presentation highlighted concerns about artificial intelligence, automation, changing job skills, employment prospects for recent college graduates, and the cost of higher education. Mr. Madancy emphasized the importance of preparing students to adapt to changing careers and evaluating the return on college investment.
Mr. Madancy shared some statistics regarding this matter.
Mr. Madancy also mentioned Mark Perna who has written a book titled *Asking Why*. Mr. Perna is one of the few people at the interception of economics and education.

Board members discussed the need to keep the curriculum relevant to future employment. Mr. Madancy cited existing opportunities such as the high school's EMT course and potential OSHA certifications that could help students enter the

workforce directly after graduation. Members also discussed the opportunities technology may create for entrepreneurship and advanced manufacturing.

Connecticut Seal of Civics Education
The Superintendent was invited by the Connecticut State Department of Education to participate in a focus group about the Connecticut Seal of Civics Education. The program recognizes students who complete qualifying civics coursework and civic engagement activities.

The Governor's Blue Ribbon Commission on Education Funding and Accountability, which is examining how the state funds public education.
The areas under review include:

- The Education Cost Sharing (ECS) formula and whether funding is distributed equitably.
- Special education funding, including concerns that reimbursement has consistently fallen short of the expected level.
- More effective and efficient ways for districts to provide special education services.
- How the costs of magnet schools and other school-choice programs should be shared.
- Accountability, operational efficiency, and reducing the burden of unfunded or costly mandates.

Mr. Madancy expressed concern that state education funding formulas have not kept pace with inflation and rising educational costs, leaving more of the burden on local taxpayers. The commission was expected to complete its work by January 17th and provide recommendations for consideration in the Governor's budget process.

Music of the Knight will be taking place on October 24, 2026. Mr. Madancy thanked members who have volunteered to present awards. Additional parking is expected to improve the event's logistics.

High school tennis courts and parking lot
The tennis court and parking lot project was reported to be approximately 95% complete. The light poles were installed but still needed to be connected to the electrical system. The court surfaces and fencing were completed, with some cleanup work remaining around drainage areas.

Mrs. Derynoski-Anastasio asked whether the project was on budget and why it had taken longer than anticipated. Mr. Madancy agreed to follow up and report back to the Board on the project's budget status and timeline.

d. Communications from Public - Agenda Items Only
No comment made.

7. Committee Reports

a. Policy & Personnel Committee Meeting - September 29, 2026
Mrs. Dawn Derynoski-Anastasio reviewed the minutes from the meeting. She gave a summary of the following items:

- Review Policy 3542.1 - Purposes and Facilities - Food Service
- Review Policy 4215 - Emergency Action Plan for Athletic Events
- Review Policy 5114 - Student Discipline
- Review Policy 5123 and R5123 - Promotion and Retention
- Policy 5132 – Dress and Grooming
- Review Policy 5141.8 - Students with Special Health Care Needs
- Policy 5144.1 Physical Restraint and Seclusion of Students and Use of Exclusionary Time Out
- Policy 6163 – Instructional Recourses for Teachers – Live Animals in Classrooms
- Job descriptions:
    - High School Department Facilitator
    - Supervisor of Deaf Education & Audiology Services
    - Agricultural Facilities Assistant

The minutes for the meeting are attached.

Mrs. Clark questioned the use of the term “members tardy” in committee minutes and asked whether this represented a new Board practice. Mr. Oshana agreed to review the matter and follow up.

Mr. Carson requested clarification about the Agricultural Facilities Assistant position's funding and compensation. The administration subsequently stated that the position was expected to be hourly, paid through the ASTE Grant, involve 15–20 hours per week, and pay $20–$25 per hour.

Board members expressed support for the current approach and discussed the importance of teaching responsible technology to use as students’ progress from middle school to high school. Members noted that the high school pilot had expanded to full implementation and that initial reports indicated few problems. The Board planned to continue monitoring the policy's effectiveness.

8. Superintendent's Report

a. Personnel Report

MOTION made by Mrs. Carmody and seconded by Mr. Baczewski, "Recommend that the Board of Education approve the Personnel Report as submitted by the Human Resource Department." Motion carried 9-0.

9. Old Business

a. Town Government Communications

No comment made.

10. New Business

a. Review Policy 3542.1 - Purposes and Facilities - Food Service - REVISED - First Reading

b. Review Policy 4215 - Emergency Action Plan for Athletic Events - NEW - First Reading

c. Review Policy 5114 - Student Discipline - REVISED - First Reading

d. Review Policy 5123 - Promotion and Retention - REVISED - First Reading

e. Review Policy 5141.8 - Students with Special Health Care Needs - NEW - First Reading

f. Approval of Job Descriptions

1. High School Department Facilitator – REVISED

MOTION made by Mrs. Derynoski-Anastasio and seconded by Mr. Baczewski, "Move that the Board of Education approve the job description presented by the administration as presented by the Policy and Personnel Committee." Motion carried 9-0.

2. Supervisor of Deaf Education & Audiology Services – NEW

MOTION made by Mrs. Derynoski-Anastasio and seconded by Mr. Brown, "Move that the Board of Education approve job description for Supervisor of Deaf Education & Audiology Services as presented by the Policy and Personnel Committee." Motion carried 9-0.

3. Agricultural Facilities Assistant – NEW

MOTION made by Mrs. Derynoski-Anastasio and seconded by Mr. Baczewski, "Move that the Board of Education approve the description for Agricultural Facilities Assistant as presented by the Policy and Personnel Committee." Motion carried 9-0.

g. Student Expulsion 2026-27-1
MOTION made by Mrs. Clark and seconded by Mrs. Carmody, "Move for expulsion of student 2026-27-1 for the school year." Motion carried 8-0. 1 abstention.

11. Public Communications

a. Public
Shama Greene, 67 Memorial Drive, Southington, CT 06489.
Ms. Greene spoke about the upcoming elementary school referendum. She inquired about clear communication with the public, evidence being presented, a timeline, alternative plans, and public accountability. Families still have unanswered questions about the future of Southington's elementary schools. She urged the Board to prioritize students and families as the community prepares to vote.

12. Adjournment
MOTION made by Mrs. Clark and seconded by Mr. Baczewski, "Move to adjourn". Motion carried 9-0.
Meeting adjourned at 8:12 p.m.

Respectfully submitted,



Recording Secretary

SOUTHINGTON Public Schools

Steven G. Madancy
Superintendent of Schools

Frank M. Pepe
Assistant Superintendent of Schools

200 North Main Street, Southington, CT 06489 www.southingtonschools.org Phone: 860-628-3202 Fax: 860-628-3205

Board of Education Southington, Connecticut

Policy & Personnel Committee Meeting

DRAFT Minutes

Public Assembly Room – Technology Training Lab
Municipal Center, 200 North Main Street

Tuesday, September 29, 2026 - 5:30pm

Members Present: Dawn Derynoski-Anastasio (Chair), Bob Brown, Cecil Whitehead

Members Tardy: Joe Basczewski (6:05 PM)

Additional BOE Member Present: Board Chair Zaya Oshana

Administration Present: Assistant Superintendent - Frank Pepe, HR Manager - Michelle Passamano, Director of Pupil Services – Amy Aresco, SHS Principal – Rich Aroian, SPED Coordinator – Cathy Goralski, Ag Science Program Director – Owen McLaughlin

The meeting was called to order at 5:30 PM.

Revisions to **Policy 3542.1 - Purposes and Facilities – Food Service** were reviewed. Language was added to allow the Board the right to send parental information of any bad debt to a debt collection agency after June 30th of the current school year to collect any unpaid meal charges. The addition of this language is in response to, as of July 1, 2026, the food service department can no longer cover the bad debt and instead any negative balance must be paid by the Board of Education.

Policy 4215 - Emergency Action Plan for Athletic Events was presented as a new policy. This action plan delineates roles and responsibilities if a student sustains a serious injury or illness while participating in an interscholastic or intramural athletic event.

Revisions to **Policy 5114 - Student Discipline** were reviewed. The two changes were additions of language. The first is found on page four and is the word "serious" in reference to physical harm. The second is found on page 18 and is the addition of the words "or second". This qualifier prompts the Board to provide tutoring for a student expelled twice. This is historically consistent with Board practice.

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Revisions to **Policy 5123** and **R5123 – Promotion and Retention** were reviewed. Adjustments to the policy sustain collaboration with parents regarding the placement or retention of a student. However, the final decision of teacher, grade and or team lies with the principal. The associated regulations were updated to reflect the 25-credit requirement for graduation.

Policy 5132– Dress and Grooming was reviewed with no changes noted. However, the regulations were updated based on work conducted by the high school administration and established constituent groups which began last year. The new regulations clearly define acceptable attire for students and are applicable at each level.

Policy 5141.8 – Students with Special Health Care Needs was presented as a new policy although the practices captured within are not new. This is evidenced by the reviewed regulation which is the current working form used by nurses across the district at each level. No changes were made to **R5141.8.**

Policy 5144.1 Physical Restraint and Seclusion of Students and Use of Exclusionary Time Out was reviewed and no changes were offered. The associated regulations were updated with a slight language modification because of current legislation. The change shifts the attempt to contact a parent, because of a student restraint or seclusion, from within 24 hours to an attempt immediately and on the same day.

Policy 6163– Instructional Resources for Teachers – Live Animals in Classrooms was reviewed with no changes suggested. However, the associated regulations are all new and define the role of service animals and service animal handlers within the school setting.

An updated job description for **High School Department Facilitator** was reviewed. This role already exists in the teacher's contract and is restricted to three departments, special education, math and English. The descriptions offered accurately capture the current roles and responsibilities.

The **Supervisor of Deaf Education & Audiology Services** was presented as a new job description. This new role is a result of a shift in contracted services which created a gap in calibrating equipment. It is more cost effective to perform the related tasks in-house. The new job description captures the roles and responsibilities which have evolved since the shift in services.

DRAFT

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The new job description for an **Agricultural Facilities Assistant** was presented. This additional position is directly linked to the new barn on Pleasant Street. The associated costs for the position are funded directly through the AgSci grant.

The committee was introduced to Shipman's model policy - Use of Private Technology Devices by Students, CABE's model policy 5131.81 – Personal Technology Use in Schools, Cheshire Public Schools sample policy – 5131.81 – Personal Technology Use in Schools/Cellular Phones/Electronic Communication Devices and Wallingford Public Schools sample policy – 5131.81 – Cellular Phones/Electronic Communication Devices. The common thread for all these policies is the aim to mitigate the negative impact of unrestricted access to personal technology in school.

Current practice including expectations, process and associated discipline for each level in Southington was presented and discussed. The middle levels practice has been in place for the past three years and the high school began a pilot last year with full implementation this year. Essentially student cell phones, PreK-8 are powered down during the entire school day including lunch and are out of sight. The high school allows cell phones during passing time, the second half of an 88-minute study hall block and during lunch. Otherwise, cell phones are completely restricted.

The Committee agreed to forward all the agenda items above for full BOE review and further consideration.

Meeting adjourned – 6:50 p.m.

Respectfully Submitted,
Frank Pepe

DRAFT

Board of Education

Administrative Report

October 29, 2026

1. Music of the Knight
2. Budget Meetings
3. Convocation and Professional Development
4. Special Education Coordinator Interviews

SOUTHINGTON Public Schools

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Superintendent of Schools

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Southington Board of Education
Curriculum & Instruction Committee Meeting Minutes
Wednesday October 21, 2026 – 1:00 p.m.
Technology Training Lab (Public Assembly Room)
Municipal Center, 200 North Main Street
Southington, CT 06489

Members Present: Bob Brown, Terri Carmody, Colleen Clark, Dawn Anastasio.

Member Absent: N/A

Administration Present: Director of Teaching and Learning, Dr. Christina Zlatin.

School Staff Present: SHS Health and PE Department Leader, Tony Loomis; SHS English Department Leader, Rebecca Migliaro; SHS Science Assistant Department Leader, Dr. Lisa Daigle; SHS Science Department Leader, Nicole Raccio; SHS Social Studies Department Leader, Heather Allenback.

The meeting was called to order at 12:57 PM by Bob Brown.

SHS Physical Education - Unit 2, Recreational Lifetime Activities– Revised Curriculum
Tony Loomis, SHS Health and PE Department Leader, presented the new outdoor archery component of the Recreational Lifetime Activities unit for PE II. The addition of outdoor archery supports the department's vision, mission, and beliefs; helps students develop movement identities; and aligns to national standards. The unit emphasizes safety practices in instruction and assessment, including first teaching whistle commands without equipment. Teachers implementing outdoor archery must be trained through the National Archery in the Schools Program. Students have a choice to learn archery, and teachers must approve students who select this option. Equipment is designed specifically for schools. The Committee unanimously agreed to forward this item to the full Board for review.

SHS English - Novel Proposal
Rebecca Migliaro, SHS English Department Leader, shared as an informational item a new required text, *Everyday* by David Levithan, for the 12th grade Humanities elective course. The plot follows an individual who wakes up in a different person's body each day. It directly supports course themes such as what makes us human and includes topics such as substance abuse but has no graphic content. Families of students in the Humanities course will receive communication about the text.

SHS Energy in the Environment - Unit 2, Energy Flow from Earth's Systems – New Curriculum
Dr. Lisa Daigle, SHS Science Assistant Department Leader, presented a new unit for the one-semester course, Energy in the Environment. The unit uses a recent national event, the Texas power crisis of 2021, as a phenomenon to guide students learning about energy. Students learn through simulations, data analysis, and models as they develop arguments and solutions to real-world problems. The Committee unanimously agreed to forward this item to the full Board for review.

Board of Education
Zaya Oshana, *Board Chairperson* – Terri Carmody, *Vice Chairperson* – Dawn Derynoski-Anastasio, *Secretary*
Joseph Baczewski – Robert Brown – Lisa Cammuso – Sean Carson – Colleen Clark – Cecil Whitehead

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200 North Main Street, Southington, CT 06489 ❖ www.southingtonschools.org ❖ Phone: 860-628-3202 ❖ Fax: 860-628-3205

SHS Accelerated General Chemistry - Unit 1, Illuminating Matter – New Curriculum

Dr. Lisa Daigle, SHS Science Assistant Department Leader, presented a new chemistry unit in which students study the lightbulb to understand fundamental concepts in chemistry, including the structure and properties of matter, periodic trends, and wave properties. Through their study, students learn how light bulbs produce light, how different types of bulbs produce different colors of light, and how properties of matter make some elements good for light bulbs. The Committee unanimously agreed to forward this item to the full Board for review.

SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACC – Revised Curriculum
SHS Earth Science – Unit 4, Astronomy - Guest Stars and the Big Bang ACA – Revised Curriculum

Nicole Raccio, SHS Science Department Leader, presented a revised unit for the 9th grade Earth Science course, academic and accelerated levels. The unit integrates earth science and physical science standards as students study the phenomenon of the guest star, a star that has been in the sky and then disappears. Students use this phenomenon to develop understandings of the properties of light as well as matter and forces within stars. Students in the accelerated course extend their learning to study how the universe is changing. The Committee unanimously agreed to forward this item to the full Board for review.

SHS Earth Science – Unit 2, Climate Change and Human Impact ACC – New Curriculum

Nicole Raccio, SHS Science Department Leader, presented a new Earth Science unit that uses the phenomenon of rising sea levels to deepen students' understanding of climate change. Students explore evidence of rising sea levels, develop an understanding of the cause, and evaluate potential solutions to slow polar ice melt. There are opportunities for students to apply their learning on performance tasks throughout the unit. The Committee unanimously agreed to forward this item to the full Board for review.

SHS Social Studies - Current Issues - Revised

Heather Allenback, SHS Social Studies Department Leader, presented a revised curriculum for the one-semester course, Current Issues. Throughout the course, there is an emphasis on evaluating information, recognizing bias, and participating responsibly in civic life. All students participate in two core units, and three additional units are selected by each class from the following options: "Artificial Intelligence & Creativity"; "Bridging the Gap: Income Inequality in the US"; "Climate in Crisis"; "Displaced Dreams: Refugees"; "Hot Spots: Political Issues of the 21st Century"; "Mind Matters: Mental Health & Social Media"; "Safeguarding Society: Navigating Public Safety"; "The State of Education"; and "Who Owns Culture?" The Committee unanimously agreed to forward this item to the full Board for review.

SHS Social Studies - American Culture - Revised Curriculum

Heather Allenback, SHS Social Studies Department Leader, presented a revised curriculum for American Culture. The course teaches US history from the 1950s through the first quarter of the 21st century, through the lens of US culture and identity. Students use historical sources and materials from popular culture to understand who we are, what we value, and how Americans understand their place in society. The Committee unanimously agreed to forward this item to the full Board for review.

SHS Social Studies - Criminal Justice CLC - Textbook Overview

Heather Allenback, SHS Social Studies Department Leader, presented as an informational item a free, online, open-source textbook to support a new concurrent enrollment Criminal Justice course offered in partnership with the University of Bridgeport. The text is: R. Supplee, et al. *Introduction to the American Criminal Justice System: An Equity Lens*. Open Oregon Educational Resources, 2025. This is a college-level textbook and selected chapters are used in the course. The textbook was previously approved by Mr. Madancy.

Board of Education
Zaya Oshana, *Board Chairperson* – Terri Carmody, *Vice Chairperson* – Dawn Derynoski-Anastasio, *Secretary*
Joseph Baczewski – Robert Brown – Lisa Cammuso – Sean Carson – Colleen Clark – Cecil Whitehead

SOUTHINGTON Public Schools

Steven G. Madancy
Superintendent of Schools

Frank M. Pepe
Assistant Superintendent of Schools

200 North Main Street, Southington, CT 06489 ❖ www.southingtonschools.org ❖ Phone: 860-628-3202 ❖ Fax: 860-628-3205

SHS New Course Enrollment

Dr. Christina Zlatin, Director of Teaching and Learning, presented as an informational item an overview of course enrollment for new SHS courses approved since 2023-2024. Committee members posed questions about the implementation timeline, vendor, enrollment cap, and funding for the Emergency Medical Technician course; this information will be provided in follow-up communication.

The meeting adjourned at 2:25 PM.

Respectfully Submitted,

Christina L. Zlatin, Ed.D.
Director Of Teaching and Learning

Board of Education
Zaya Oshana, *Board Chairperson* – Terri Carmody, *Vice Chairperson* – Dawn Derynoski-Anastasio, *Secretary*
Joseph Baczewski – Robert Brown – Lisa Cammuso – Sean Carson – Colleen Clark – Cecil Whitehead

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only _____ **Board Meeting Date** October 29, 2026

Decision Requested X **Agenda Code** 8 b.

AGENDA REPORTING FORM

Agenda Topic: Policy 3542.1 – Purposes and Facilities – Food Service - Revised – Second Reading.

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 3542.1 – Purposes and Facilities – Food Service - Revised.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve Policy 3542.1 as presented by the Policy & Personnel Committee.

Titles of Attachments:

1. DRAFT Policy 3542.1

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Policy 3542.1
Purposes and Inventories – Food Service
Revised Policy
Draft

Purposes and Facilities: Food Service

The goal of the District's food services program is to provide students with nutritious and healthy foods that enhance learning.

The Southington Board of Education (Board) has an agreement with the Connecticut State Department of Education to participate in one or more school Child Nutrition Programs and accepts full responsibility for adhering to the federal and state guidelines and regulations pertaining to these school Child Nutrition Programs. The Board also accepts full responsibility for providing free or reduced-price meals to eligible elementary and secondary students enrolled in the District's schools. Applicants for such meals are responsible to pay for meals until the application for the free or reduced-price meals is completed and approved. All applications for free and reduced-price lunch and any related information is considered strictly confidential and not to be shared outside of the District's food services program.

Meals are planned to meet the specified nutrient standards outlined by the United States Department of Agriculture for children based on their age or grade group.

Because of the District's participation in the Child Nutrition Programs, the Board approves the establishment of a system to allow a student to charge a meal.

The Board realizes that funds from the nonprofit school food service account, according to federal regulations, cannot be used to cover the cost of charged meals that have not been paid.

Moreover, federal funds are intended to subsidize the meals of children and may not be used to subsidize meals for adults (teachers, staff and visitors). Adults are not allowed to charge meals and shall pay for such meals at the time of service or through prepaid accounts.

The Board prohibits the public identification or shaming of a child/student for any unpaid charges, including, but not limited to, the following:

- Delaying or refusing to serve a meal to such student,
- Designating a specific meal option for such student or otherwise taking any disciplinary action against such student.

Charging

A student needing to charge a meal will be informed of his/her right to purchase a meal, which may exclude a la carte items, for any school breakfast, lunch or other feeding.

To sustain the District's food services program, the District cannot permit the excessive charging of student meals. Therefore, any charging of meals must be consistent with this policy and any accompanying regulations. The Superintendent or his/her designee shall develop regulations designed to effectively and respectfully address family responsibility for unpaid meals.

Any parent/guardian who anticipates a problem with paying for meals is encouraged to contact the Food Services ~~Manager/~~Director ~~and/or the applicable school Principal~~ for assistance. The Board encourages all families who may have a child eligible for free or reduced-price lunch to apply.

Elementary and Secondary Students

1. The District uses an automated prepayment system, which allows parents/guardians to view their child's meal account balance and purchases, receive low-balance notifications, as well as, make deposits, to their child's school meal account. Any student whose account has insufficient funds (i.e., is at the charging limit) and does not bring a meal from home may charge any combination of meals. Negative balance status can be avoided by making a payment in the form of cash, check, or by credit card to the automated prepayment website.

2. All other a-la-carte items shall not be charged. After thirty charges, the parents/guardians of such child will be referred to the District's homeless education liaison. When a charge is incurred, a written notification shall be sent home to parents. All credited meals must be repaid.

Purposes and Facilities: Food Service

Charging (continued)

3. No student shall be deprived of a reimbursable meal due to forgotten or lost meal money. ~~The Principal or his/her designee is responsible for collecting money loaned to students.~~ Students will be responsible for repaying all loaned money within an established timeframe. ~~A note shall be given to the student to take home or mailed to the student's home to inform parents of the loan obligation.~~ In situations in which a student is consistently without meal money, the Principal or his/her designee should encourage the parent/guardian to apply for free or reduced price meals.

4. All charges must be paid in 10 days. Parents will be notified and asked for prompt payment after 3 charges.

5. Communications with parents/guardians regarding collection of a child's unpaid meal charges shall include information on local food pantries, application for free or reduced-price meals and the Department of Social Services' supplemental nutrition assistance program and a link to the District's website that lists any community services available to town/city residents.

Purposes and Facilities: Food Service

Charging (continued)

Delinquent Debt and Bad Debt

The District's efforts to recover from households money owed due to the charging of meals must not have a negative impact on the children involved and shall focus primarily on the adults in the household responsible for

providing funds for meal purchases. The school food authority is encouraged to consider whether the benefits of potential collections outweigh the costs which would be incurred to achieve those collections. Money owed because of unpaid meal charges shall be considered "delinquent debt," as defined, as long as it is considered collectable and reasonable efforts are being made to collect it. Such debt must be paid by June 30, effective within the current school year.

After reasonable attempts are made to collect the delinquent debt, and it is determined that further collection efforts are useless or too costly, the debt must be reclassified as "bad debt." Such debt shall be written off as an operating loss not to be absorbed by the nonprofit school food service account but must be restored using non-federal funds.

Definitions

"Delinquent Debt" are unpaid meal charges, like any other money owed to the nonprofit school food service account when payment is overdue, as defined by state or local policies.

"Bad Debt" are when unpaid meal charges are not collected and are considered a loss. Such debt must be written off as an operating loss, which cannot be absorbed by the nonprofit school food service account, but must be restored using nonfederal funds.

The Board will accept gifts, donations, or grants from any public or private sources for the purpose of paying off any unpaid charges for school meals.

The Board reserves the right to send parental information of any "bad debt" to a debt collection agency after June 30th of the current school year in an effort to collect any unpaid meal charges.

Purposes and Facilities: Food Service

Dissemination of Policy

This policy shall via an electronic post on each school's web page.

This policy shall be available to all households at all times via student/parent handbooks, on online portals that households use to access student accounts, placed on the District's website, on the website of each school, and published at the beginning of each school year at the time information is distributed regarding free and reduced price meals and again to the household the first time the policy is applied to a specific child.

This policy shall be provided to all school staff and/or school food authority staff responsible for its enforcement. In addition, school social workers, nurses, the homeless liaison, and other staff members assisting children in need or who may be contacted by families with unpaid meal charges also should be informed of this policy.

The District's school food authority shall maintain, as required, documentation of the methods used to communicate this policy to households and school or school food authority-level staff responsible for policy enforcement.

Legal Reference: Connecticut General Statutes

10-215 Lunches, breakfasts and other feeding programs for public school children and employees. (as amended by PA 21-46)

10-215a Nonpublic school and nonprofit agency participation in feeding programs.

10-215b Duties of State Board of Education re feeding

programs. State Board of Education Regulations:

State of Connecticut, Bureau of Health/Nutrition, Family Services and Adult Education Operational Memorandum No. 4-17, "Guidance on Unpaid Meal Charges and Collection of Delinquent Meal Payments," Nov. 2, 2016

Operational Memorandum #19-10, State of Connecticut, Bureau of Health/Nutrition, Family Services and Adult Education "Unallowable Charges to No-profit School Food Service Accounts and the Serving of Meals to No paying Full and Reduced Price Students"
National School Lunch Program and School Breakfast Program; Competitive

Foods. (7 CFR Parts 210 and 220, Federal Register, Vol 45 No. 20, Tuesday, January 29, 1980, pp 6758-6772

USDA Guidance:

SP 46-2016, "Unpaid Meal Charges: Local Meal Charge Policies"

SP 47-2016, "Unpaid Meal Charges: Clarification on Collection of Delinquent Meal Payment"

SP 57-2016 "Unpaid Meal Charges: Guidance and Q and A"

SP 58-2016 "2016 Edition: Overcoming the Unpaid Meal Challenge: Proven Strategies from Our Nation's Schools"

Policy adopted: October 1988

Policy reviewed: April 2003

Policy revised: February 2022
Policy revised: November 2023

Policy revised: September 2026

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only _____ **Board Meeting Date** October 29, 2026

Decision Requested X **Agenda Code** 8 c.

AGENDA REPORTING FORM

Agenda Topic: Policy 4215 – Emergency Action Plan for Athletic Events - NEW – Second Reading.

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 4215 – Emergency Action Plan for Athletic Events - NEW.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve Policy 4215 as presented by the Policy & Personnel Committee.

Titles of Attachments:

1. DRAFT Policy 4215

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Policy 4215
Emergency Action Plan for Athletic Events
NEW Policy
Draft

Series 4000: Personnel

NEW DRAFT POLICY

Emergency Action Plan for Athletic Events

The Southington Board of Education (the "Board"), in consultation with local emergency medical services providers and allied health professions, authorizes the Administration to develop an emergency action plan to be followed in the event that a student sustains a serious injury or illness while participating in an interscholastic or intramural athletic event. Such plan shall include, but need not be limited to, the following components:

a) A list of the school employees, coaches or licensed athletic trainers in each school who will be responsible for implementing the emergency action plan and a description of each person's responsibilities under the plan;

b) Identification of the location(s) or venue(s) where the interscholastic or intramural athletic event is taking place;

c) A description of the equipment and supplies that may be available at the site of the interscholastic or intramural athletic event that will assist in responding to an emergency, including the location of where such equipment and supplies may be found at such site;

d) A description of the procedures to be followed when a student sustains a serious sports-related injury, including, but not limited to, responding to the injured student, summoning emergency medical care, assisting local first responders in getting to the injured student and documenting the actions taken during the emergency;

e) A description of the protocols to be followed during cardiac or respiratory emergencies, including the operation of an automatic external defibrillator, use of cardiopulmonary resuscitation or the administration of medication, in accordance with applicable state law and Board policy;

f) A description of the protocols to be followed when a student is observed to exhibit signs, symptoms or behaviors consistent with a concussion or is diagnosed with a concussion, in accordance with applicable state law and Board policy;

g) A description of the protocols to be followed when a student suffers from a traumatic brain injury or spinal cord injury, provided such protocols are designed to include instructions that are based on the level of training of the person implementing the emergency action plan and are in accordance with best practices and state law; and

h) A description of the protocols to be followed in the event of heat and cold-related emergencies, provided such protocols are in accordance with current professional standards.

Series 4000: Personnel

NEW DRAFT POLICY

Emergency Action Plan for Athletic Events

In developing the emergency action plan, the Administration may also consult recommendations from the governing authority for intramural and interscholastic athletics.

The Board shall annually review such emergency action plan and authorize the Administration to update such plan, as necessary. Any school employee, coach or licensed athletic trainer identified in the emergency action plan shall (1) annually rehearse such emergency action plan, and (2) be certified in cardiopulmonary resuscitation and have completed a course in first aid offered by the American Red Cross, the American Heart Association, the Department of Public Health, any director of health, or an organization using guidelines for first aid published by the American Heart Association and the American Red Cross.

The Board shall distribute the emergency action plan to all school employees, coaches and licensed athletic trainers identified in the emergency action plan. The Board shall also post such emergency action plan in all athletic facilities and at all sites where interscholastic and intramural athletic events will take place, and make such emergency action plan available on the Internet web site for the school district or school.

Legal References

- Conn. Gen. Stat. § 10-212i. Emergency action plans for serious and life-threatening sports-related injuries during interscholastic and intramural athletic events
- Connecticut Association of Schools, Connecticut Interscholastic Athletic Conference, Medical Handbook 2022-2023, available at https://www.casciac.org/pdfs/CIAC_medical_handbook22-23.pdf.

Policy adopted: September 2026

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only _____ **Board Meeting Date** October 29, 2026

Decision Requested X **Agenda Code** 8 d.

AGENDA REPORTING FORM

Agenda Topic: Policy 5114 – Student Discipline - Revised – Second Reading.

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 5114 – Student Discipline - Revised.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve Policy 5114 as presented by the Policy & Personnel Committee.

Titles of Attachments:

1. DRAFT Policy 5114

Frank Ryan
Signature of Staff Member Submitting Report

Peter Madaras
Signature of Superintendent of Schools

Policy 5114
Student Discipline
Revised Policy
Draft

Series 5000

STUDENT DISCIPLINE

It is the policy of the Southington Board of Education (the "Board") to create a school environment that promotes respect of self, others, and property within the Southington Public Schools (the "District"). Compliance with this policy will enhance the Board and the District's ability to maintain discipline and reduce interference with the educational process that can result from student misconduct. Pursuant to this policy, the District shall promote the utilization of consistent discipline practices, both within and across schools in the District, while also promoting the consideration of individual circumstances arising in each student disciplinary matter. Where appropriate, the District implements strategies that teach, encourage and reinforce positive student behavior that do not require engagement with the discipline system.

I. Definitions

A. **Cannabis** means marijuana, as defined by Conn. Gen. Stat. § 21a-240.
B. **Dangerous Instrument** means any instrument, article or substance which, under the circumstances in which it is used or attempted or threatened to be used, is capable of causing death or serious physical injury, and includes a "vehicle" or a dog that has been commanded to attack.
C. **Deadly Weapon** means any weapon, whether loaded or unloaded, from which a shot may be discharged, or a switchblade knife, gravity knife, billy, blackjack, bludgeon or metal knuckles. A weapon such as a pellet gun and/or air soft pistol may constitute a deadly weapon if such weapon is designed for violence and is capable of inflicting death or serious bodily harm. In making such determination, the following factors should be considered: design of weapon; how weapon is typically used (e.g. hunting); type of projectile; force and velocity of discharge; method of discharge (i.e. spring v. CO2 cartridge) and potential for serious bodily harm or death.
D. **Electronic Defense Weapon** means a weapon which by electronic impulse or current is capable of immobilizing a person temporarily, but is not capable of inflicting death or serious physical injury, including a stun gun or other conductive energy device.
E. **Emergency** means a situation in which the continued presence of the student in school poses such a danger to persons or property or such a disruption of the educational process that a hearing may be delayed until a time as soon after the exclusion of such student as possible.
F. **Exclusion** means any denial of public school privileges to a student for disciplinary purposes.
G. **Expulsion** means the exclusion of a student from school privileges for more than ten (10) consecutive school days and shall be deemed to include, but not be limited to, exclusion from the school to which such pupil was assigned at the time such disciplinary action was taken. The expulsion period may not extend beyond one (1) calendar year.

H. **Firearm**, as defined in 18 U.S.C § 921, means (a) any weapon (including a starter gun) that will, is designed to, or may be readily converted to expel a projectile by the action of an explosive, (b) the frame or receiver of any such weapon, (c) a firearm muffler or silencer, or (d) any destructive device. The term firearm does not include an antique firearm. As used in this definition, a "**destructive device**" includes any explosive, incendiary, or poisonous gas device, including a bomb, a grenade, a rocket having a propellant charge of more than four ounces, a missile having an explosive or incendiary charge of more than one-quarter ounce, a mine, or any other similar device; or any weapon (other than a shotgun or shotgun shell which the Attorney General finds is generally recognized as particularly suited for sporting purposes) that will, or may be readily converted to, expel a projectile by explosive or other propellant, and which has a barrel with a bore of more than ½" in diameter. The term "destructive device" also includes any combination of parts either designed or intended for use in converting any device into any destructive device and from which a destructive device may be readily assembled. A "destructive device" does not include: an antique firearm; a rifle intended to be used by the owner solely for sporting, recreational, or cultural purposes; or any device which is neither designed nor redesigned for use as a weapon.

I. **In-School Suspension** means an exclusion from regular classroom activity for no more than ten (10) consecutive school days, but not exclusion from school, provided such exclusion shall not extend beyond the end of the school year in which such in-school suspension was imposed. No student shall be placed on in school suspension more than fifteen (15) times or a total of fifty (50) days in one (1) school year, whichever results in fewer days of exclusion.

J. **Generative Artificial Intelligence ("AI")** refers to a technology system, including but not limited to ChatGPT, capable of learning patterns and relationships from data, enabling it to create content, including but not limited to text, images, audio, or video, when prompted by a user.

K. **Protected Class Harassment** is a form of discrimination on the basis of any protected characteristic (or protected class) including race, color, religion, age, sex, sexual orientation, marital status, national origin, alienage, ancestry, disability, pregnancy, gender identity or expression, veteran status, status as a victim of domestic violence, or any other basis prohibited by state or federal law ("Protected Class"). Harassment constitutes unlawful discrimination when it creates a hostile environment, which occurs when the harassment is sufficiently severe, pervasive, or persistent so as to interfere with or limit a student's ability to participate in or benefit from the services, activities, or opportunities offered by a school. Harassment does not have to include intent to harm, be directed at a specific target, or involve repeated incidents. Harassment against any individual on the basis of that individual's association with someone in a Protected Class may be a form of Protected Class harassment.

L. **Martial Arts Weapon** means a nunchaku, kama, kasari-fundo, octagon sai, tonfa or chinese star.

M. **Removal** is the exclusion of a student from a classroom for all or part of a single class period, provided such exclusion shall not extend beyond ninety (90) minutes.
N. **School Days** shall mean days when school is in session for students.
O. **School-Sponsored Activity** means any activity sponsored, recognized or authorized by the Board and includes activities conducted on or off school property.
P. **Seriously Disruptive of the Educational Process**, as applied to off-campus conduct, means any conduct that markedly interrupts or severely impedes the day to-day operation of a school.
Q. **Suspension** means the exclusion of a student from school and/or transportation services for not more than ten (10) consecutive school days, provided such suspension shall not extend beyond the end of the school year in which such suspension is imposed; and further provided no student shall be suspended more than ten (10) times or a total of fifty (50) days in one school year, whichever results in fewer days of exclusion, unless such student is granted a formal hearing as provided below.
R. **Weapon** means any BB gun, any blackjack, any metal or brass knuckles, any police baton or nightstick, any dirk knife or switch knife, any knife having an automatic spring release device by which a blade is released from the handle, having a blade of over one and one-half inches in length, any stiletto, any knife the edged portion of the blade of which is four inches and over in length, any martial arts weapon or electronic defense weapon, or any other dangerous or deadly weapon or instrument, unless permitted by law under Section 29-38 of the Connecticut General Statutes.

Notwithstanding the foregoing definitions, the reassignment of a student from one regular education classroom program in the district to another regular education classroom program in the district shall not constitute a suspension or expulsion.

For purposes of this policy, references to "school", "school grounds" and "classroom" shall include physical educational environments, including on school transportation, as well as environments in which students are engaged in remote learning, which means instruction by means of one or more Internet-based software platforms as part of a remote learning model.

II. Scope of the Student Discipline Policy

A. Conduct on School Grounds or at a School-Sponsored Activity:

1. Suspension. Students may be suspended for conduct on school grounds or at any school-sponsored activity that violates a publicized policy of the Board or is seriously disruptive of the educational process or endangers persons or property.
2. Expulsion. Students may be expelled for conduct on school grounds or at any school-sponsored activity that either (1) violates a publicized policy

of the Board and is seriously disruptive of the educational process, or (2) endangers persons or property.

B. Conduct off School Grounds:

1. Discipline. Students may be disciplined, including suspension and/or expulsion, for conduct off school grounds if such conduct **violates a publicized policy of the Board and is seriously disruptive of the educational process**.

C. Seriously Disruptive of the Educational Process:

1. In making a determination as to whether such conduct is seriously disruptive of the educational process, the Administration and the Board of Education may consider, but such consideration shall not be limited to, the following factors: (1) **whether the incident occurred within close proximity of a school**; (2) **whether other students from the school were involved or whether there was any gang involvement**; (3) **whether the conduct involved violence, threats of violence, or the unlawful use of a weapon**, as defined in Section Conn. Gen. Stat. § 29-38, and **whether any injuries occurred**; and (4) **whether the conduct involved the use of alcohol**. The Administration and/or the Board of Education may also consider (5) **whether the off-campus conduct involved the illegal use of drugs**.
2. A student shall not have greater discipline, punishment, or sanction for the use, sale, or possession of cannabis on school property than a student would face for the use, sale, or possession of alcohol on school property, except as otherwise required by applicable law.

III. Actions Leading to Disciplinary Action, including Removal from Class, Suspension and/or Expulsion

Conduct that is considered to violate a publicized policy of the Board of Education includes the offenses described below. Any such conduct may lead to disciplinary action (including, but not limited to, removal from class, suspension and/or expulsion in accordance with this policy):

1. Striking or assaulting a student, members of the school staff or other persons.
2. Theft.
3. The use of obscene or profane language or gestures, the possession and/or display of obscenity or pornographic images or the unauthorized or inappropriate possession and/or display of images, pictures or photographs

depicting nudity.

4. Violation of smoking, dress, transportation regulations, or other regulations and/or policies governing student conduct.
5. Refusal to obey a member of the school staff, law enforcement authorities, or school volunteers, or disruptive classroom behavior.
6. Any act of Protected Class Harassment or reprisal or retaliation against any individual for reporting in good faith incidents of Protected Class Harassment, or who participate in the investigation of such reports.
7. Refusal by a student to identify himself/herself to a staff member when asked, misidentification of oneself to such person(s), lying to school officials or otherwise engaging in dishonest behavior.
8. Inappropriate displays of public affection of a sexual nature and/or sexual activity on school grounds or at a school-sponsored activity.
9. A walk-out from or sit-in within a classroom or school building or school grounds.
10. Blackmailing, threatening or intimidating school staff or students (or acting in a manner that could be construed to constitute blackmail, a threat, or intimidation, regardless of whether intended as a joke), including the use of AI to engage in such conduct.
11. Possession of any weapon, weapon facsimile, deadly weapon, martial arts weapon, electronic defense weapon, pistol, knife, blackjack, bludgeon, box cutter, metal knuckles, pellet gun, air pistol, explosive device, firearm, whether loaded or unloaded, whether functional or not, or any other dangerous object or instrument. The possession and/or use of any object or device that has been converted or modified for use as a weapon.
12. Possession of any ammunition for any weapon described above in paragraph 11.
13. Unauthorized entrance into any school facility or portion of a school facility or aiding or abetting an unauthorized entrance.
14. Possession or ignition of any fireworks, combustible or other explosive materials, or ignition of any material causing a fire. Possession of any materials designed to be used in the ignition of combustible materials, including matches and lighters.
15. Possession, sale, distribution, use, or consumption of tobacco, electronic nicotine delivery systems (e.g. e-cigarettes), or vapor products, or the unlawful possession, sale, distribution, use or consumption of drugs, narcotics or alcoholic beverages (or any facsimile of tobacco, drugs, narcotics or alcoholic beverages, or any item represented to be tobacco, drugs or alcoholic beverages), including being under the influence of any such substances or aiding in the procurement of any such substances. For the purposes of this Paragraph 15, the term "electronic nicotine delivery system" shall mean an electronic device used in the delivery of nicotine or other substances to a person inhaling from the device, and includes, but is not limited to, an electronic cigarette, electronic cigar, electronic cigarillo,

electronic pipe or electronic hookah and any related device and any cartridge or other component of such device, including, but not limited to, electronic cigarette liquid. For the purposes of Paragraph 15, the term "vapor product" shall mean any product that employs a heating element, power source, electronic circuit or other electronic, chemical or mechanical means, regardless of shape or size, to produce a vapor that may or may not include nicotine and is inhaled by the user of such product. For the purposes of this Paragraph 15, the term "drugs" shall include, but shall not be limited to, any medicinal preparation (prescription and non-prescription) and any controlled substance whose possession, sale, distribution, use or consumption is illegal under state and/or federal law including cannabis.

16. Sale, distribution, or consumption of substances contained in household items; including, but not limited to glue, paint, accelerants/propellants for aerosol canisters, and/or items such as the aerators for whipped cream; if sold, distributed or consumed for the purpose of inducing a stimulant, depressant, hallucinogenic or mind-altering effect.
17. Possession of paraphernalia used or designed to be used in the consumption, sale or distribution of drugs, alcohol or tobacco, as described in subparagraph (15) above. For purposes of this policy, drug paraphernalia includes any equipment, products and materials of any kind which are used, intended for use or designed for use in planting, propagating, cultivating, growing, harvesting, manufacturing, compounding, converting, producing, processing, preparing, testing, analyzing, packaging, repackaging, storing, containing or concealing, or injecting, ingesting, inhaling or otherwise introducing controlled drugs or controlled substances into the human body, including but not limited to items such as "bongs," pipes, "roach clips," vials, tobacco rolling papers, and any object or container used, intended or designed for use in storing, concealing, possessing, distributing or selling controlled drugs or controlled substances including cannabis.
18. The destruction of real, personal or school property, such as, cutting, defacing or otherwise damaging property in any way.
19. Accumulation of offenses such as school and class tardiness, class or study hall cutting, or failure to attend detention.
20. Trespassing on school grounds while on out-of-school suspension or expulsion.
21. Making false bomb threats or other threats to the safety of students, staff members, and/or other persons.
22. Defiance of school rules and the valid authority of teachers, supervisors, administrators, other staff members and/or law enforcement authorities.
23. Throwing snowballs, rocks, sticks and/or similar objects, except as specifically authorized by school staff.
24. Unauthorized and/or reckless and/or improper operation of a motor vehicle on school grounds or at any school-sponsored activity.
25. Leaving school grounds, school transportation or a school-sponsored activity without authorization.
26. Use of or copying of the academic work of another individual and presenting

it as the student's own work, without proper attribution; or any other form of academic dishonesty, cheating or plagiarism including the unauthorized use of AI for the completion of class assignments; or any other form of academic dishonesty, cheating or plagiarism.

27. Possession and/or use of a cellular telephone, radio, portable audio player, CD player, blackberry, personal data assistant, walkie talkie, Smartphone, mobile or handheld device, or similar electronic device, on school grounds or at a school-sponsored activity in violation of Board policy and/or administrative regulations regulating the use of such devices without permission.
28. Possession and/or use of a beeper or paging device on school grounds or at a school-sponsored activity without the written permission of the principal or his/her designee.
29. Unauthorized use of or tampering with any school computer, computer system, computer software, Internet connection or similar school property or system, or the use of such property or system for inappropriate purposes including using AI in a manner that disrupts or undermines the effective operation of the school district or is otherwise seriously disruptive to the educational process.
30. Possession and/or use of a laser pointer, unless the student possesses the laser pointer temporarily for an educational purpose while under the direct supervision of a responsible adult.
31. Hazing.
32. Bullying, defined as an act that is direct or indirect and severe, persistent or pervasive, which:
    a. causes physical or emotional harm to an individual;
    b. places an individual in reasonable fear of physical or emotional harm; or
    c. infringes on the rights or opportunities of an individual at school; or
33. Bullying shall include, but need not be limited to, a written, oral or electronic communication or physical act or gesture based on any actual or perceived differentiating characteristics, such as race, color, religion, ancestry, national origin, gender, sexual orientation, gender identity or expression, socioeconomic status, academic status, physical appearance, or mental, physical, developmental or sensory disability, or by association with an individual or group who has or is perceived to have one or more of such characteristics.
34. Cyberbullying, defined as any act of bullying through the use of the Internet, interactive and digital technologies, cellular mobile telephone or other mobile electronic devices or any electronic communications.
35. Acting in any manner that creates a health and/or safety hazard for staff

members, students, or the public, regardless of whether the conduct is intended as a joke.

36. Engaging in a plan to stage or create a violent situation for the purposes of recording it by electronic means; or recording by electronic means acts of violence for purposes of later publication. Reporting recordings to school officials may warrant exceptions from disciplinary action in certain circumstances.
37. The unauthorized publication or dissemination of a recording (photographic or audio) of another individual without permission of the individual or a school employee. Reporting recordings to school officials may warrant exceptions from disciplinary action in certain circumstances.
38. Using computer systems, including email, instant messaging, text messaging, blogging or the use of social networking websites, or other forms of electronic communications, to engage in any conduct prohibited by this policy.
39. Use of a privately owned electronic or technological device in violation of school rules, including the unauthorized recording (photographic or audio) of another individual without permission of the individual or a school staff member.
40. Engaging in teen dating violence, defined as any act of physical, emotional or sexual abuse, including stalking, harassing and threatening, that occurs between two students who are currently in or who have recently been in a dating relationship.
41. Any action prohibited by any Federal or State law.
42. Any other violation of school rules or regulations or a series of violations which makes the presence of the student in school seriously disruptive of the educational process and/or a danger to persons or property.

IV. Discretionary and Mandatory Expulsions

A. A principal may consider recommendation of expulsion of a student in **grades three to twelve, inclusive**, in a case where he/she has reason to believe the student has engaged in conduct described at Sections II.A. or II.B., above.
B. A principal must recommend expulsion proceedings in all cases against any student in **grades kindergarten to twelve, inclusive**, whom the Administration has reason to believe:
    1. was in **possession on school grounds** or at a **school-sponsored activity** of a **deadly weapon**, **dangerous instrument**, **martial arts weapon**, or **firearm** as defined in 18 U.S.C. § 921 as amended from time to time; or
    2. **off school grounds**, **possessed a firearm** as defined in 18 U.S.C. § 921, in violation of Conn. Gen. Stat. § 29-35, or **possessed and used a firearm** as defined in 18 U.S.C. § 921, a **deadly weapon**, a **dangerous instrument** or a **martial arts weapon** in the **commission of a crime**

under chapter 952 of the Connecticut General Statutes; or

3. was engaged **on or off school grounds** in **offering for sale or distribution a controlled substance** (as defined in Conn. Gen. Stat. § 21a-240(9)), whose manufacturing, distribution, sale, prescription, dispensing, transporting, or possessing with intent to sell or dispense, offering or administering is subject to criminal penalties under Conn. Gen. Stat. §§21a-277 and 21a-278.

The terms "**dangerous instrument**," "**deadly weapon**," **electronic defense weapon**," "**firearm**," and "**martial arts weapon**," are defined above in Section I.

C. In any preschool program provided by the Board of Education or provided by a regional educational service center or a state or local charter school pursuant to an agreement with the Board of Education, no **student enrolled in such a preschool program** shall be expelled from such preschool program, except an expulsion hearing shall be conducted by the Board of Education in accordance with Section VIII of this policy whenever the Administration has reason to believe that that a student enrolled in such preschool program was in **possession of a firearm** as defined in 18 U.S.C. § 921, as amended from time to time, on or off school grounds or at a preschool program-sponsored event. The term **"firearm"** is defined above in Section I.

D. Upon receipt of an expulsion recommendation, the Superintendent may conduct an inquiry concerning the expulsion recommendation.

If the Superintendent or his/her designee determines that a student should or must be expelled, he or she shall forward his/her recommendation to the Board of Education so that the Board can consider and act upon this recommendation.

E. In keeping with Conn. Gen. Stat. § 10-233d and the Gun-Free Schools Act, it shall be the policy of the Board to expel a student in grades kindergarten to twelve, inclusive, for one (1) full calendar year for the conduct described in Section IV.B(1), (2) and (3) of this policy and to expel a student enrolled in a preschool program for one (1) calendar year for the conduct described in Section IV.C. For any mandatory expulsion offense, the Board may modify the term of expulsion on a case-by-case basis.

V. Procedures Governing Behavior that Causes a Serious Disruption

A. A school principal or other school administrator shall notify a parent or guardian of a student whose behavior has caused a serious disruption to the instruction of other

students; caused self-harm; or caused physical harm to a teacher, another student, or other school employee not later than twenty-four (24) hours after such behavior occurs.

B. Such notice shall include, but not be limited to, informing such parent or guardian that the teacher of record in the classroom in which such behavior occurred may request a behavior intervention meeting.

C. If the teacher of record in the classroom ultimately requests a behavior intervention meeting with the crisis intervention team for the school, the parent or guardian must be notified that such meeting will occur.

D. If a behavior intervention meeting occurs, the crisis intervention team shall, not later than seven (7) days after the behavior intervention meeting, provide to the parent or guardian of such student, in the dominant language of such parent or guardian, a written summary of such meeting, including, but not limited to, the resources and supports identified.

VI. Procedures Governing Removal from Class

A. A student may be removed from class by a teacher or administrator if he/she deliberately causes a serious disruption of the educational process. When a student is removed, the teacher must send him/her to a designated area and notify the principal or his/her designee at once.
B. A student may not be removed from class more than six (6) times in one school year nor more than twice in one week unless the student is referred to the building principal or designee and granted an informal hearing at which the student should be informed of the reasons for the disciplinary action and given an opportunity to explain the situation.
C. The parents or guardian of any minor student removed from class shall be given notice of such disciplinary action within twenty-four (24) hours of the time of the institution of such removal from class.

VII. Procedures Governing Suspension

A. The responsible administrator or the administrator's designee shall have the right to suspend a student for breach of conduct as noted in Section II of this policy for not more than the following: five (5) consecutive school days for an in-school suspension; ten (10) consecutive school days for an out-of-school suspension for students in grades three through twelve, inclusive; or five (5) consecutive school days for an out-of-school suspension for students in grades preschool to two, inclusive. In cases where suspension is contemplated, the following procedures shall be followed.

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STUDENT DISCIPLINE (cont'd)

1. Unless an emergency situation exists, no student shall be suspended prior to having an informal hearing before the principal or designee at which the student is informed of the charges and given an opportunity to respond. In the event of an emergency, the informal hearing shall be held as soon after the suspension as possible.
2. If suspended, such suspension shall be an in-school suspension, except the principal or designee may impose an out-of-school suspension on any pupil:
   a. in grades three to twelve, inclusive, if, during the informal hearing, (i) the principal or designee determines that the student poses such a danger to persons or property or such a disruption of the educational process that he or should be excluded from school during the period of suspension; or (ii) the principal or designee determines that an out-of-school suspension is appropriate based on evidence of (*A*) the student's previous disciplinary problems that have led to suspensions or expulsion of such student, and (*B*) previous efforts by the Administration to address the student's disciplinary problems through means other than out-of-school suspension or expulsion, including positive behavioral support strategies, or
   b. in grades preschool to two, inclusive, if the principal or designee:

      i. determines that an out-of-school suspension is appropriate for such student based on evidence that such student's conduct on school grounds is behavior that caused serious physical harm;
      ii. requires that such student receives services that are trauma-informed and developmentally appropriate and align with any behavioral intervention plan, individualized education program ("IEP") or plan pursuant to Section 504 of the Rehabilitation Act of 1973 ("Section 504") for such student upon such student's return to school immediately following the out-of-school suspension; and
      iii. considers whether to convene a Planning and Placement Team ("PPT") meeting for the purposes of conducting an evaluation to determine whether such student may require special education or related services.

3. Evidence of past disciplinary problems that have led to removal from a classroom, suspension, or expulsion of a student who is the subject of an informal hearing may be received by the principal or designee, but only considered in the determination of the length of suspensions.
4. By telephone, the principal or designee shall make reasonable attempts to immediately notify the parent or guardian of a minor student following the suspension and to state the cause(s) leading to the suspension.
5. Whether or not telephone contact is made with the parent or guardian of such minor student, the principal or designee shall forward a letter promptly to such parent or guardian to the last address reported on

school records (or to a newer address if known by the principal or designee), offering the parent or guardian an opportunity for a conference to discuss same.

6. In all cases, the parent or guardian of any minor student who has been suspended shall be given notice of such suspension within twenty-four (24) hours of the time of the institution of the suspension.
7. Not later than twenty-four (24) hours after the commencement of the suspension, the principal or designee shall also notify the Superintendent or his/her designee of the name of the student being suspended and the reason for the suspension.
8. The student shall be allowed to complete any classwork, including examinations, without penalty, which he or she missed while under suspension.
9. The school Administration may, in its discretion, shorten or waive the suspension period for a student who has not previously been suspended or expelled, if the student completes an Administration-specified program and meets any other conditions required by the Administration. Such Administration-specified program shall not require the student and/or the student's parents to pay for participation in the program.
10. Notice of the suspension shall be recorded in the student's cumulative educational record. Such notice shall be expunged from the cumulative educational record if the student graduates from high school. In cases where the student's period of suspension is shortened or waived in accordance with Section VI.A(9), above, the Administration may choose to expunge the suspension notice from the cumulative record at the time the student completes the Administration-specified program and meets any other conditions required by the Administration.
11. If the student has not previously been suspended or expelled, and the Administration chooses to expunge the suspension notice from the student's cumulative record prior to graduation, the Administration may refer to the existence of the expunged disciplinary notice, notwithstanding the fact that such notice may have been expunged from the student's cumulative file, for the limited purpose of determining whether any subsequent suspensions or expulsions by the student would constitute the student's first such offense.
12. The decision of the principal or designee with regard to disciplinary actions up to and including suspensions shall be final.
13. During any period of suspension served out of school, the student shall not be permitted to be on school property and shall not be permitted to attend or participate in any school-sponsored activities, unless the principal specifically authorizes the student to enter school property for a specified purpose or to participate in a particular school-sponsored activity.

B. In cases where a student's suspension will result in the student being suspended more than ten (10) times or for a total of fifty (50) days in a school year, whichever results in fewer days of exclusion, the student shall, prior to the pending suspension, be granted a formal hearing before the

Board of Education. The principal or designee shall report the student to the Superintendent or designee and request a formal Board hearing. If an emergency situation exists, such hearing shall be held as soon after the suspension as possible.

VIII. Procedures Governing In-School Suspension

A. The principal or designee may impose in-school suspension in cases where a student's conduct endangers persons or property, violates school policy or seriously disrupts the educational process as determined by the principal or designee.
B. In-school suspension may not be imposed on a student without an informal hearing by the building principal or designee.
C. In-school suspension may be served in the school that the student regularly attends or in any other school building within the jurisdiction of the Board.
D. No student shall be placed on in-school suspension more than fifteen (15) times or for a total of fifty (50) days in one school year, whichever results in fewer days of exclusion.
E. The parents or guardian of any minor student placed on in-school suspension shall be given notice of such suspension within twenty-four (24) hours of the time of the institution of the period of the in-school suspension.

IX. Procedures Governing Expulsion Hearing

A. Emergency Exception:

Except in an emergency situation, the Board of Education shall, prior to expelling any student, conduct a hearing to be governed by the procedures outlined herein and consistent with the requirements of Conn. Gen. Stat. § 10-233d or Conn. Gen. Stat. § 10-233*l*, if applicable, as well as the applicable provisions of the Uniform Administrative Procedures Act, Conn. Gen. Stat. §§ 4-176e to 4-180a, and § 4- 181a. Whenever an emergency exists, the hearing provided for herein shall be held as soon as possible after the expulsion.

B. ***Hearing Panel:***

1. Expulsion hearings conducted by the Board will be heard by any three or more Board members. A decision to expel a student must be supported by a majority of the Board members present, provided that no less than three (3) affirmative votes to expel are cast.

2. Alternatively, the Board may appoint an impartial hearing board composed of one (1) or more persons to hear and decide the expulsion matter, provided that no member of the Board may serve on such panel.

C. ***Hearing Notice and Rights of the Student and Parent(s)/Guardian(s):***

1. Written notice of the expulsion hearing must be given to the student, and, if the student is a minor, to his/her parent(s) or guardian(s) at least five (5) business days before such hearing.
2. A copy of this Board policy on student discipline shall also be given to the student, and if the student is a minor, to his/her parent(s) or guardian(s), at the time the notice is sent that an expulsion hearing will be convened.
3. The written notice of the expulsion hearing shall inform the student of the following:
    a. The date, time, place and nature of the hearing.
    b. The legal authority and jurisdiction under which the hearing is to be held, including a reference to the particular sections of the legal statutes involved.
    c. A short, plain description of the conduct alleged by the Administration.
    d. The student may present as evidence relevant testimony and documents concerning the conduct alleged and the appropriate length and conditions of expulsion; and that the expulsion hearing may be the student's sole opportunity to present such evidence.
    e. The student may cross-examine witnesses called by the Administration.
    f. The student may be represented by an attorney or other advocate of his/her choice at his/her expense or at the expense of his/her parent(s) or guardian(s).
    g. A student is entitled to the services of a translator or interpreter, to be provided by the Board of Education, whenever the student or his/her parent(s) or guardian(s) requires the services of an interpreter because he/she/they do(es) not speak the English language or is(are) disabled.
    h. The conditions under which the Board is not legally required to give the student an alternative educational opportunity (if applicable).
    i. Information concerning the parent's(s') or guardian's(s') and the student's legal rights and about free or reduced-rate legal services and how to access such services.
    j. The parent(s) or guardian(s) of the student have the right to have the expulsion hearing postponed for up to one

week to allow time to obtain representation, except that if an emergency exists, such hearing shall be held as soon after the expulsion as possible.

D. Hearing Procedures:

1. The hearing will be conducted by the Presiding Officer, who will call the meeting to order, introduce the parties, Board members and counsel, briefly explain the hearing procedures, and swear in any witnesses called by the Administration or the student. If an impartial board or more than one person has been appointed, the impartial board shall appoint a Presiding Officer.
2. The hearing will be conducted in executive session. A verbatim record of the hearing will be made, either by tape recording or by a stenographer. A record of the hearing will be maintained, including the verbatim record, all written noticesand documents relating to the case and all evidence received or considered at hearing.
3. The Administration shall bear the burden of production to come forward with evidence to support its case and shall bear the burden of persuasion. The standard of proof shall be a preponderance of the evidence.
4. Formal rules of evidence will not be followed. The Board (or the impartial board) has the right to accept hearsay and other evidence if it deems that evidence relevant or material to its determination. The Presiding Officer will rule on testimony or evidence as to it being immaterial or irrelevant.
5. The hearing will be conducted in two (2) parts. In the first part of the hearing, the Board will receive and consider evidence regarding the conduct alleged by the Administration.
6. In the first part of the hearing, the charges will be introduced into the record by the Superintendent or his/her designee.
7. Each witness for the Administration will be called and sworn. After a witness has finished testifying, he/she will be subject to cross-examination by the opposite party or his/her legal counsel, by the Presiding Officer and by Board members.
8. The student shall not be compelled to testify at the hearing.
9. After the Administration has presented its case, the student will be asked if he/she has any witnesses or evidence to present concerning the charges. If so, the witnesses will be sworn, will testify, and will be subject to cross examination and to questioning by the Presiding Officer and/or by the Board. The student may also choose to make a statement at this time. If the student chooses to make a statement, he or she will be sworn and subject to cross examination and questioning

by the Presiding Officer and/or by the Board. Concluding statements will be made by the Administration and then by the student and/or his or her representative.

10. In cases where the student has denied the allegation, the Board must determine whether the student committed the offense(s) as charged by the Superintendent.
11. If the Board determines that the student has committed the conduct as alleged, then the Board shall proceed with the second portion of the hearing, during which the Board will receive and consider relevant evidence regarding the length and conditions of expulsion.
12. When considering the length and conditions of expulsion, the Board may review the student's attendance, academic and past disciplinary records. The Board may not review notices of prior expulsions or suspensions which have been expunged from the student's cumulative record, except as so provided in Section VI.A (9), (10), (11), above, and Section X, below. The Board may ask the Superintendent for a recommendation as to the discipline to be imposed.
13. Evidence of past disciplinary problems which have led to removal from a classroom, suspension or expulsion of a student being considered for expulsion may be considered only during the second portion of the hearing, during which the Board is considering length of expulsion and nature of alternative educational opportunity to be offered.
14. Where administrators presented the case in support of the charges against the student, such administrative staff shall not be present during the deliberations of the Board either on questions of evidence or on the final discipline to be imposed. The Superintendent may, after reviewing the incident with administrators, and reviewing the student's records, make a recommendation to the Board as to the appropriate discipline to be applied.
15. The Board shall make findings as to the truth of the charges, if the student has denied them; and, in all cases, the disciplinary action, if any, to be imposed. While the hearing itself is conducted in executive session, the vote regarding expulsion must be made in open session and in a manner that preserves the confidentiality of the student's name and other personally identifiable information.
16. Except for a student who has been expelled based on possession of a firearm or deadly weapon as described in subsection IV.B(1) and (2) above, the Board may, in its discretion, shorten or waive the expulsion period for a student who has not previously been suspended or expelled, if the student completes a Board-specified program and meets any other conditions required by the Board. The Board-specified program shall not require the student and/or the student's parents to pay for participation in the program.

17. The Board (or the impartial board) shall report its final decision in writing to the student, or if such student is a minor, also to the parent(s) or guardian(s), stating the reasons on which the decision is based, and the disciplinary action to be imposed. Said decision shall be based solely on evidence presented at the hearing. The parents or guardian or any minor student who has been expelled shall be given notice of such disciplinary action within twenty-four (24) hours of the time of the institution of the period of the expulsion.

E. **Presence on School Grounds and Participation in School-Sponsored Activities During Expulsion:**

During the period of expulsion, the student shall not be permitted to be on school property and shall not be permitted to attend or participate in any school sponsored activities, except for the student's participation in any alternative educational opportunity provided by the district in accordance with this policy, unless the Superintendent specifically authorizes the student to enter school property for a specified purpose or to participate in a particular school-sponsored activity.

F. **Stipulated Agreements:**

In lieu of the procedures used in this Section, the Administration and the parent(s) or legal guardian(s) of a student facing expulsion may choose to enter into a Joint Stipulation of the Facts and a Joint Recommendation to the Board concerning the length and conditions of expulsion. Such Joint Stipulation and Recommendation shall include language indicating that the parent(s) or legal guardian(s) understand their right to have an expulsion hearing held pursuant to these procedures, and language indicating that the Board, in its discretion, has the right to accept or reject the Joint Stipulation of Facts and Recommendation. If the Board rejects either the Joint Stipulation of Facts or the Recommendation, an expulsion hearing shall be held pursuant to the procedures outlined herein. If the Student is eighteen years of age or older, the student shall have the authority to enter into a Joint Stipulation and Recommendation on his or her own behalf.

If the parties agree on the facts, but not on the disciplinary recommendation, the Administration and the parents (or legal guardians) of a student facing expulsion may also choose to enter into a Joint Stipulation of the Facts and submit only the Stipulation of the Facts to the Board in lieu of holding the first part of the hearing, as described above. Such Joint Stipulation shall include language indicating that the parents understand their right to have a

hearing to determine whether the student engaged in the alleged misconduct and that the Board, in its discretion, has the right to accept or reject the Joint Stipulation of Facts. If the Board rejects the Joint Stipulation of Facts, a full expulsion hearing shall be held pursuant to the procedures outlined herein.

X. Alternative Educational Opportunities for Expelled Students

A. **Students under sixteen (16) years of age:**

Whenever the Board of Education expels a student under sixteen (16) years of age, it shall offer any such student an alternative educational opportunity.

B. **Students sixteen (16) to eighteen (18) years of age:**

1. The Board of Education shall provide an alternative educational opportunity to a sixteen (16) to eighteen (18) year-old student expelled for the first or second time if he/she requests it and if he/she agrees to the conditions set by the Board of Education. Such alternative educational opportunity may include, but shall not be limited to, the placement of a pupil who is at least seventeen years of age in an adult education program. Any pupil participating in an adult education program during a period of expulsion shall not be required to withdraw from school as a condition to his/her participation in the adult education program.
2. The Board of Education is not required to offer an alternative educational opportunity to any student between the ages of sixteen (16) and eighteen (18) who is expelled for a second, or subsequent, time.
3. The Board of Education shall count the expulsion of a pupil when he/she was under sixteen (16) years of age for purposes of determining whether an alternative educational opportunity is required for such pupil when he/she is between the ages of sixteen and eighteen.

C. **Students eighteen (18) years of age or older:**

The Board of Education is not required to offer an alternative educational opportunity to expelled students eighteen (18)

years of age or older.

D. Content of Alternative Educational Opportunity

1. For the purposes of Section IX, and subject to Subsection IX.E, below, any alternative educational opportunity to which an expelled student is statutorily entitled shall be (1) alternative education, as defined by Conn. Gen. Stat. § 10-74j and in accordance with the *Standards for Educational Opportunities for Students Who Have Been Expelled,* adopted by the State Board of Education, with an individualized learning plan, if the Board provides such alternative education, or (2) in accordance with the *Standards for Educational Opportunities for Students Who Have Been Expelled*, adopted by the State Board of Education.
2. The Superintendent, or his/her designee, shall develop administrative regulations concerning alternative educational opportunities, which administrative regulations shall be in compliance with the standards adopted by the State Board of Education. Such administrative regulations shall include, but not limited to, provisions to address student placement in alternative education; individualized learning plans; monitoring of students placements and performance; and a process for transition planning.

E. ***Students identified as eligible for services under the Individuals with Disabilities Education Act ("IDEA"):***

Notwithstanding Subsections IX.A. through D. above, if the Board of Education expels a student who has been identified as eligible for services under the Individuals with Disabilities Education Act ("IDEA"), it shall offer an alternative educational opportunity to such student in accordance with the requirements of IDEA, as it may be amended from time to time, and in accordance with the *Standards for Educational Opportunities for Students Who Have Been Expelled*, adopted by the State Board of Education.

F. ***Students for whom an alternative educational opportunity is not required:***

The Board of Education may offer an alternative educational

opportunity to a pupil for whom such alternative educational opportunity is not required by law or as described in this policy. In such cases, the Board, or if delegated by the Board, the Administration, shall determine the components, including nature, frequency and duration of such services, of any such alternative educational opportunity.

XI. Notice of Student Expulsion on Cumulative Record

Notice of expulsion and the conduct for which the student was expelled shall be included on the student's cumulative educational record. Such notice, except for notice of an expulsion of a student in grades nine through twelve, inclusive, based upon possession of a firearm or deadly weapon, shall be expunged from the cumulative educational record by the Board if the student graduates from high school.

In cases where the student's period of expulsion is shortened or waived in accordance with Section VIII.D(14), above, the Board may choose to expunge the expulsion notice from the cumulative record at the time the student completes the Board-specified program and meets any other conditions required by the Board.

If a student's period of expulsion was not shortened or waived, the Board may choose to expunge the expulsion notice from the student's cumulative record prior to graduation if such student has demonstrated to the Board that the student's conduct and behavior in the years following such expulsion warrants an expungement. In deciding whether to expunge the expulsion notice, the Board may receive and consider evidence of any subsequent disciplinary problems that have led to removal from a classroom, suspension or expulsion of the student.

If the student has not previously been suspended or expelled, and the Administration chooses to expunge the expulsion notice from the student's cumulative record prior to graduation, the Administration may refer to the existence of the expunged notice, notwithstanding the fact that such notice may have been expunged from the student's cumulative file, for the limited purpose of determining whether any subsequent suspension or expulsion by the student would constitute the student's first such offense.

XII. Change of Residence During Expulsion Proceedings

A. Student moving into the school district:

1. If a student enrolls in the district while an expulsion hearing is pending in

another district, such student shall not be excluded from school pending completion of the expulsion hearing unless an emergency exists, as defined above. The Board shall retain the authority to suspend the student or to conduct its own expulsion hearing.

2. Where a student enrolls in the district during the period of expulsion from another public school district, the Board may adopt the decision of the student expulsion hearing conducted by such other school district. The student shall be excluded from school pending such hearing. The excluded student shall be offered an alternative educational opportunity in accordance with statutory requirements. The Board shall make its determination based upon a hearing held by the Board, which hearing shall be limited to a determination of whether the conduct which was the basis of the previous public school district's expulsion would also warrant expulsion by the Board.

B. ***Student moving out of the school district:***

Where a student withdraws from school after having been notified that an expulsion hearing is pending, but before a decision has been rendered by the Board, the notice of the pending expulsion hearing shall be included on the student's cumulative record and the Board shall complete the expulsion hearing and render a decision. If the Board subsequently renders a decision to expel the student, a notice of the expulsion shall be included on the student's cumulative record.

XIII. Procedures Governing Suspension and Expulsion of Students Identified as Eligible for Services under the Individuals with Disabilities Education Act ("IDEA")

A. ***Suspension of IDEA students:***

Notwithstanding the foregoing, if the Administration suspends a student identified as eligible for services under the IDEA (an "IDEA student") who has violated any rule or code of conduct of the school district that applies to all students, the following procedures shall apply:

1. The Administration shall make reasonable attempts to immediately notify the parents of the student of the decision to suspend on the date on which the decision to suspend was made, and a copy of the special education procedural safeguards must either be hand-delivered or sent by mail to the parents on the date that the decision to suspend was made.
2. During the period of suspension, the school district is not

required to provide any educational services to the IDEA student beyond that which is provided to all students suspended by the school district.

B. Expulsion and Suspensions that Constitute Changes in Placement for IDEA students:

Notwithstanding any provision to the contrary, if the Administration recommends for expulsion an IDEA student who has violated any rule or code of conduct of the school district that applies to all students, the procedures described in this section shall apply. The procedures described in this section shall also apply for students whom the Administration has suspended in a manner that is considered under the IDEA, as it may be amended from time to time, to be a change in educational placement:

1. Upon the decision by the Administration to recommend expulsion or impose a suspension that would constitute a change in educational placement, the Administration shall promptly notify the parent(s)/guardian(s) of the student of the recommendation of expulsion or the suspension that would constitute a change in educational placement, and provide the parents(s)/guardian(s) a copy of the special education procedural safeguards either by hand-delivery or by mail (unless other means of transmission have been arranged).
2. The school district shall immediately convene the student's planning and placement team ("PPT"), but in no case later than ten (10) school days after the recommendation for expulsion or the suspension that constitutes a change in placement was made. The student's PPT shall consider the relationship between the student's disability and the behavior that led to the recommendation for expulsion or the suspension which constitutes a change in placement, in order to determine whether the student's behavior was a manifestation of his/her disability.
3. If the student's PPT finds that the behavior <u>was</u> a manifestation of the student's disability, the Administration shall not proceed with the recommendation for expulsion or the suspension that constitutes a change in placement.
4. If the student's PPT finds that the behavior <u>was not</u> a manifestation of the student's disability, the Administration may proceed with the recommended expulsion or suspension that constitutes a change in placement.
5. During any period of expulsion, or suspension of greater than ten (10) days per school year, the Administration shall provide the

student with an alternative education program in accordance with the provisions of the IDEA.

6. When determining whether to recommend an expulsion or a suspension that constitutes a change in placement, the building administrator (or his or her designee) should consider the nature of the misconduct and any relevant educational records of the student.

C. **Removal of Special Education Students for Certain Offenses:**

1. School personnel may remove a student eligible for special education under the IDEA to an appropriate interim alternative educational setting for not more than forty-five (45) school days if the student:
   a. Was in possession of a dangerous weapon, as defined in 18 U.S.C. 930(g)(2), as amended from time to time, on school grounds or at a school-sponsored activity, or
   b. Knowingly possessed or used illegal drugs or sold or solicited the sale of a controlled substance while at school or at a school-sponsored activity; or
   c. Has inflicted serious bodily injury upon another person while at school, on school premises, or at a school function.
2. The following definitions shall be used for this subsection XIII.C.:
   a. **Dangerous weapon** means a weapon, device, instrument, material, or substance, animate or inanimate, that is used for, or is readily capable of, causing death or serious bodily injury, except that such term does not include a pocket knife with a blade of less than 2.5 inches in length.
   b. **Controlled substance** means a drug or other substance identified under schedules I, II, III, IV, or V in section 202(c) of the Controlled Substances Act, 21 U.S.C. 812(c).
   c. **Illegal drug** means a controlled substance but does not include a substance that is legally possessed or used under the supervision of a licensed health-care professional or that is legally possessed or used under any other authority under the Controlled Substances Act or under any other provision of federal law.
   d. **Serious bodily injury** means a bodily injury which involves: (A) a substantial risk of death; (B) extreme physical pain; (C) protracted and obvious disfigurement; or (D) protracted loss or impairment of the function of a bodily member, organ, or mental faculty.

XIV. Procedures Governing Expulsions for Students Identified as Eligible under Section 504 of the Rehabilitation Act of 1973 ("Section 504")

A. Except as provided in subsection B below, notwithstanding any provision

to the contrary, if the Administration recommends for expulsion a student identified as eligible for educational accommodations under Section 504 who has violated any rule or code of conduct of the school district that applies to all students, the following procedures shall apply:

1. The parents of the student must be notified of the decision to recommend the student for expulsion.
2. The district shall immediately convene the student's Section 504 team ("504 team") for the purpose of reviewing the relationship between the student's disability and the behavior that led to the recommendation for expulsion. The 504 team will determine whether the student's behavior was a manifestation of his/her disability.
3. If the 504 team finds that the behavior was a manifestation of the student's disability, the Administration shall not proceed with the recommendedexpulsion.
4. If the 504 team finds that the behavior was not a manifestation of the student's disability, the Administration may proceed with the recommended expulsion.

B. The Board may take disciplinary action for violations pertaining to the use or possession of illegal drugs or alcohol against any student with a disability who currently is engaging in the illegal use of drugs or alcohol to the same extent that such disciplinary action is taken against nondisabled students. Thus, when a student with a disability is recommended for expulsion based solely on the illegal use or possession of drugs or alcohol, the 504 team *shall not be required to meet* to review the relationship between the student's disability and the behavior that led to the recommendation for expulsion.

XV. Procedures Governing Expulsions for Students Placed in a Juvenile Detention Center

A. Any student who commits an expellable offense and is subsequently placed in a juvenile detention center or any other residential placement for such offense may be expelled by the Board in accordance with the provisions of this section. The period of expulsion shall run concurrently with the period of placement in a juvenile detention center or other residential placement.
B. If a student who committed an expellable offense seeks to return to a school district after participating in a diversionary program or having been placed in a juvenile detention center or any other residential placement and such student has not been expelled by the board of education for such offense under subdivision (A) of this subsection, the Board shall allow such student to return and may not expel the student for additional time for such offense.

XVI. Early Readmission to School

An expelled student may apply for early readmission to school. The Board delegates the authority to make decisions on readmission requests to the Superintendent. Students desiring readmission to school shall direct such readmission requests to the Superintendent. The Superintendent has the discretion to approve or deny such readmission requests, and may condition readmission on specified criteria.

XVII. Dissemination of Policy

The Board of Education shall, at the beginning of each school year and at such other times as it may deem appropriate, provide for an effective means of informing all students, parent(s) and/or guardian(s) of this policy.

XVIII. Compliance with Documentation and Reporting Requirements

A. The Board of Education shall include on all disciplinary reports the individual student's state-assigned student identifier (SASID).
B. The Board of Education shall report all suspensions and expulsions to the State Department of Education.
C. If the Board of Education expels a student for sale or distribution of a controlled substance, as defined in Conn. Gen. Stat. § 21a-240(9), whose manufacture, distribution, sale, prescription, dispensing, transporting or possessing with the intent to sell or dispense, offering, or administration is the subject to criminal penalties under Conn. Gen. Stat. §§ 21a-277 and 21a-278, the Board shall refer such student to an appropriate state or local agency for rehabilitation, intervention or job training and inform the agency of its action.
D. If the Board of Education expels a student for possession of a firearm, as defined in 18 U.S.C. § 921, or deadly weapon, dangerous instrument or martial arts weapon, as defined in Conn. Gen. Stat. § 53a-3, the Board shall report the violation to the local police.

Legal References:

Connecticut General Statutes:

Public Act 19-91, "An Act Concerning Various Revisions and Additions to the Education Statutes."

Public Act 19-13, "An Act Prohibiting the Sale of Cigarettes, Tobacco Products, Electronic Nicotine Delivery Systems and Vapor Products to Persons Under Age Twenty-One."

Series 5000

STUDENT DISCIPLINE (cont'd)

§ 10-16 Length of school year

§§ 4-176e through 4-180a and § 4-181a Uniform Administrative Procedures Act
§ 10-222d Safe school climate plans. Definitions. Safe school climate assessments
§§ 10-233a through 10-233f Suspension and expulsion of students.
§ 10-233*l* Expulsion and suspension of children in preschool programs
§ 10-253 School privileges for children in certain placements, nonresident children, children in temporary shelters, homeless children and children in juvenile detention facilities. Liaison to facilitate transitions between school districts and juvenile and criminal justice systems.
§ 21a-240 Definitions
§ 19a-342a Use of electronic nicotine delivery system or vapor product prohibited
§§ 21a-408a through 408p Palliative Use of Marijuana
§ 29-38 Weapons in vehicles
§ 53a-3 Definitions
§ 53-344b Sale and delivery of electronic nicotine delivery system or vapor products to minors
§ 53-206 Carrying of dangerous weapons prohibited.

Packer v. Board of Educ. of the Town of Thomaston, 246 Conn. 89 (1998). *State v. Hardy*, 896 A.2d 755, 278 Conn. 113 (2006). *State v. Guzman*, 955 A.2d 72, 2008 Conn. App. LEXIS 445 (Sept. 16, 2008).

Connecticut State Department of Education, *Standards for Educational Opportunities for Students Who Have Been Expelled*, adopted

January 3, 2018. Federal law:

Individuals with Disabilities Education Act, 20 U.S.C. 1400 *et seq*., as amended by the Individuals with Disabilities Education Improvement Act of 2004, Pub. L. 108-446.
Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. § 794(a).
18 U.S.C. § 921 (definition of "firearm")
18 U.S.C. § 930(g)(2) (definition of "dangerous weapon")
18 U.S.C. § 1365(h)(3) (identifying "serious bodily injury")
21 U.S.C. § 812(c) (identifying "controlled substances")
34 C.F.R. § 300.530 (defining "illegal drugs")
Gun-Free Schools Act, 20 U.S.C. § 7961

Series 5000

STUDENT DISCIPLINE (cont'd)

Honig v. Doe, 484 U.S. 305 (1988)

ADOPTED: August 2002

REVISED: November 2020

REVISED: May 2025

REVISED: September 2026

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only _____ **Board Meeting Date** October 29, 2026

Decision Requested X **Agenda Code** 8 e.

AGENDA REPORTING FORM

Agenda Topic: Policy 5123 – Promotion and Retention - Revised – Second Reading.

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 5123 – Promotion and Retention - Revised.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve Policy 5123 as presented by the Policy & Personnel Committee.

Titles of Attachments:

1. DRAFT Policy 5123

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Policy 5123
Promotion and Retention
Revised Policy
Draft

Series 5000: Students

Progress/Records

Promotion and Retention

It is the philosophy of the Board of Education that all students should have access to instructional programs that are compatible with their maturity, functional and achievement levels, emotional condition, learning style(s), and intellectual capacity.

Grade, placement of pupils attending the Southington Public Schools shall be determined by their level of development as well as their achievement of learning objectives. Each case will be decided on an individual basis after all factors noted above are carefully examined.

A recommendation for placement or retention will be based on the professional judgment of the classroom teacher(s) after discussion with parent(s)/guardian(s), the principal, and instructional support personnel. The principal, in consultation with school personnel ~~and parent(s)/guardian(s),~~ will be responsible for the final decision of teacher, grade and or team.

The school administration shall inform all parents and students of this policy at the beginning of each school year.

Cross-reference:
See Complaints about Conduct of the Schools, Policy 1312

Policy Approved: June 1985
Policy Reviewed: August 2002
Policy Revised: February 2006
Policy Revised: September 2026

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only _____ **Board Meeting Date** October 29, 2026

Decision Requested X **Agenda Code** 8 f.

AGENDA REPORTING FORM

Agenda Topic: Policy 5141.8 – Students with Special Health Care Needs - NEW – Second Reading.

Summary of Issue: The Policy & Personnel Committee has reviewed Policy 5141.8 – Students with Special Health Care Needs - NEW.

Background: The Policy and Personnel Committee reviews policies with the administration to ensure they are current and appropriate.

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: Move that the Board of Education approve Policy 5141.8 as presented by the Policy & Personnel Committee.

Titles of Attachments:

1. DRAFT Policy 5141.8

Frank Ryan
Signature of Staff Member Submitting Report

Peter Madaus
Signature of Superintendent of Schools

Policy 5141.8
Students with Special Health Care Needs
NEW Policy
Draft

Series 5000: Students

Students with Special Health Care Needs

The focus of a Districtwide Food Allergy Management Plan shall be prevention, education, awareness, communication and emergency response. The management plan shall strike a balance between the health, social normalcy and safety needs of the individual student with life threatening food allergies and the education, health and safety needs of all students. The District Food Allergy Management Plan shall be the basis for the development of the procedural guidelines that will be implemented at the school level and provide for consistency across all schools within the district.

The goals for the Districtwide Plan include:

1. To maintain the health and protect the safety of children who have life-threatening food allergies in ways that are developmentally appropriate, promote self-advocacy and competence in self-care and provide appropriate educational opportunities.

2. To ensure that interventions and individual health care plans for students with life-threatening food allergies are based on medically accurate information and evidence-based practices.

3. To define a formal process for identifying, managing, and ensuring continuity of care for students with life-threatening food allergies across all transitions. (Pre-K-Grade 12)

It is the policy of the Board of Education to follow the guidelines developed and promulgated by the Connecticut Department of Public Health and Department of Education for students within the District with life-threatening food allergies and glycogen storage disease. Such guidelines include (1) education and training for school personnel on the management of students with life-threatening food allergies and glycogen storage disease, including training related to the administration of medication with a cartridge injector and nasal spray and the provision of food or dietary supplements, (2) procedures for responding to life threatening allergic reactions to food, (3) a process for the development of individualized health care and food allergy action plans for every student with a life-threatening food allergy, (4) a process for the development of individualized health care and glycogen storage disease action plans for every student with glycogen storage disease and such plan shall include, but not be limited to, the provision of food or dietary supplements by the school nurse or by any school employee approved by the school nurse, to a student with glycogen storage disease provided such plan does not prohibit a parent/guardian or a person they so designate, to provide food or dietary supplements on school grounds during the school day, and (5) protocols to prevent exposure to food allergens.

It is the Board's expectation that specific building-based guidelines/actions will consider the health needs and well-being of all children without discrimination or isolation of any child. It is the Board's belief that education and open and informative communication are vital for the creation of an environment with reduced risks for all students and their families. To assist children with life-threatening allergies to assume more individual responsibility for maintaining their safety as they grow, it is the policy of the Board that guidelines shift as children advance through the primary grades and through secondary school.

Series 5000: Students

Students with Special Health Care Needs

The District's plan for managing students with life-threatening food allergies shall be posted on the District's website (and/or on the website of each school within the District).

(cf. 5141 - Student Health Services)

(cf. 5141.21 - Administering Medication)

(cf. 5141.23 - Students with Special Health Care Needs)

(cf. 5141.3 - Health Assessments)

(cf. 5145.4 - Nondiscrimination)

Legal Reference: Connecticut General Statutes

10-15b Access of parent or guardian to student's records.

10-154a Professional communications between teacher or nurse and student.

10-207 Duties of medical advisors.

10-212a Administrations of medications in schools

10-212c Life threatening food allergies; Guidelines; district plans, ass amended by P.A. 12-198

10-212a(d) Administration of medications in schools by a paraprofessional

10-220i Transportation of students carrying cartridge injectors

52-557b Good Samaritan Law. Immunity from liability for emergency medical assistance, first aid or medication by injection

PA 05-104 An Act Concerning Food Allergies and the Prevention of Life-Threatening Incidents in Schools

PA 05-144 and 05-272 An Act Concerning the Emergency Use of Cartridge Injectors

The Regulations of Connecticut State Agencies section 10-212a through 10-212a-7

Federal Legislation

Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794 § 504; 34 C.F.R. § 104 et seq.)

Americans with Disabilities Act (ADA) of 1990 (42 U.S.C. §12101 et seq.; 29C.F.R. §1630 et seq.

The Family Education Rights and Privacy Act of 1974 (FERPA)

Series 5000: Students

Students with Special Health Care Needs

The Individuals with Disabilities Education Act of 1976 (IDEA) (20 U.S.C. § 1400 et seq.); 34 C.F.R. § 300 et seq.

FCS Instruction783-2, Revision 2, Meal substitution for medical or other special dietary reasons.

P.A. 09-155 An Act Concerning the Use of Asthmatic Inhalers and Epinephrine Auto-Injectors While at School

Land v. Baptist Medical Center, 164 F3d 423 (8th Cir. 1999)

Policy adopted: September 2026

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 a.

AGENDA REPORTING FORM

Agenda Topic: SHS – Physical Education – Unit 2, Recreational Lifetime Activities - Revised - First Reading.

Summary of Issue: SHS – Physical Education – Unit 2, Recreational Lifetime Activities - Revised - First Reading.

Background:

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS – Physical Education – Unit 2, Recreational Lifetime Activities - Revised – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Unit Overview	
Unit Title:	Unit 2: Recreational/Lifetime Activities
Teacher:	SHS PE Department
Grade Level/Course:	PE II, Grade 12
Length/Dates:	4 classes per activity
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	Students will be exposed to a variety of physical activities and develop an appreciation of a self selected physical activity that meets the need for self-expression and enjoyment. In this unit, the activities that will be practiced are golf, country line dance, and a choice of other forms of dance.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
Priority Standards: **S1.H1 Demonstrates competency and/or refines activity-specific movement skills in two or more lifetime activities (outdoor pursuits, individual performance activities, aquatics, net/wall games or target games).** **S2.H4.L1 Demonstrates the ability to identify examples of social and technical dance forms.** Daily Rubric: S4.H1.L1 Demonstrates the ability to employ effective self-management skills to analyze barriers and modify physical activity patterns appropriately, as needed. S4.H2.L1 Demonstrates the ability to exhibit proper etiquette, respect for others and teamwork while engaging in physical activity and/or social dance. S4.H3.L1 Demonstrates the ability to use communication skills and strategies that promote team or group dynamics. S4.H4.L1 Demonstrates the ability to solve problems and think critically in physical activity and/or dance settings, both as an individual and in groups S4.H5.L1 Demonstrates the ability to apply best practices for participating safely in physical activity, exercise, and dance (e.g., injury prevention, proper alignment, hydration, use of equipment, implementation of rules, sun protection) Supporting Standards: S5.H4.L1 Demonstrates the ability to identify the opportunity for social support in a self-selected physical activity or dance. These are considerations.

S5.H2.L2 Chooses an appropriate level of challenge to experience success and desire to participate in a self-selected physical activity.

S5.H3.L1 Demonstrates the ability to select and participate in physical activities or dance that meet the need for self-expression and enjoyment.

National Standard: 3 Develops social skills through movement.

Learning Indicator: 3.12.6 Applies best practices for participating safely in physical activity (e.g., proper etiquette, respect for others, injury prevention, use of equipment, implementation of rules).

Other Goal(s)

Standard 1: The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.
Standard 2: The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.
Standard 4: The physically literate individual exhibits responsible personal and social behavior that respects self and others.

Transfer Goals (Vision of the Graduate)

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).
Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.
Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.
Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.
Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s):	EU 1: When I effectively execute learned movements, I will successfully utilize the basic skills needed to perform skills both inside and outside of school. EU 2: When I know the rules, techniques and skills of a game or activity, I can participate actively and support my team. EU 3: I will enhance my communication and collaboration skills to create a safe and equitable environment.

Essential Question(s):	EQ 1: How does effective and appropriate movement affect my wellness and participation in physical activity? EQ 2: To what extent do concepts, principles, strategies and tactics influence performance in competitive games and activities? EQ 3: How do social skills and etiquette learned through physical activity apply to other daily life experiences?

What will students <u>know...</u>	**What will students <u>be able to do…</u>**
Golf *Concepts:* ● Understand how the ball gets into the air. ● Know the types/differences of clubs. ● Short game priority order. ● Know what equipment you need. ● Distance control in putting ● Learn rules and etiquette ● The difference between Irons and Wood. *Skills:* ● Mastering the grip ● Stance ● Swing playing with strategy ● Drive ● Approach ● Chipping putting ● Game play **Vocabulary:** ● **Birdie**: a score of one under par / to play a hole with a score of one under par ● **Bunker:** a hollow are of ground filled with sand (a hazard in golf) ● **Drive:** to hit a golf ball hard so it travels a long way ● **Eagle**: a score of two under par / to play a hole with a score of two under par ● **Fairway:** the area with short grass between the tee and the green on a golf course ● **Fore:** interjection – a warning shouted to warn people that a golf ball is approaching them ● **Green:** a flat area of grass surrounding the hole on a golf course ● **Hole in one:** a shot from the tee that goes into the hole with just one hit ● **Par:** the expected score a good golfer should get when hitting the golf ball into the hole (or holes) on a golf course / to play a hole with a score of par	● Successfully execute the basic fundamentals during drills/practices/competitions. ● Apply the 3 types of grips (overlapping, interlocking, 10-finger grip) ● Demonstrate the correct golf stance. ● Demonstrate the correct approach to hitting a golf ball. ● Hit a golf ball. ● Execute proper swing when hitting a golf ball ● Correctly place a golf ball on a tee ● Demonstrate proper body posture and alignment when addressing and hitting the ball ● Successfully hit a golf ball using the correct technique. ● Define and apply unit vocabulary throughout golf practice/game play.

● **Putt:** a gentle hit of a golf ball across the green or short grass towards or into the hole / to gently hit a golf ball across the green or short grass towards or into the hole ● **Rough**: an area of a golf course with long grass ● **Tee**: a small stick that holds the golf ball so you can hit it easily – or the place where you hit the first golf ball on a hole **Line Dance** *Concepts:* ● Action content - travel, turn, elevation, gesture, stillness, floor work, transfer of weight. ● Dynamic content - fast/slow, sudden/sustained, acceleration/deceleration, strong/light, direct/indirect, flowing/abrupt. ● Spatial awareness - pathways, levels, directions, patterns. ● Timing ● Rhythmic Movement ● Movement with style and an accurate way. **Vocabulary:** ● **BALL CHANGE:** A quick rock step using the ball of the foot using an "&" count. ● **BRUSH:** The free leg moves forward or backward letting the ball of the foot make contact with the floor. There is not a weight change! ● **CLOCKWISE:** Right turn also called a "Natural" turn. ● **COUNTERCLOCKWISE:** Left turn is also called a "Reverse" turn. ● **FOOTWORK:** This refers to the part of the foot that touches the floor first. ● **GRAPEVINE:** A side step, cross behind, step side - usually finished off with either a touch, stomp, kick, or hitch as you bring your feet together. ● **HOP:** A jump on one foot ● **KICK:** A lifting of the leg off the floor and moving forward or backward. Can be done using a straight leg or using a bend of the knee ● **PIVOT:** A turn that travels . ● **ROCK:** An exchange of weight from one foot to the other. Can be danced in any foot position. Usually a rock step in a dance will signal a change of direction. ● **SCUFF:** The heel is used instead of the toe to drag across ground. (only done forward or to the side). ● **SLIDE:** Smoothly moving left and right	● Execute each dance step when performing/practicing a style of dance ● Apply dynamic dance concepts (speed & tempo) to music (fast/slow) ● Be aware of available space when executing a dance ● Apply dance steps to the proper rhythm of the music ● Define and apply unit vocabulary throughout each country line dance. ● Research, practice, perform and teach a variety of dance

- **STEP:** Placing the foot on the floor with weight.
- **STOMP:** Placing the foot on the floor forcefully enough to make an audible sound. Can be done with or without a weight change.
- **TAP:** This is placing the foot on the floor without weight. Generally the toe is the part of the foot that makes contact with the floor.
- **TRIPLE STEP:** This is 3 steps that take only 2 beats of music. Can be danced in place, side to side, or forward and back.
- **WEIGHT CHANGE:** To move from one foot to the other.

Dance Choice

- Variety of cultural/modern dance styles
    - Ballet
    - Ballroom
    - Contemporary
    - Hip-hop
    - Jazz
    - Tap
    - Irish dance
    - Folk
    - Lyrical
    - Freestyle
    - Breakdance
    - Fusion

Outdoor Archery

Concepts:

- Safety (personal safety and the safety of others; commands & handling of equipment)
- Eye Dominance
- How to keep score

Vocabulary:

Command	Waiting line	Shooting line
Target line	Quiver	Bow
Arrow	Knock	Crest
Fletching	Grip	Rest
Target	Stance	Pre-draw
Anchor	Aim	Shot set-up
Release	Follow Through/reflect	End
Dry Shooting	String Bow	Eye Dominance

Students will be able to:

- Handle the equipment safely; keep self and others safe
- How to Shoot:
    - Set-Up (stance, knock arrow, draw hand set, bow hand set)
    - Draw (pre-draw, draw, anchor, aim, shot set-up)
    - Release (release, follow through/ reflect)
- Shoot properly using 11 Steps

1. Stance
2. Knock arrow
3. Draw hand set
4. Bow hand set
5. Pre-draw
6. Draw
7. Anchor
8. Aim
9. Shot set-up
10. Release
11. Follow through/reflect

- Keep score
    - Bullseye is worth 10, each circle beyond that is worth 1 less; on the line is worth the higher total

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence

Summative Performance Task:
Create A Dance

Create a Dance: Peer Reflection Rubric

Performance Task

- **Goal**

The goal for students is to demonstrate their knowledge, skills, strategies learned in the Country Line Dance unit to create their own dance.

- **Role**

A country line dance instructor at Cadillac Ranch.

- **Audience**

Our target audience is the teacher/instructor.

- **Situation**

Challenge students to create and implement a line dance and present it to the class.

- **Product/Performance/Purpose**

Students are given guidelines to create a dance, perform the dance, and be assessed on the dance.

Standards and Criteria for Success
Students will meet or exceed the criteria of the performance task.

Outdoor Archery Performance Assessment

- **Click here to view the assessment (including Standards and Criteria for Success)**
- **Description:** Outdoor Archery is a great activity, but safety needs to be and will be the top priority throughout instruction. Only the most important concepts/topics/skills/knowledge should be graded/assessed. To that end, this Performance Assessment has been developed to ensure that a constant focus on safety is employed by both the teacher and students. Each day of the activity, the students will be graded using the outdoor archery safety rubric found below. In the gradebook, these will be labeled as Performance Assessments. If a student is absent from class, they are to receive an "E" (exempt) for that grade.

Resources

Projector and speaker

Evaluative Criteria

How students will be evaluated:
Pre/Post assessment, daily rubric, skills assessment/rubrics

Feedback will be provided to the student in the following ways:

- Informal: can occur at any time as it is something that emerges spontaneously in the moment or during action
- Formal: is planned and systematically scheduled into the process.
- Self Assessment Feedback

Stage 3: Instructional Design

Learning Target:	Success Criteria:
Country Line Dance Block 1: I will learn the basic steps of Western Slide, Elvira. (ie. Slide, kick)	Block 1: I can successfully utilize the basic steps learned and perform the Western Slide, Elvira.

Learning Activities

Block 1:

- Students line-up for proper spacing
- Teacher models each step and students try/practice. (slide, scuff, triple step)
- Students put all the steps together and perform the dance
- Administer exit ticket

Assessments

- Daily Performance Rubric **(teacher observation)**
- Parking lot poster
    - Each student is given 1 sticky notes that they place in the chart paper as an exit ticket

Rate your level of Comfort for executing the Western Slide (1-4 scale)	
1 (I am not comfortable yet)	2 (I am comfortable with some steps but need more practice on others)
3 (I am comfortable to perform the Western Slide)	4 (I am comfortable to perform the Western Slide and can teach it to a peer)

Learning Target:	Success Criteria:
Country Line Dance Block 2: I will learn the intermediate steps of the Boot Scootin BoogieCowboy Charleston. I.e.Grapevine, hop, skip.	Block 2: I can successfully utilize the intermediate steps learned and perform the Boot Scootin Boogie, Cowboy Charleston.

Learning Activities

Block 2:

- Students line-up for proper spacing
- Teacher models each step and students try/practice. (slide, scuff, triple step)
- Students put all the steps together and perform the dance.
- Administer peer assessment

Assessments
Daily Performance Rubric **(teacher observation)** Line Dance Peer Assessment

Learning Target:	Success Criteria:
Country Line Dance Block 3: I will learn the Advanced steps of the Mister Mom, Watermelon Crawl, Batter up. I.e.Grapevine, hop, skip.	Block 3: I can successfully utilize the Advanced steps learned and perform the Mister Mom, Watermelon Crawl, Batter Up.
Learning Activities	
Block 3: ● Students line-up for proper spacing ● Teacher models each step and students try/practice. (slide, scuff, triple step) ● Students put all the steps together and perform the dance.	
Assessments	
Daily Performance Rubric **(teacher observation)** Country Line Dance Rubric.jpeg **(Teacher observation)**	

Learning Target:	Success Criteria:
Country Line Dance Block 3: I will create a dance that uses all dance steps. Some examples are grapevine, kick, hop.	Block 3: I can successfully create a dance which incorporates dance steps learned in the line dance unit and teach it to the class.
Learning Activities	
● Use the rubric provided to create a line dance. ● Students plan/put all the steps together and practice the dance. ● Students will perform the dance and teach it to the class.	
Assessments	
Daily Performance Rubric **(teacher observation)** **Culminating Line Dance Assessment**	

Golf Unit:

Learning Target:	Success Criteria:
Golf Block 1: I will learn the parts of the golf club. I will learn the 3 types of grips (overlapping, interlocking, 10-finger grip) I will learn the difference between Irons and Woods. Define and apply unit vocabulary throughout golf practice/game play. I will learn the rules of golf. I will learn how to Place the ball on a tee. I will learn the appropriate golf stance. I will learn proper golf etiquette.	Block 1: I can name the parts of the golf club and explain their importance. I can apply the three types of grips and decide which is most comfortable for use. I can explain the difference between an iron and a wood and how to use them. I can apply unit vocabulary throughout the golf unit. I can apply the rules of golf to a match. I can stand correctly when hitting a golf ball. I can apply proper golf etiquette into a golf match.

Learning Activities
Block 1: ● Teacher models each skill and students try/practice. ● Use the rubric provided to assess each skill.

Assessments
Daily Performance Rubric **(teacher observation)** **Etiquette Assessment**, Golf Skill Assessment

Learning Target:	Success Criteria:
● I will learn how to execute proper swing when hitting a golf ball ● I will body posture when hitting a ball	● I can use a proper golf swing when hitting a golf ball. ● I can execute appropriate body posture when hitting a golf ball.

Learning Activities
Teacher models each skill and students try/practice. Use the rubric provided to assess each skill.

Assessments
Daily Performance Rubric **(teacher observation)** Golf Swing Rubric

Learning Target:	Success Criteria:
Golf Block 2: I will learn how to putt a golf ball. I will learn how to chip a golf ball.	Block 2: I can putt the ball successfully into a hole from varying distances.

	I can chip the ball into a chipping net at varying distances.

Learning Activities

Block 2:

- Teacher models each skill and students try/practice.
- Use the rubric provided to assess each skill.

Assessments

Daily Performance Rubric **(teacher observation)**
Putting/Chipping Student Assessment

Learning Target:	Success Criteria:
Golf Block 3: I will learn how to use the basic fundamentals to participate in golf drills/practices/competitions.	Block 3: Successfully execute the basic fundamentals during drills/practices/competitions.

Learning Activities

Block 3:

- Teacher models each skill and students try/practice.
- Use the rubric provided to assess each skill.

Assessments

Daily Performance Rubric **(teacher observation)**
Golf Summative Assessment

Resources

Golf- golf clubs, golf balls, tees, chipping nets, hula-hoops, and putting greens

Learning Target:	Success Criteria:
Outdoor Archery Block 1: I can… • Describe what the term “Movement Identity” means. • Explain why people participate in recreational activities. • Safely participate in archery by following all commands/rules. • Hit the target!	Block 1: • Summarize the archery safety commands • Hit a blank target from close range

Learning Activities

Block 1:

- Archery Demonstration
    - Teacher demonstrates how to use the bow and arrow
- Movement Identities & Recreational Activities
    - Questioning, small and large group discussion
- Archery Safety
    - Whistle commands (2 whistles: archers to the shooting line; 1 whistle: remove arrow from quiver and shoot; 3 whistles: retrieve arrows; 5 or more whistles: emergency, stop immediately)
    - General safety rules (Follow the commands! No talking while commands are being given; Handle equipment correctly)
- 11 Steps to a Bullseye

1. Stance
2. Knock arrow
3. Draw hand set
4. Bow hand set
5. Pre-draw
6. Draw
7. Anchor
8. Aim
9. Shot set-up
10. Release
11. Follow through/reflect

- Practice on string bows
    - Everyone shoots string bows right-handed; everyone shoots string bows left-handed
- Shoot a real arrow right-handed for the 1st time from 10 feet away to blank side of target

Assessments

Outdoor Archery Performance Assessment (linked)

Learning Target:	Success Criteria:
Outdoor Archery Block 2: I can… ● Review the terms “Movement Identity” and “Recreational Activities.” ● Safely participate in archery by following all commands/rules. ● Hit the target!	Block 2: ● Explain the archery safety commands ● Discuss the 11 Steps to a Bullseye

Learning Activities

Block 2:

- Grading: Archery Performance Assessment
- Teacher demonstration of “11 Steps to a Bullseye”
- String bow & archery safety practice
    - Left handed and right handed
- Review “11 Steps to a Bullseye” & everyone shoots 2 arrows right handed
- Eye dominance
    - Have students find a new partner based on similar eye dominance
- Take turns shooting (utilizing whistle commands) until the end of the period

Assessments

Outdoor Archery Performance Assessment (linked)

Learning Target:	Success Criteria:
Outdoor Archery Block 3: I can… ● Review the terms “Movement Identity” and “Recreational Activities.” ● Safely participate in archery by following all commands/rules. ● Properly score arrows that hit the target	Block 3: ● Apply the archery safety commands ● Utilize the 11 Steps to a Bullseye ● Keep score

Learning Activities

Block 3:
- Review grading: Archery Performance Assessment
- Teacher demonstration of “11 Steps to a Bullseye”
    - Review steps with partner and as a class
    - Emphasize line of sight aiming
- Teach students how to keep score
    - Have clipboards and scoresheets ready
- Take turns shooting (utilizing whistle commands) until the end of the period

Assessments

Outdoor Archery Performance Assessment (linked)

Learning Target:	Success Criteria:
Outdoor Archery Block 4: I can… ● Reflect on my current “Movement Identity.” ● Safely participate in archery by following all commands/rules. ● Properly score arrows that hit the target	Block 4: ● Apply the archery safety commands ● Make adjustments to my form in order to achieve a higher score in archery

Learning Activities

Block 4:
- Review safety rules and grading
- Teacher demonstration of “11 Steps to a Bullseye”
    - Describe how your partner can provide you feedback based on the steps in order for you to make adjustments to your form and achieve a higher score
- Take turns shooting (utilizing whistle commands) until the end of the period
    - Partners provide feedback after each end
- If time, run a short tournament/competition based on the highest score

Alternative Activities For The Final Day:
- Archery Tic-Tac-Toe
- Balloon Pop

Assessments

Outdoor Archery Performance Assessment (linked)

Resources
Targets, cones/quivers, poly spots, bows, arrows, string bows, arm guards, clip boards, scoresheets, pencils, posters (safety rules poster, 11-steps poster)

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 b.

AGENDA REPORTING FORM

Agenda Topic: SHS Energy in the Environment - Unit 2, Energy Flow from Earth's Systems - NEW - First Reading.

Summary of Issue: SHS Energy in the Environment - Unit 2, Energy Flow from Earth's Systems- NEW - First Reading.

Background: _____

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

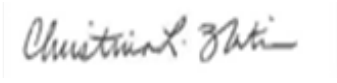
Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

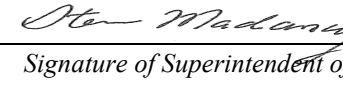
Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS Energy in the Environment - Unit 2, Energy Flow from Earth's Systems - NEW– to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal



Signature of Staff Member Submitting Report



Signature of Superintendent of Schools

Unit Overview	
Unit Title:	Energy in the Environment: Unit 2 - *Energy Flow from Earth's Systems*
Teacher:	Kelsey Duffy
Grade Level/Course:	10-12 Energy in the Environment
Length/Dates:	12 weeks
Unit Summary:	How can we design more reliable systems to meet our communities' energy needs? This unit is designed to introduce students to the concept of energy transfer in a relevant and grounded context: the Texas power crisis of February 2021. Students read articles and wonder about the complex social, environmental, and physical realities that led to such a crisis. They figure out how energy transfers between systems from a generator to our communities, and what makes an energy source reliable. This allows the class to model and explain what happened in Texas at multiple scales, from the electrons in the wires to the power companies making difficult decisions to maintain stability. Students consider engineering tradeoffs, criteria, and constraints inherent in making decisions about our energy systems, and apply them in a culminating task: design a reliable energy solution that meets our communities' needs, as articulated by interviews with friends and family members. The task is designed to give students the tools to speak up in their local and global community for a better energy future, one that aligns with their own values, and those of their families. P.1: Energy Flow from Earth's Systems

Performance Expectations

This unit builds toward these performance expectations:

HS-PS3-2† Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).
HS-PS3-3 Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
HS-PS3-1† Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
HS-ESS3-2† Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.

HS-ETS1-3† Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics as well as possible social, cultural, and environmental impacts.
HS-ETS1-4 Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.

*This performance expectation is developed across multiple units. This unit reinforces these NGSS PEs in a physics context.
†This performance expectation is developed across multiple courses. This unit reinforces or works toward these NGSS PEs that students will have previously developed in the OpenSciEd chemistry and/or biology courses.

Essential Questions:

1. How does electricity transfer through systems, and what causes instability in those systems?
2. What could cause unbalanced effects on communities that experience blackouts?
3. What design solutions could improve electricity systems in our communities?

Science and Engineering Practices (Skills)	Disciplinary Core Ideas (Knowledge)	Crosscutting Concepts (Enduring Understandings)
This unit **intentionally develops** students' engagement in these practice elements: **Asking questions and defining problems** in 9–12 builds on K–8 experiences and progresses to formulating, refining, and evaluating empirically testable questions and design problems using models and simulations. The following elements of this practice are intentionally developed across this unit: ● Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical, and/or environmental considerations.	**PS3.A: Definitions of Energy** ● Energy is a quantitative property of a system that depends on the motion and interactions of matter and radiation within that system. That there is a single quantity called energy is due to the fact that a system's total energy is conserved, even as, within the system, energy is continually transferred from one object to another and between its various possible forms. ● At the macroscopic scale, energy manifests itself in multiple ways, such as in motion, sound, light, and thermal	This unit **intentionally develops** students' engagement in these crosscutting concept elements: **Systems and System Models.** A *system* is an organized group of related objects or components; models can be used for understanding and predicting the behavior of systems. The following elements of this crosscutting concept are intentionally developed across this unit: ● Systems can be designed to do specific tasks. ● Models (e.g., physical, mathematical, and computer models) can be used to

Developing and using models in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed worlds. The following elements of this practice are intentionally developed across this unit:

- Develop and use a model based on evidence to illustrate and/or predict the relationships between systems or between components of a system.
- Develop and/or use a model (including mathematical and computational) to generate data to support explanations, predict phenomena, analyze systems, and/or solve problems.

Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. The following element of this practice is intentionally developed across this unit:

- Design, evaluate, and/or refine a solution to a complex real-world problem, based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and trade-off considerations.

energy.

- "Electrical energy" may mean energy stored in a battery or energy transmitted by electric currents. (secondary)
- These relationships are better understood at the microscopic scale, at which all of the different manifestations of energy can be modeled as a combination of energy associated with the motion of particles and energy associated with the configuration (relative position of the particles). In some cases the relative position energy can be thought of as stored in fields (which mediate interactions between particles). This last concept includes radiation, a phenomenon in which energy stored in fields moves across space.

PS3.B: Conservation of Energy and Energy Transfer

- Conservation of energy means that the total change of energy in any system is always equal to the total energy transferred into or out of the system.
- Energy cannot be created or destroyed, but it can be transported from one place to another and transferred between systems.
- The availability of energy limits what can occur in any system.

PS3.D: Energy in Chemical Processes

- Although energy cannot be destroyed, it can be converted to less useful

simulate systems and interactions—including energy, matter, and information flows—within and between systems at different scales.

Energy and Matter. Tracking energy and matter flows, into, out of, and within systems helps one understand their system's behavior. The following elements of this crosscutting concept are intentionally developed across this unit:

- The total amount of energy and matter in closed systems is conserved.
- Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.
- Energy cannot be created or destroyed—only moves between one place and another place, between objects and/or fields, or between systems.

Elements from the following crosscutting concepts are also **key to the sensemaking** in this unit:

- Patterns
- Structure and Function
- Cause and Effect

	forms—for example, to thermal energy in the surrounding environment. **ESS3.A Natural Resources** ● All forms of energy production and other resource extraction have associated economic, social, environmental, and geopolitical costs and risks as well as benefits. New technologies and social regulations can change the balance of these factors. (HS-ESS3-2) **ETS1.A: Defining and Delimiting Engineering Problems** ● Humanity faces major global challenges today, such as the need for supplies of clean water and food or for energy sources that minimize pollution, which can be addressed through engineering. These global challenges may also have manifestations in local communities. (HS-ETS1-1) **ETS1.B: Developing Possible Solutions** ● When evaluating solutions, it is important to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (HS-ETS1-3) ● Both physical models and computers can be used in various ways to aid in the engineering design process. Computers are useful for a variety of purposes, such as running simulations to test different ways of solving a problem or to see which one is most	

	efficient or economical, and in making a persuasive presentation to a client about how a given design will meet their needs. (HS-ETS1-4)	

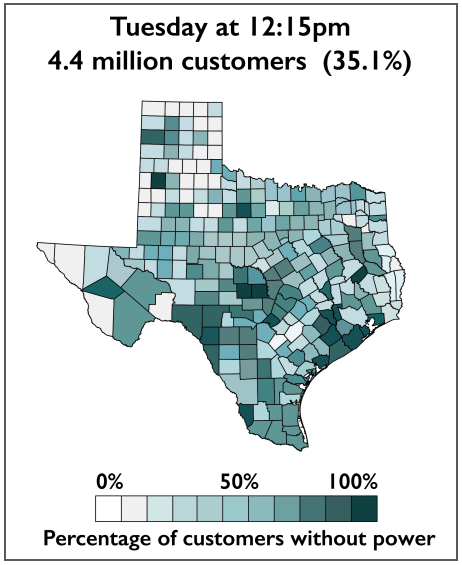
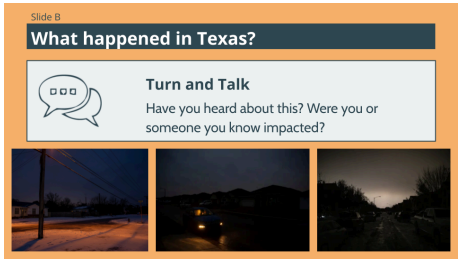
Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

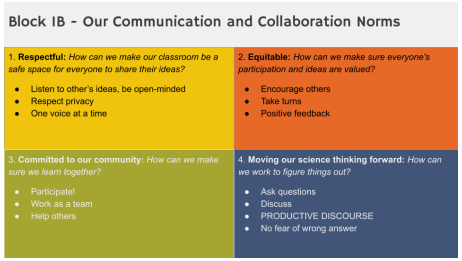
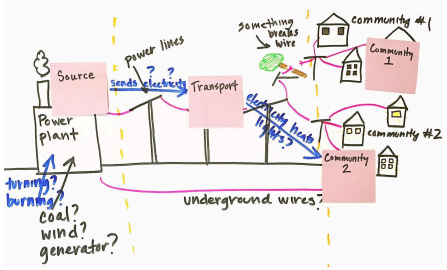
Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).
Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

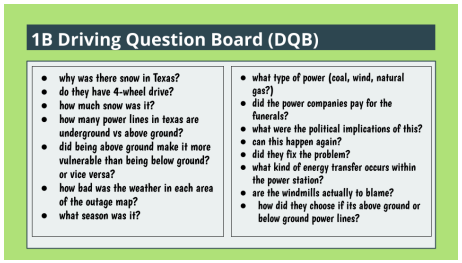
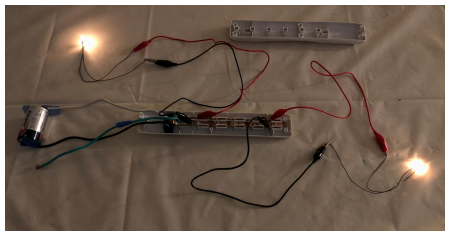
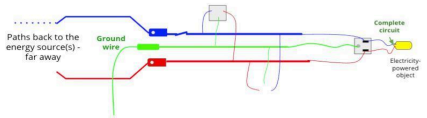
C District Rubrics

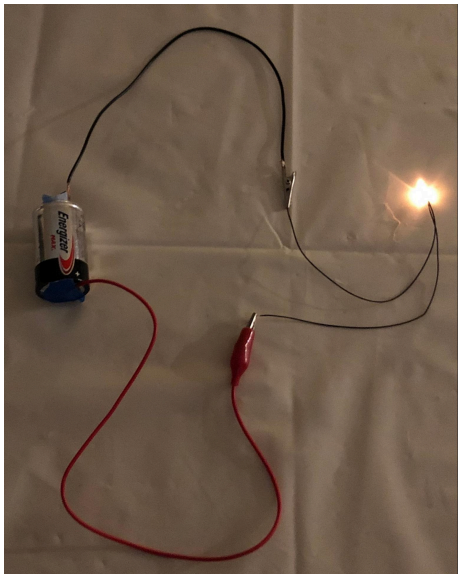
Performance Assessment(s) and Evaluative Criteria:

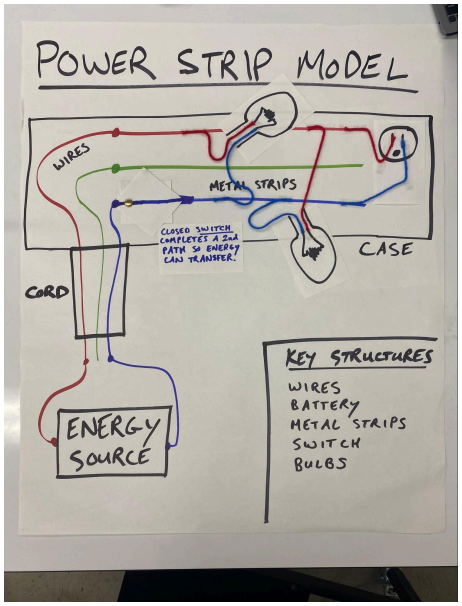
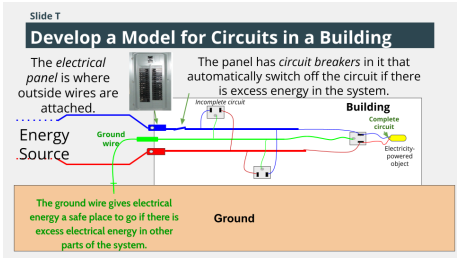
1. LS1 Common Assessment: Motors Transfer Task: Students design, build, and improve a device that converts energy from one form into another within given constraints.
   Success Criteria:
   - develop and use models to explain how energy is transferred and transformed in my device.
   - design and test a device that successfully converts one form of energy into another.
   - refine a design based on evidence, performance data, and design constraints.
2. LS2 Common Assessment: Electricity Tradeoffs Transfer Task: Students use evidence from data and models to explain energy-related challenges and evaluate tradeoffs in energy decisions.
   Success Criteria:
   - analyze data to identify patterns and distinguish between correlation and causation.
   - explain how energy moves through systems and where energy can be transferred out of a system.
   - use evidence to evaluate tradeoffs and propose solutions to energy challenges at different scales.
3. LS3 Common Assessment: Sand and Mirrors Transfer Task: Students develop and use models to explain how energy is stored, transferred, and transformed in systems, and evaluate solutions that improve energy transfer.
   Success Criteria:
   - develop and use models to show how energy is associated with the motion and positions of particles or objects.
   - use evidence and calculations to explain how energy moves through and between systems.
   - evaluate and justify solutions based on energy transfer, efficiency, and design criteria.

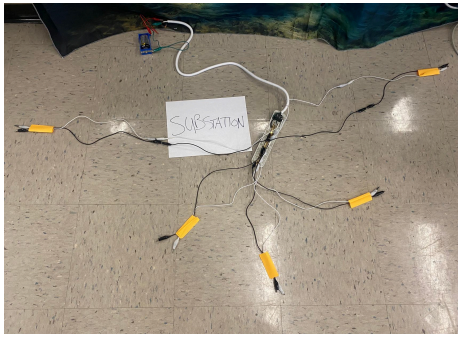
Target Question	Activity	Standard Objectives/Learning Target	Student will know and wonder
Learning Sequence 1: How does Electricity Transfer through Systems, and what causes Instability in those Systems? **Class Notes: LS1 - How does Electricity Transfer through Systems, and what causes Instability in those Systems?**			
Lesson 1: What can we learn from a blackout in Texas about producing reliable energy for our communities? **Lesson 1 - P.1 Energy Flow …**  	**P.1 Lesson 1 Teacher Edition** **-SET THE STAGE FOR THE ANCHORING PHENOMENON**  **-JIGSAW: TEXAS BLACKOUTS ARTICLES** **Texas Article #1** **Texas Article #2** **Texas Article #3** **Texas Article #4** **Texas Article #5** **Texas Article #6** **-NOTICE OUTAGE PATTERNS** **Reference Texas Outages Map** **-NAVIGATE: HOME LEARNING AND EXIT TICKET** **-NAVIGATE: SHARE STORIES AND BROADEN TO RELATED PHENOMENA**	**Learning Target:** I can develop and use a model to explain how energy flows through systems to produce electricity in my community and how changes can cause blackouts. **Success Criteria:** I will… • obtain and share information about the 2021 Texas blackouts. • use my model to explain how disruptions in the system can lead to blackouts. • ask questions to define problems and improve how our community generates and uses energy. **1.A** Develop a model of energy transfer through systems to explain how energy manifests as electricity in our communities, including how changes to an otherwise stable system could cause blackouts. (SEP: 2.3; CCC: 7.1; DCI: PS3.A.2, PS3.B.2, PS3.B.4)	**What students will wonder:** We explore a new phenomenon by reading a series of articles about widespread blackouts in Texas and by drawing on the experiences of our friends and family. We make an initial consensus model of what happens to our electricity production system when it is stable and during a blackout. We develop questions for our Driving Question Board and brainstorm initial ideas about ways we could design more reliable systems to meet our communities' energy needs. We decide to document the electricity infrastructure in our homes and communities to look for patterns that could help us understand how the system works and identify weaknesses. **What students will figure out:** • The term *electricity* describes energy transfer that can power lights and other devices. • There are several

	P.1 Lesson 1 Handout Colle… **-CREATE INITIAL MODELS AND CONDUCT A GALLERY WALK** **Initial Model: Blackouts - Duffy** **-DISCUSS COMMUNITY AGREEMENTS IN A SCIENTISTS CIRCLE** **P.1 Lesson 1 Handout Com…**  Block IB - Our Communication and Collaboration Norms 1. **Respectful:** *How can we make our classroom be a safe space for everyone to share their ideas?* • Listen to other's ideas, be open-minded • Respect privacy • One voice at a time 2. **Equitable:** *How can we make sure everyone's participation and ideas are valued?* • Encourage others • Take turns • Positive feedback 3. **Committed to our community:** *How can we make sure we learn together?* • Participate! • Work as a team • Help others 4. **Moving our science thinking forward:** *How can we work to figure things out?* • Ask questions • Discuss • PRODUCTIVE DISCOURSE • No fear of wrong answer **-COME TO CONSENSUS IN A SCIENTISTS CIRCLE**  **-NAVIGATE: TEST OUR MODEL IN TEXAS** **-BUILD THE DQB**	**1.B** Ask questions to clarify and define the problem of how our community can generate energy by designing systems to address both local and global challenges. (SEP: 1.4; 1.8; CCC: 4.1; DCI: ETS1.A.2)	subsystems that we agree are important for understanding how energy transfers to power our communities when the system is stable and during a blackout. ***What's next?*** *We will compare photos and drawings of structures that provide electricity. We will dissect a power strip and connect it to a battery to power multiple devices. We will develop a model of how structures of the power strip system enable it to transfer energy from one source to multiple devices. We test the effects of short circuits and broken circuits.*

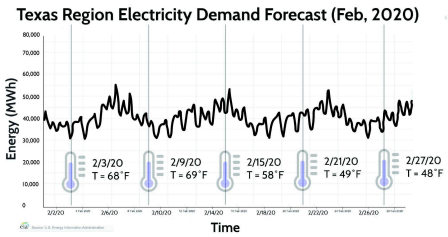
	 **-BRAINSTORM DESIGNS AND FURTHER INVESTIGATION** **-NAVIGATE: REFLECT AND ASSIGN HOME LEARNING**		
Lesson 2: What structures in the system enable energy transfer from one source to multiple devices, buildings, and neighborhoods? **Lesson 2 - P.1 Energy Flow …**  	**P.1 Lesson 2 Teacher Edition** **-DISSECT A POWER STRIP** **Carry out Investigation A to dissect a power strip in groups.** **-POWER THE CIRCUIT** **Power Strip Model - Duffy**	**Learning Target:** I can collect data and use models to explain how electrical energy moves through connected systems and where failures can occur. **Success Criteria:** I will… ● collect and analyze data from power strips and connected systems to identify how energy is transferred. ● identify interaction points and explain where and why failures can happen in the system. ● develop and revise a model that shows similarities between small systems (power strips) and larger systems (buildings).	**What students will wonder:** We compared photos and drawings of structures that provide electricity in our buildings and neighborhoods. We dissected a power strip and connected it to a battery to power multiple devices. We read about the function of ground wires and circuit breakers. We developed a model of how structures of the power strip system enable it to transfer energy from one source to multiple devices. We used this model to draw parallels to larger-scale systems (buildings, neighborhoods) and test the effects of short circuits and broken circuits. **What students will figure out:** ● Energy will transfer from a

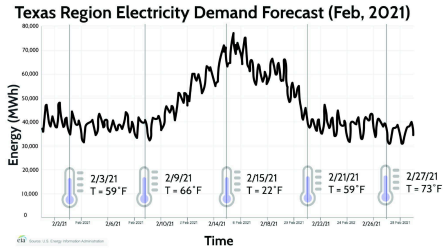
	 **-DEVELOP A MODEL FOR EXPLAINING HOW THE POWER STRIP SYSTEM WORKS** **-CLEAN UP AND ASSIGN HOME LEARNING** **Electricity Related Parts Rea…** **-DEVELOP A CLASS CONSENSUS MODEL FOR HOW THE POWER STRIP SYSTEM WORKS**	**2.A** Collect data from a designed system (a power strip) and a network of interconnected subsystems (multiple powerstrips) on the interactions needed for and failure points in the transfer of electrical energy. (SEP: 3.6; DCI: PS3.A.3; CCC: 4.1) **2.B** Develop, revise, and use a model to identify analogous structures that affect the electrical energy transfers across and between different (sub)systems at different scales (a powerstrip versus a building). (SEP: 2.3; DCI: PS3.B.2; CCC: 4.1, 6.1)	source to a device when a complete circuit is formed, but it will stop transferring immediately when there is a break in any of those paths (a broken circuit). • Plugging in an electronic device creates a giant circuit from that device to a power source that may be far away. • When energy transfers through a circuit system without powering any devices, we call this a short circuit. A short circuit occurs when there is a direct conducting path from one side of the energy source to the ground or to the other side of the source. A single short circuit in a system can cause blackouts in the entire system. ***What's next?*** *We will read about an energy crisis that began in Ohio, and a strategy used by engineers to prevent short and broken circuits in power lines. We will keep track of our ideas in the Engineering Design Tracker. We will develop a new representation to model energy transfer through parts of the system. We will analyze*

	 **-DEVELOP A MODEL FOR CIRCUITS IN A BUILDING**  **-USE THE POWER STRIP MODELS TO INVESTIGATE ELECTRICAL DISTRIBUTION IN A CITY** **P.1 Lesson 2 Teacher Refer…**		*electricity demand and supply data in Texas and use this to brainstorm ideas of where to go next.*

	  **-USE THE MODEL CITY TO INVESTIGATE POWER OUTAGES FROM SHORT CIRCUITS AND BROKEN CIRCUITS** **-ADD TO OUR COMMUNITY AGREEMENTS** **-NAVIGATE** **Raise new ideas and questions about the Texas case study.**		
Lesson 3: Could the blackouts in Texas have been caused by a broken or short-circuited circuit? **Lesson 3 - P.1 Energy Flow …**	**P.1 Lesson 3 Teacher Edition** **-READ ABOUT A POWER**	**Learning Target:** I can use evidence and data to explain how energy moves through the electric	**What students will wonder:** We read about an energy crisis that began in Ohio, and a strategy







OUTAGE EVENT

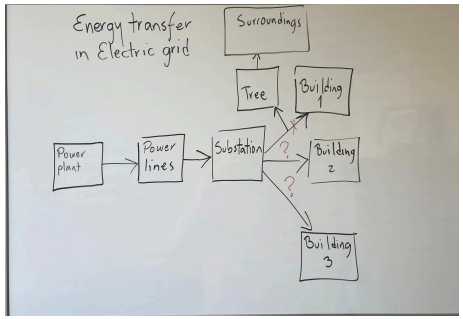
Undergrounding Power Line…

-INTRODUCE THE ENGINEERING DESIGN TRACKER

Engineering Design Tracker

P.1 Lesson 9 Answer Key En…

-DEVELOP A MODEL TO REPRESENT ENERGY TRANSFER IN THE SYSTEM



(insert picture of student model example)

-MODEL ENERGY TRANSFER IN VARIOUS SCENARIOS

Energy Transfer Scenarios - …

-ANALYZE GRAPHS OF FORECASTED ELECTRICITY DEMAND
PART 1:

Electricity Demand Forecast/…

grid and how changes in the system contributed to the Texas power crisis.

Success Criteria: I will…

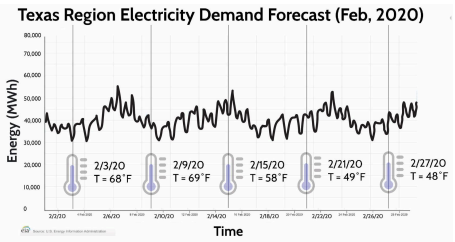
3.A Develop and use a model based on evidence from our investigation in Lesson 2 to illustrate the energy flow between components of the electric grid system and energy loss from the system as a possible cause of the crisis in Texas. (SEP: 2.3; DCI: PS3.B.2, PS3.D.1; CCC: 4.3)

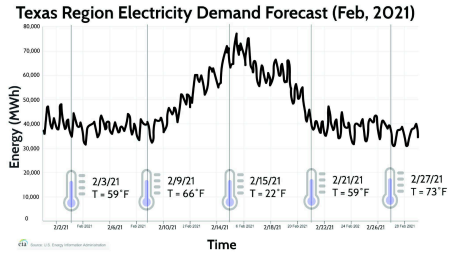
3.B Evaluate the impact of empirical data about energy supply and demand from Texas in February 2020 and 2021 to identify patterns, and evaluate how scientific knowledge and constraints impact possible solutions. (SEP: 4.5, 6.5; DCI: PS3.B.4; CCC 1.5, Connections to Engineering, Technology, and Applications of Science: Influence of Science, Engineering, and Technology on Society and the Natural World)

engineers have used to prevent short and broken circuits in power lines. We use a new tool, the Engineering Design Tracker, to keep track of our ideas to inform possible design solutions, including criteria and constraints. We develop an energy transfer model to explore various scenarios that could result in little or no electrical energy transferred to communities. We analyze data about electricity supply and demand, and we find out that change in supply must match changes in demand to avoid a crisis. We brainstorm ideas of what could have caused the drop in supply we observed in Texas.

What students will figure out:

- Engineering constraints can affect the implementation of a possible solution.
- The production of electrical energy must match the demand for electrical energy.
- The cold temperatures during the Texas blackout probably caused a spike in energy demand, which was accompanied by a drop in

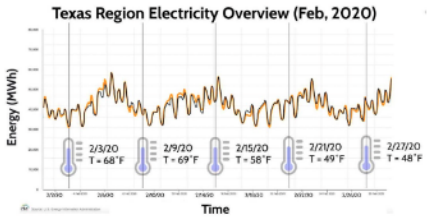


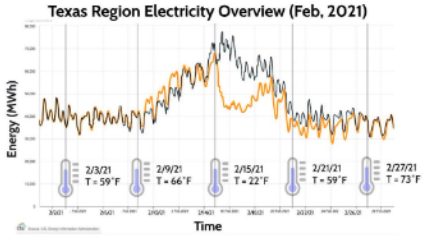


[Hourly Electric Grid Monitor]

-ANALYZE GRAPHS OF ELECTRICITY PRODUCTION AND DEMAND
PART 2:

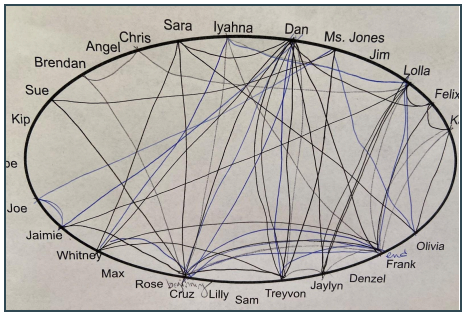
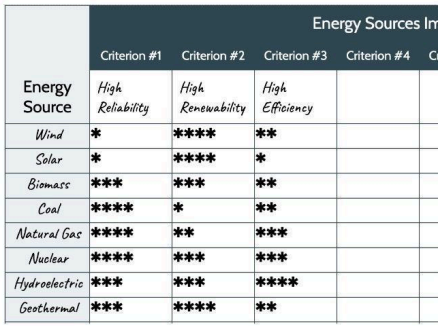
Electricity Demand Forecast/…

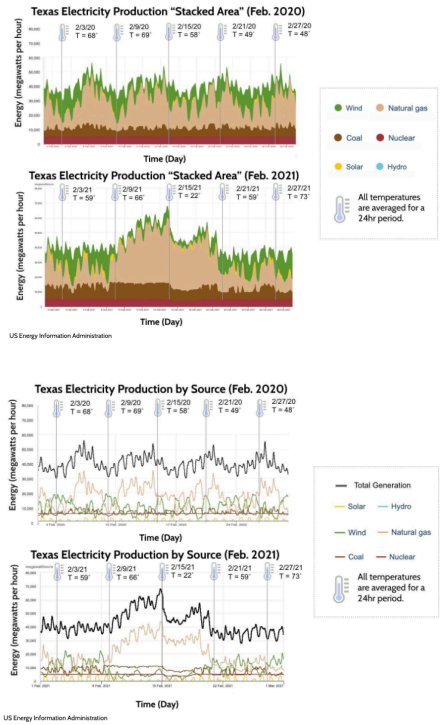




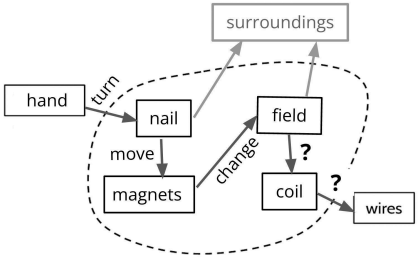
the supply of electrical energy.

What's next?
We will use informational cards and several data representations from the 2021 Texas crisis to seek additional information about specific sources of energy to help us figure out which source might be responsible for the drop in supply. We will use a new tool called Decisions Matrix to keep track of how well each source meets criteria we think are important.

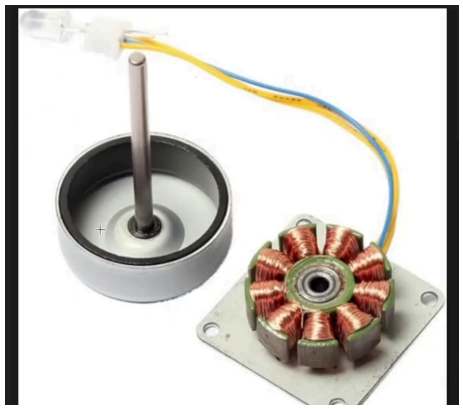
	-DISCUSS ABOUT ENERGY SUPPLY AND DEMAND IN A SCIENTISTS CIRCLE 		
Lesson 4: What makes an energy source reliable? **Lesson 4 - P.1 Energy Flow …**  	**P.1 Lesson 4 Teacher Edition** **-ENGAGE** **(notice and wonder)** **Texas Power Stations - Duffy** **-RANK ENERGY SOURCE CARDS** **Energy Source Cards to Prin…** **P.1 Lesson 4 Handout Energ…** **-CONDUCT A RANKING GALLERY WALK** **(Energy Source Cards)** **-LEAD AN INITIAL DISCUSSION ABOUT RELIABILITY** **-ANALYZE ENERGY SOURCE SUPPLY GRAPHS**	**Learning Target:** I can analyze data about energy sources to explain how different energy systems affect the reliability and stability of the electric grid. **Success Criteria:** I will… • analyze data about different energy sources and their impact on the energy grid. • identify characteristics of energy sources that make the grid more reliable and stable. • explain why energy supply must meet energy demand to keep the system functioning successfully	**What students will wonder:** We look at energy sources used in Texas, and consider what we know about each. We use informational cards to seek additional information about specific sources of energy to help us figure out which source might be responsible for the drop in supply we discovered in Lesson 3. We rank the sources by reliability, but realize that this criterion is hard to quantify. We look at several data representations from the 2021 Texas crisis to analyze how each energy source performed. We use a new tool called Decisions Matrix to keep track of how well each source meets criteria we think are important. **What students will figure out:**

	 **-LEAD A BUILDING UNDERSTANDINGS DISCUSSION ABOUT RELIABILITY OF SPECIFIC ENERGY SOURCES** **-INTRODUCE THE DECISIONS MATRIX** **Decisions Matrix - Duffy**	**4.A** Analyze multiple types of data to identify characteristics of energy sources derived from Earth's systems that increase the reliability of the energy grid (a criterion for success), given that for the system to remain stable, it must be designed for energy supply to meet energy demand. (SEP: 4.6; DCI: ESS3.A.2; DCI: PS3.B.4; CCC: 7.4)	• The energy used to create electricity in a power plant comes from Earth's systems. • Making decisions about complex societal issues like energy production requires defining criteria for success that might not be straightforward or easy to quantify. ***What's next?*** *We will use diagrams of power plants to figure out how they transfer energy into wires, which makes us wonder what is happening inside generators. We will dissect a generator, then build our own, and use compasses to investigate fields. Lastly, we will model energy transfer through fields inside our generators, and make connections between matter and energy to refer to as we move forward.*
Lesson 5: Where does electrical energy come from? **Lesson 5 - P.1 Energy Flow …** **P.1 Constructing DIY Gener…** **P.1 Lesson 5 Prep**	**P.1 Lesson 5 Teacher Edition** **-INITIAL MODELS OF ENERGY TRANSFER IN POWER PLANTS** **Power Plant Diagrams - Duffy**	**Learning Target:** I can develop and test a model of a generator to explain how energy is transferred to produce electricity and light. **Success Criteria:** I will…	**What students will wonder:** We use diagrams of power plants to figure out how they transfer energy into wires, which makes us wonder what is happening inside generators. We dissect a





-MOTIVATE A CLOSER LOOK AT THE GENERATOR



-BUILD A GENERATOR

P.1 Lesson 5 Teacher Refer…
P.1 Constructing DIY Gener…

-DEBRIEF THE GENERATOR INVESTIGATION

Generator Engineering Task …

-NAVIGATE: EXIT TICKET WITH A PARTNER

Point out that there is energy transfer at a distance (without parts of the generator touching), and suggest experiments to investigate this.

- develop a model that shows how energy and matter change within a generator system.
- explain how energy is transferred through moving parts and magnetic fields.
- design, test, and improve a generator system that transfers motion energy into light.

5.A Develop a model based on evidence to illustrate the energy and matter changes in a generator, including energy transfer through contact between moving parts and energy transfer at a distance through fields. (SEP: 2.3, DCI: PS3.A.2, PS3.A.3; CCC: 5.2)

5.B Design and build a generator system to transfer motion energy to light that meets agreed-upon criteria, manipulating variables and collecting data to identify failure points and improve performance. (SEP: 3.6, DCI: PS3.A.2; CCC: 4.1)

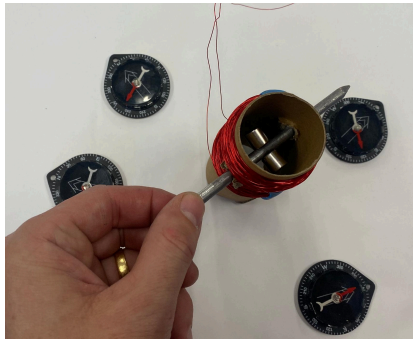
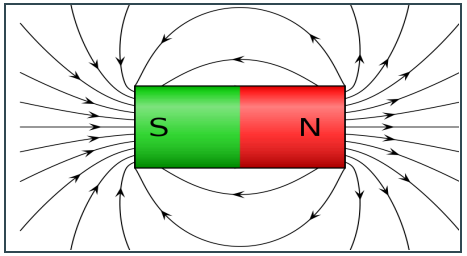
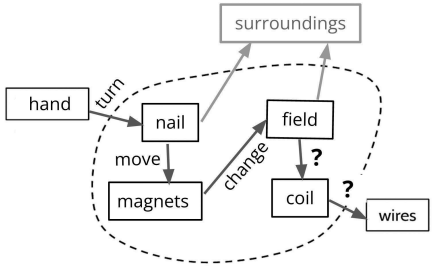
generator, then build our own, and use compasses to investigate fields. Lastly, we model energy transfer through fields inside our generators, and make connections between matter and energy to refer to as we move forward.

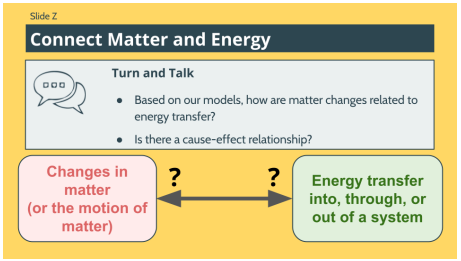
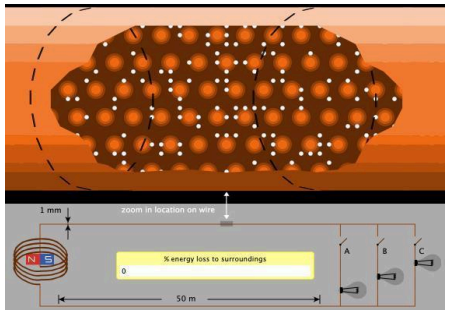
What students will figure out:

- Many power plants have generators, which are loops of copper wire and powerful magnets.
- Matter changes and/or motion can cause energy transfer through contact (and vice-versa).
- The motion of a magnet can generate changing fields, which can cause energy transfer at a distance (and vice-versa).
- When moving matter (e.g., pushing wind or steam) moves the magnets inside a generator, that can cause energy transfer into wires through changing fields.

What's next?

We will read about fields to help us model energy transfer more closely, focusing on transfers inside a wire. Using a simulation, we will explore how characteristics

	-REVISIT COMMUNITY AGREEMENTS: "RESPECTFUL" CATEGORY **-BUILD UNDERSTANDING ABOUT MAGNETISM**   **-MODEL ENERGY TRANSFER IN THE GENERATOR**  		*of an electrical system could influence the transfer of electrical energy, and check our results using classroom equipment. We will then refine our Engineering Design Trackers with ideas from the simulation.*

	-DISCUSS MATTER-ENERGY CONNECTION AND ADD TO THE PROGRESS TRACKER  Slide Z Connect Matter and Energy Turn and Talk • Based on our models, how are matter changes related to energy transfer? • Is there a cause-effect relationship? Changes in matter (or the motion of matter) ? ? Energy transfer into, through, or out of a system **-NAVIGATE: EXIT TICKET** **Connect the generator investigations back to what happened in Texas by completing an exit ticket.**		
Lesson 6: How does energy transfer in wires? **Lesson 6 - P.1 Energy Flow …**  **P.1 Lesson 6**	**P.1 Lesson 6 Teacher Edition** **-DO A CLOSE READING ABOUT FIELDS** **Changing Fields - Duffy** **-MODEL ENERGY TRANSFER IN THE FIELDS READING** **P.1 Lesson 6 Reference Rub…** **-MODEL THE TRANSFER OF MATTER INSIDE A WIRE** **-IDENTIFY MODEL LIMITATIONS AND NEW QUESTIONS** **-NAVIGATE: ASSIGN HOME LEARNING** **Models of Electrons - Duffy**	**Learning Target:** I can use models and simulations to explain how electrical energy is transferred through particles and fields in a system. **Success Criteria:** I will… • use readings, models, and simulations to explain how particles and fields transfer electrical energy. • identify cause-and-effect relationships between particle motion and energy transfer in a system. • use a simulation to analyze electron flow and determine how changes in	**What students will wonder:** We read about fields to help us model energy transfer more closely, focusing on transfers inside a wire. Using a simulation, we explore how characteristics of an electrical system could influence the transfer of electrical energy, and check our results using classroom equipment. We then refine our Engineering Design Trackers with ideas from the simulation. **What students will figure out:** • Electric and magnetic fields change when energy transfers into or out of

Wire Sim Results

- As ... increases, ... decreases.
- As ... increases, ... increases.
- As ... increases, ... doesn't change much.

-INTRODUCE THE COMPUTER SIMULATION

Wire Simulation Investigatio…

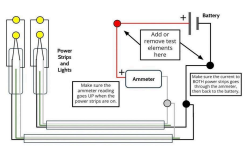
-CONDUCT AN INVESTIGATION USING THE SIMULATION

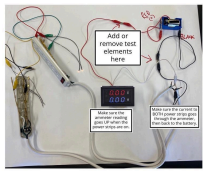
Wire Simulation Investigatio…

-SHARE CONCLUSIONS

-CARRY OUT REAL-LIFE EXPERIMENTS

P.1 Lesson 6 Teacher Refer…





-NAVIGATE: EXIT TICKET

-FILL IN THE ENGINEERING DESIGN TRACKER
Add to the Engineering Design Tracker to include the main ideas on the Wire Sim Results poster.

-ASSIGN THE MOTOR TRANSFER TASK

-REVISIT "MOVING OUR SCIENCE THINKING FORWARD"

-NAVIGATE: EXIT TICKET

variables affect electrical energy transfer.

6.A Integrate information from a reading alongside student-generated models and a computer simulation to examine smaller-scale mechanisms within the system and develop cause-effect relationships about motions of particles or energy stored in fields. (SEP: 8.2; DCI: PS3.A.3; CCC: 2.2)

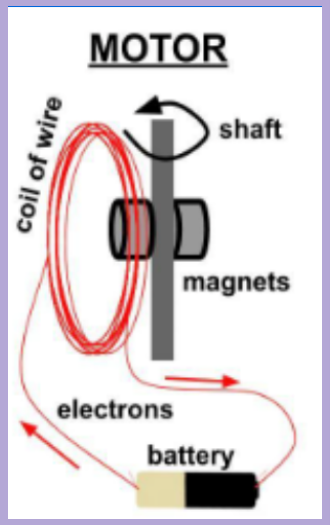
6.B Use a simulation to model electron flow inside a wire in order to identify patterns, answer questions, and determine relationships between independent and dependent variables involving electrical energy transfer that can be interpreted to reengineer and improve the electric grid. (SEP: 1.3; DCI: PS3.A.4; CCC: 1.3)

them.

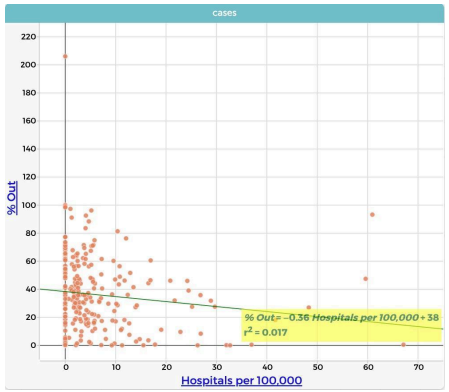
- Electric fields can push electrons. "Electrical energy" is the energy of the movement of electrons transferring through pushes from fields.
- A turbine transfers energy through electric and magnetic fields to the electrons in a wire, causing them to slosh back and forth continuously.
- Electrons cause the atoms of the wire material to heat up, transferring energy from the system to the surroundings as "heat".

What's next?

We will develop a model showing how insufficient supply entering the electrical system could lead to buildings losing power during a crisis. We will test our models using Electric City, and we will notice that to keep the lights on in one building, we need to cut power to others. We will use data to test for correlations with county-level factors, and we will consider limitations on this analysis.

	OPTIONAL: **Algebra in Circuits - Duffy**		
-LS1 Common Assessment: **Motors Transfer Task** Lesson 6: How does energy transfer in wires? **Lesson 6 - P.1 Energy Flow from Earth'…** **P.1 Lesson 6 Teacher Edition** **Built in Canvas using this.** **Answer Key.** 	Motor Speed (rpm)	Temperature After 5 min (°C)
---	---
100	25
200	31
300	39
400	48 | 		**Learning Target:** I can design, build, and improve a device that converts energy from one form into another within given constraints. **Success Criteria:** I will… • develop and use models to explain how energy is transferred and transformed in my device. • design and test a device that successfully converts one form of energy into another. • refine my design based on evidence, performance data, and design constraints. **Transfer Task HS-PS3-3** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. (SEP: 2.3, 6.5; DCI: PS3.A.2, PS3.A.3, PS3.D.1; CCC: 5.2)	
Learning Sequence 2: What could cause unbalanced effects on communities that experience blackouts? **Class Notes: LS2 - What could cause unbalanced effects on communities that experience blackouts?**			
Lesson 7: What could have caused the disparities we saw in the blackouts in Texas? **Lesson 7 - P.1 Energy Flow …**	**P.1 Lesson 7 Teacher Edition** **-NAVIGATE** **Navigate into the work by deciding to put the pieces together. Brainstorm what to include in a model to show how an insufficient supply could have affected energy transfer into certain communities in Texas when the temperatures dropped.**	**Learning Target:** I can develop and test explanations for how energy supply affects communities and evaluate tradeoffs involved in energy system decisions. **Success Criteria:** I will… • develop a model showing how a decrease in energy supply can reduce energy transfer to communities.	**What students will wonder:** We develop a model showing how insufficient supply entering the system could lead to buildings losing power during a crisis. We test our models using Electric City, and we notice that to keep the lights on in one building, we need to cut power to others. We use data to test for correlations with county-level factors, and we consider limitations on this analysis.





-MODEL IN GROUPS
Have student groups model energy transfer to show how insufficient supply could have affected energy transfer into certain communities in Texas when the temperatures dropped.

-CREATE A CONSENSUS MODEL
Create a consensus model. Highlight what we do not know about how limited supply is distributed during a crisis. Motivate using Electric City to test our ideas.

-USE ELECTRIC CITY TO TEST OUR IDEAS
Use Electric City to model an energy supply crisis. Orient students to the ammeter. Make decisions to keep the lights on in the "hospital".

-NAVIGATE BY CONSIDERING OUR DECISION-MAKING
Have students turn and talk about human decision-making. Make it clear that students' concerns about ethics and decision-making have a rightful presence in the science classroom.

-NAVIGATE WITH A STOP AND JOT

- use evidence to explain how disruptions in the energy system contributed to power outages in Texas.
- develop and test a hypothesis about energy tradeoffs and use data to evaluate the strengths and limitations of my explanation.

7.A Develop a model showing how insufficient supply entering the system could lead to reduced energy transfer into certain communities in Texas when the temperatures dropped, resulting in buildings losing power. (SEP: 2.3; DCI: PS3.B.4; CCC: 5.2, 5.3)

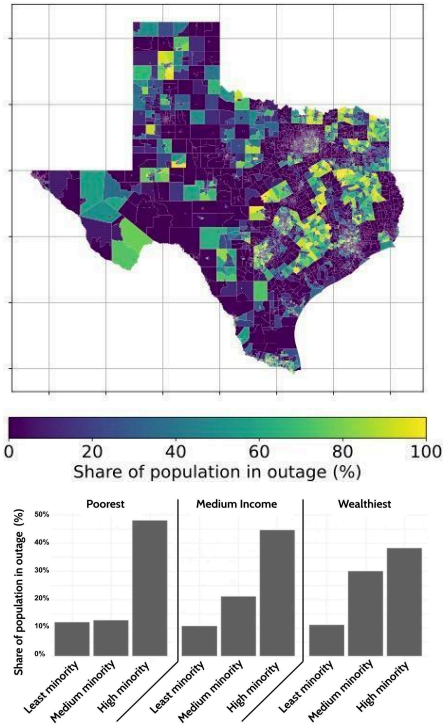
7.B Develop and test a correlational hypothesis to investigate tradeoffs inherent in making decisions about energy, and then consider limitations on this analysis to motivate seeking information about patterns at a smaller grain size. (SEP: 1.6, 4.2, 4.3; DCI: ETS1.B.1; CCC: 2.1, 3.3)

What students will figure out:

- Power companies in Texas probably had to make decisions about who lost power in some places in order to keep the lights on in others.
- There is no one factor that explains why some counties in Texas lost power and others did not.

What's next?
We will listen to a podcast featuring a scientist whose research group used satellite data to investigate patterns in who lost power in Texas. We will read about two fictionalized families in Texas and consider how existing disparities can make the impact of a power outage inequitable across communities. We will consider battery power as a potential solution.

	Have students stop and jot about human decision-making. **-ANALYZING DATA AS A CLASS** **Untitled Document - CODAP** **Lead the class in discussing a hypothesis and making a prediction. Orient to CODAP and run a correlation analysis between hospitals and percent out. Have students turn and talk about what might vary between counties.** **-ANALYZE DATA IN SMALL GROUPS** **Have student groups complete Texas County Data Analysis to develop a hypothesis, test it using CODAP, and consider limitations on the scale of our analysis.** **-DISCUSS LIMITATIONS OF THE DATA SET** **Texas County Data - Duffy** **Motivate a better look at counties by discussing the limitations of our analysis. Use a Turn and Talk to get students thinking about patterns within a county.**		
Lesson 8: Why do design solutions affect some people differently than others? **Lesson 8 - P.1 Energy Flow …**	**P.1 Lesson 8 Teacher Edition** **-NAVIGATE** **Navigate by prompting students**	**Learning Target:** I can analyze information from multiple sources to explain the challenges and tradeoffs involved in making	**What students will wonder:** We listen to (and read the transcript of) a podcast featuring a scientist whose research group

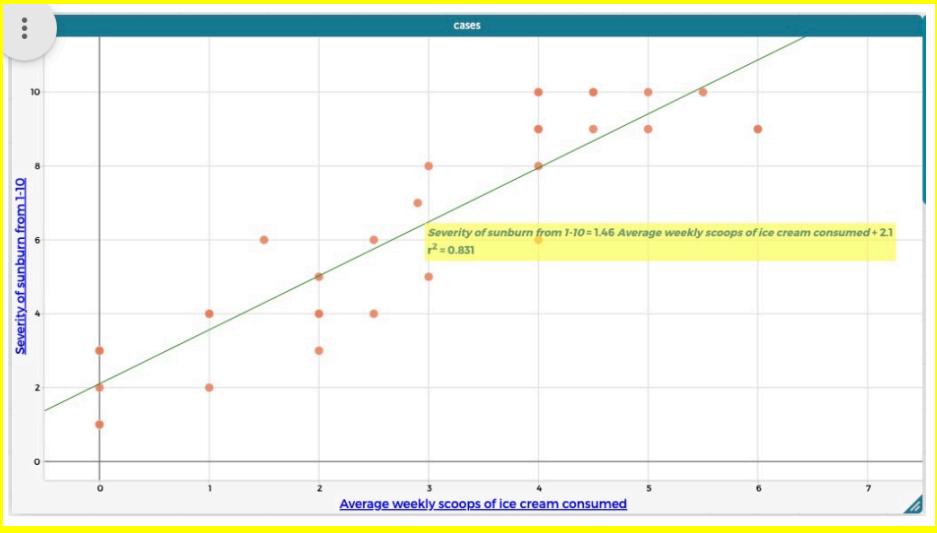
	**to reflect on their questions.** **-LISTEN TO AN INTERVIEW WITH AN EXPERT** **Podcast Transcript Interview** **P.1 Interview With an Expert …** **Have student groups listen to a podcast and discuss questions embedded in its transcript. Use Listening Group Roles Reference to scaffold this task (optional).** **-BUILDING UNDERSTANDING** **Discuss takeaways from the podcast as a class, eliciting ideas about correlation, design solutions, and tradeoffs. Forecast that we will continue to think about tradeoffs inherent in decision-making about power.** **-NAVIGATE** **Discuss tradeoffs that we identified in our last class period to navigate back into the work.** **-REVIEW THE READING'S INTRODUCTION** **Texas Case Studies - Duffy** **Discuss how tradeoffs might affect people differently. Motivate the reading and have partners read the introduction.** **-REVIEW THE READING'S CASE**	energy decisions during periods of high demand and limited supply. **Success Criteria:** I will… • analyze quantitative, visual, and written information about energy supply and demand. • identify challenges and tradeoffs that occur when energy supply decreases during extreme weather events. • use evidence from multiple sources to evaluate different energy decision-making options. **8.A** Integrate quantitative information, visual information, and audio (or text) to define some of the challenges and tradeoffs associated with a drop in energy supply driven by cold weather, and consider additional tradeoffs associated with making energy decisions. (SEP: 8.2; CCC/NOS: 5.2, 5.3; Science Addresses Questions About the Natural and Material World; DCI: ETS1.A.2, ETS1.B.1)	used satellite data to investigate patterns in who lost power in Texas. We discuss takeaways and put together the pieces we have gathered over the past several lessons. We realize that some tradeoffs associated with engineering design decisions affect people in different ways. We read about two fictionalized families in Texas and consider how existing disparities can make the impact of a power outage inequitable across communities. We consider battery power as a potential solution. **What students will figure out:** • An imbalance of energy supply and demand was the primary cause of the blackouts in Texas in February 2021. • Design solutions for avoiding this in the future include interconnected power grids to increase supply when necessary, and winterizing gas pipelines and windmills. • Across Texas, what neighborhood people lived in made an impact on whether they lost power. • Power outages have an

	STUDIES **Have students read the case studies individually and respond to the reflection questions. Then discuss the reading as a class.** **-NAVIGATE: EXIT TICKET** **Assign the electronic Exit Ticket using an online form.**		inequitable impact on people in communities where there are existing disparities. ● Throughout Texas, power companies made decisions to keep the power on in neighborhoods with "essential" buildings. ● All forms of energy production and other resource extraction have economic, social, environmental, and geopolitical costs and risks as well as benefits, which we will need to consider when making decisions about our own communities. ***What's next?*** *We will develop and revise energy transfer models to represent how batteries can make electric grid systems more reliable. We will quantify how much energy was needed to prevent the energy crisis in Texas 2021. We will use data from existing energy storage solutions to calculate the number of batteries needed and the costs associated with adding them to the system.*

-LS2 Common Assessment:
Electricity Tradeoffs Transfer Task

Lesson 8: Why do design solutions affect some people differently than others?
Lesson 8 - P.1 Energy Flow from Earth's Systems
P.1 Lesson 8 Handout Podcast Transcript Interview
Built on Canvas using this.

P.1 Lesson 8 Answer Key L8 Electronic Exit



Learning Target: I can use evidence from data and models to explain energy-related challenges and evaluate tradeoffs in energy decisions.

Success Criteria: I will…

- analyze data to identify patterns and distinguish between correlation and causation.
- explain how energy moves through systems and where energy can be transferred out of a system.
- use evidence to evaluate tradeoffs and propose solutions to energy challenges at different scales.

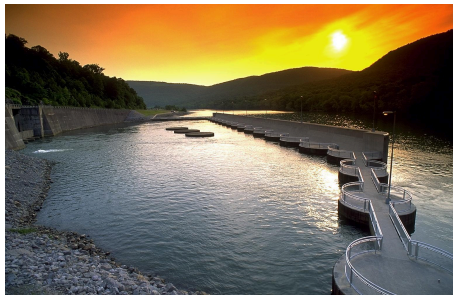
7.A Develop a model showing how insufficient supply entering the system could lead to reduced energy transfer into certain communities in Texas when the temperatures dropped, resulting in buildings losing power. (SEP: 2.3; CCC: 5.2, 5.3; DCI: PS3.B.4)

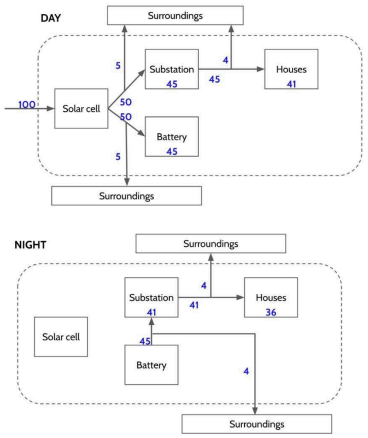
7.B Develop and test a correlational hypothesis to investigate trade-offs inherent in making decisions about energy, and then consider limitations on this analysis to motivate seeking information about patterns at a smaller grain size. (SEP: 1.6, 4.2, 4.3; CCC: 2.1, 3.3; ETS1.B.1)

8.A Integrate quantitative information, visual information, and audio (or text) to define some of the challenges and trade-offs associated with a drop in energy supply driven by cold weather, and consider additional trade-offs associated with making energy decisions. (SEP: 8.2; CCC: 5.2, 5.3, Science Addresses Questions About the Natural and Material World; DCI: ETS1.A.2, ETS1.B.1)

Learning Sequence 3: What Design Solutions could improve Electricity Systems in our Communities?

Lesson 9: How can energy storage make our systems more reliable during an energy crisis? **Lesson 9 - P.1 Energy Flow …**	**P.1 Lesson 9 Teacher Edition** **-NAVIGATE** **Review the design solutions**	**Learning Target:** I can use models and calculations to evaluate how battery storage can	**What students will wonder:** We develop and revise energy transfer models to represent how batteries can make electric grid





that could help power companies generate enough electricity through a crisis.

-INTEGRATE A BATTERY INTO THE ENERGY TRANSFER MODEL

Modeling Reliability - Duffy

P.1 Lesson 9 Answer Key M..

Have students model how adding a battery to a system affects its reliability. Ask students to switch a model with a partner and give feedback.

-CONSIDER A REAL ENERGY STORAGE SYSTEM

Describe the Moss Landing Energy Storage Facility. Calculate how much energy was needed to fill the gap in Texas in February 2021.

-NAVIGATE: PEER FEEDBACK SELF-ASSESSMENT

Reflect on giving and receiving feedback with a self-assessment exit ticket.

-NAVIGATE

Have students share some of their strategies to calculate the number of Moss Landings needed to provide enough energy to prevent an energy crisis in Texas. Carry out the calculation with the class.

improve the stability and reliability of an energy system.

Success Criteria: I will…

- develop and use a model to predict how batteries affect energy transfer and grid stability.
- compare energy systems with and without batteries to explain how energy storage can prevent outages.
- use calculations involving ratios, rates, percentages, and unit conversions to evaluate the feasibility of energy solutions.

9.A Develop an energy transfer model to predict the stability in the distribution of electric energy when batteries are present and absent from the system. (SEP: 2.3; CCC: 7.4; DCI: PS3.B.1, PS3.B.4)

9.B Apply ratios, rates, percentages, and unit conversions to calculate the costs and land area of use of a design solution to evaluate its feasibility for preventing an energy crisis like the one in Texas in 2021. (SEP: 5.5;

systems more reliable. We quantify how much energy was needed to prevent the energy crisis in Texas 2021. We use data from existing energy storage solutions to calculate the number of batteries needed and the costs associated with adding them to the system. We add to our Engineering Design Trackers, and wonder about the non-financial costs of design solutions.

What students will figure out:

- All forms of energy production and other resource extraction have economic, social, environmental, and geopolitical costs and risks as well as benefits, which we will need to consider when making decisions about our own communities.
- Design solutions that store excess energy can prevent an energy crisis by bridging the gap between energy demand and supply.
- Energy storage systems can make an electric grid more reliable by providing power when the energy supply drops.

	-CARRY OUT ADDITIONAL CALCULATIONS **Calculate the cost of the energy storage system in partners, and as a class.** **-EVALUATE ADDITIONAL ENERGY STORAGE SOLUTIONS** **Testing Battery Storage - Duffy** **Raise the issue of challenges to battery installation. Give students 12 minutes to complete Testing Battery Storage Solutions. Have them finish this handout as home learning if time is short.** **-NAVIGATE** **Consider tradeoffs associated with batteries to motivate the home learning reading assignment** **Reading Battery Constructio…** **P.1 Lesson 9 Answer Key En…**	DCI: ETS1.B.1; PS3.D.1; CCC: 3.1)	***What's next?*** *We will read about tradeoffs associated with various energy sources. We will identify the electricity-related values of diverse interested parties. We will begin developing a plan for improving electricity infrastructure in our community.*
Lesson 10: What decisions do we need to make to design more reliable systems to meet our community's energy needs? **Lesson 10 - P.1 Energy Flo…**	**P.1 Lesson 10 Teacher Edition** **-NAVIGATE** **Have students turn and talk about criteria that might be missing from our decision matrices.** **Decisions Matrix - Duffy** **-READ ARTICLES AND IDENTIFY TRADEOFFS IN**	**Learning Target:** I can analyze community perspectives and tradeoffs to define criteria for improving the reliability and impact of energy systems. **Success Criteria:** I will… • gather and analyze information from community members about	**What students will wonder:** We read about tradeoffs associated with various energy sources. We create a Consensus Decisions Matrix that represents the criteria we agree are important when making decisions. We read quotes from interested parties, and develop and carry out an interview protocol to capture the values of people in our community.



Ranking	Criterion* & Reason - Interested Party #1 (Mother)	Criterion* & Reason - Interested Party #2 (Grandmother)
Highest Priority	**Cost:** I have three kids, and I belong to the middle income bracket, which means the cost of living is super high. If the electricity bill were to be cheaper, that would be a big help	**Environmental impact:** I have seen the impact we are having in the environment. My biggest priority is to ensure we do not continue damaging our planet.
Second highest	**Safety:** A power plant can affect our town and our environment, especially if it is going to be close to where I live. I don't want something polluting the air of the water that my family drinks.	**Social impact:** Some communities living close to where the power plants are built might be more affected. I don't want energy generation to affect other communities.
Second lowest	**Environment:** I want to have a planet for my kids and my grandkids.	**Cost:** Electricity is expensive, but I can afford it.
Lowest priority	**Aesthetics:** I want my region to look nice, but it is not a big priority. If it is going to be close to my place and affect my property value, then I would care more.	**Reliability:** I know the fluctuation of energy in this region is not significant, so that is not my main concern.

JIGSAW GROUPS
Assign each student an article about tradeoffs associated with the energy sources we have been investigating. Create jigsaw groups including at least three articles per group to identify additional important criteria and update students' decision matrices.

Biomass Impacts - Duffy
Coal Impacts - Duffy
Gas Impacts - Duffy
Hydropower Impacts - Duffy
Nuclear Impacts - Duffy
Solar Impacts - Duffy

-CONSIDER HOW COSTS AFFECT PEOPLE
Elicit student ideas about costs that are not financial to motivate the need to develop criteria for making decisions about energy production.

-BUILD A CLASS CONSENSUS DECISIONS MATRIX
Have students generate ideas for categories in a Scientists Circle. As a class, decide which criteria to include in a Consensus Decisions Matrix, and rate how well the various energy sources meet them.
Energy Source Cards to Prin…

-NAVIGATE

energy system needs and concerns.
- identify criteria for successful energy solutions, including cost, safety, reliability, and environmental impact.
- evaluate tradeoffs between different energy decisions and explain how they affect communities.

10.A Define the problem, and then interview various interested parties in our community to identify criteria that can help make decisions to improve the electricity infrastructure, including how it is designed for reliability (stability) and its social, cultural, and environmental impacts. (SEP: 1.4, 1.8; DCI: ETS1.B.1; CCC: 7.4)

10.B Analyze data generated by interviews with community members to specify criteria for success related to energy solutions, such as monetary cost, safety, and reliability, and weigh cost/benefit tradeoffs related to social, cultural, and environmental impacts. (SEP: 4.6; DCI: ETS.1.B.1; CCC: Influence of Science, Engineering, and

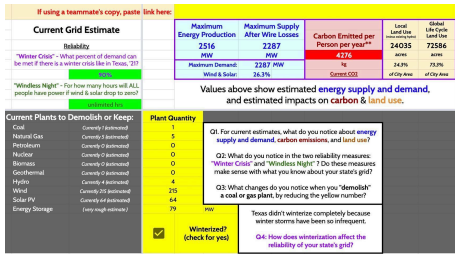
We begin developing a plan for improving electricity infrastructure in our community.

What students will figure out:
- When developing solutions to redesign our electric grid, we need to take into account a range of constraints, including cost, safety, reliability, and aesthetics, and to weigh the various social, cultural, and environmental impacts that specific choices may have.
- Input from interested parties and people we know can help us decide which values and priorities should guide how we address tradeoffs in our local energy grid solution.

What's next?
We will use a computational model to measure the success of our solutions against various criteria. We will describe our design solution to our classmates and use each other's feedback to refine our designs. We will celebrate our progress on the Driving Question Board. We will complete an assessment, explaining energy transfer in a solar sand power plant and using data to evaluate

	Have students record their personal rankings of the most important criteria. As an exit ticket, have them place stickers on the Consensus Decisions Matrix to reflect the most important categories for us to weight. **-NAVIGATE: NOTICING PATTERNS** **Review the Consensus Decisions Matrix to identify the criteria that we felt were most important.** **-CONSIDER THE VALUES OF INTERESTED PARTIES** **Motivate the reading about interested parties. Have students read and discuss the interested parties' quotes in pairs or small groups.** **Reference Quotes from Inter…** **-PREPARE TO INTERVIEW INTERESTED PARTIES** **Have students turn and talk about how to represent the values of interested parties before making decisions about energy.** **-DEVELOP A SCRIPT FOR COLLECTING INTERESTED PARTIES' FEEDBACK** **Have students work in partners to develop a script for collecting interested parties' feedback. As**	Technology on Society and the Natural World, Science Is a Human Endeavor)	*its feasibility for providing reliable power to a community.*

	a home learning assignment, students will use their script to interview an interested party. **Interview Protocol - Duffy** **-NAVIGATE** **Have students debrief their interviews in small groups.** **-ADD RANKINGS OF INTERESTED PARTIES TO THE CLASS MATRIX** **Have students add the rankings of the people they interviewed to the Consensus Decisions Matrix.** **-DECIDE HOW TO WEIGHT CRITERIA** **Have students look for new patterns in the importance given to each criterion on the Consensus Decisions Matrix poster. Co-develop a system for weighting the criteria.** **-INTRODUCE THE DESIGN CHALLENGE** **Have student groups complete the first two tasks on the Design Challenge handout to prepare to develop a community plan.** **Design Challenge - Duffy** **Energy Source Statistics - D…** **-NAVIGATE** **complete the Electronic Exit**		

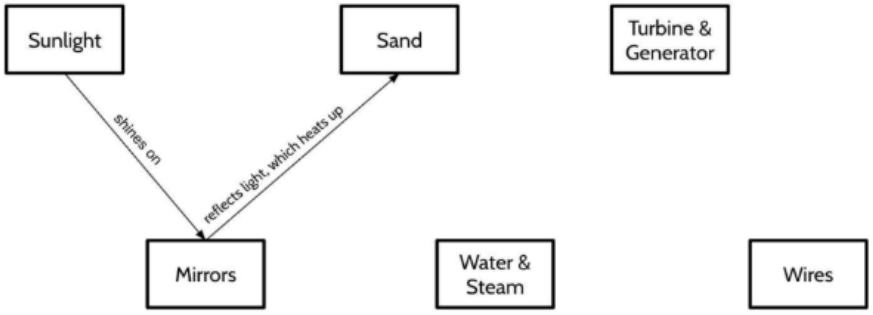
	[Ticket.](#) **P.1 Lesson 10 Answer Key L…**		
Lesson 11: What have we figured out, and what can we carry forward? **Lesson 11 - P.1 Energy Flow…**  	**P.1 Lesson 11 Teacher Edition** **-NAVIGATE** **Reconvene the culminating project groups formed in Lesson 10, and have students discuss criteria and measures.** **-INTRODUCE THE ENERGY GRID CALCULATOR** **Introduce the Energy Grid Calculator as a tool for measuring success against a number of possible criteria.** **Energy Grid Calculator** **-COMPLETE QUESTION 2 OF THE DESIGN CHALLENGE** **Have students complete Question 2 of the Design Challenge using the Energy Grid Calculator.** **P.1 Lesson 11 Answer Key D…** **-INTRODUCE ADDITIONAL FUNCTIONS OF THE ENERGY GRID CALCULATOR** **Demonstrate how to use the Energy Grid Calculator as a tool for simulating grid solutions.** **-COMPLETE PART 2 OF THE DESIGN CHALLENGE** **Have students use the**	**Learning Target:** I can design and refine a solution to improve the electrical grid by using evidence, criteria, and tradeoff considerations. **Success Criteria:** I will… • define a problem related to improving the reliability and stability of the electrical grid. • evaluate and refine a design solution using scientific evidence, models, and established criteria. • consider social, cultural, environmental, and economic tradeoffs when selecting and defending a solution. **11.A** Define a problem related to the challenge of improving our electrical grid, and then design, evaluate, and refine a solution, taking into account social, cultural, and environmental impacts (both intentional and unintentional), based on results from a computational model, scientific knowledge we have figured out	**What students will wonder:** We learn about the Energy Grid Calculator, a computational model we use to measure the success of our solutions against a variety of criteria. We describe our design solution to our classmates, and we give each other feedback that we use to refine our designs. We return to the Driving Question Board and celebrate our progress in light of all the questions we can answer. We work through an assessment task in which we explain energy transfer in a solar sand power plant and use data to evaluate the feasibility of using this technology to provide reliable power to a community. **What students will figure out:** • Solving the problems with our energy grid will require tough choices because all choices have tradeoffs. • Factors that impact whether an energy grid solution is desirable include reliability, cost, carbon emissions, land use, and other factors.

	calculator to make changes to the grid that reflect their design criteria. Then instruct them to complete Q3 of the Design Challenge. **Design Challenge - Duffy** **-COMPLETE PART 3 OF THE DESIGN CHALLENGE** **Instruct students to complete Part 3. Circulate as they work to provide support.** **Design Challenge - Duffy** **-USE A STAYER-STRAYER PROTOCOL TO SHARE IDEAS AND GIVE PEER FEEDBACK** **Describe the stayer-strayer protocol and how students will give peer feedback using the handout.** **-INCORPORATE FEEDBACK INTO PRODUCTS** **Have students return to their original groups and process the feedback they received. Assign the home learning handout.** **P.1 Lesson 11 Handout Peer…** **-NAVIGATE: MAKING CONNECTIONS** **Use crosscutting concepts to review our progress over the course of this unit.** **-RETURN TO THE DRIVING QUESTIONS BOARD**	over the unit, weighted criteria, and tradeoff considerations. (SEP: 1.8, 2.6, 6.5, DCI: ETS1.A.2, ETS1.B.2, ESS3.A.2; CCC: 1.3) **11.B** Ask questions to identify and refine criteria for success for our design solutions, including reliability (stability) and social, cultural, and environmental impacts. (SEP: 1.4, DCI: ETS1.B.1; CCC: 7.4)	• The best solution to the problem of how to improve our energy grid depends on lots of factors, including the values and personal priorities of different people and interested parties. ***What's next?*** ***END OF UNIT***

	Have students work in pairs to determine which questions the class has answered from the DQB. Discuss the questions the class can now answer, and celebrate how far we have come. **P.1 Lesson 11 Handout Revi…** **-ADMINISTER THE FINAL TRANSFER TASK** **Set the context for the assessment and have students complete the assessment task in class.**		
-LS3 Common Assessment: **Sand and Mirrors Transfer Task** **Built in Canvas using this.** **P.1 Lesson 11 Answer Key Sand and Mirrors**		**Learning Target:** I can develop and use models to explain how energy is stored, transferred, and transformed in systems, and evaluate solutions that improve energy transfer. **Success Criteria:** I will… • develop and use models to show how energy is associated with the motion and positions of particles or objects. • use evidence and calculations to explain how energy moves through and between systems. • evaluate and justify solutions based on energy transfer, efficiency, and design criteria. **Transfer Task PE: HS-PS3-2** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects). (SEP: 2.3, 4.6, 5.5; DCI: PS3.A.1, PS3.A.2, PS3.A.4, PS3.B.1, PS3.B.4, PS3.D.1, ETS1.B.1; CCC: 5.2, 5.3)	



Only prototypes of 'sand power plants' exist right now Amble, CC BY-SA 4.0



Energy Flow from Earth's Systems

Energy in the Environment-Unit 2

Written by Kelsey Duffy
Presentation Created by Nicole Raccio
October 21, 2026



Unit 2: Energy Flow from Earth's Systems

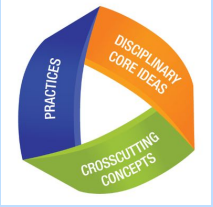
The students will explore how to design a more reliable systems to meet the communities' energy needs. **This unit is designed to introduce students to the concept of energy transfer in a relevant and grounded context: the Texas power crisis of February 2021.** Students read articles and wonder about the complex social, environmental, and physical realities that led to such a crisis. They figure out how energy transfers between systems from a generator to our communities, and what makes an energy source reliable. This allows the class to model and explain what happened in Texas at multiple scales, from the electrons in the wires to the power companies making difficult decisions to maintain stability. Students consider engineering tradeoffs, criteria, and constraints inherent in making decisions about our energy systems, and apply them in a culminating task: **design a reliable energy solution that meets our communities' needs, as articulated by interviews with friends and family members. The task is designed to give students the tools to speak up in their local and global community for a better energy future, one that aligns with their own values, and those of their families.**



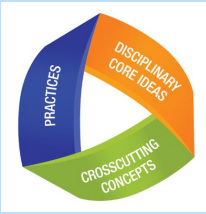
A winter storm in Texas in February 2021 led to devastating widespread blackouts throughout the state.

Standards Assessment

- **HS-PS3-2** Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motion of particles (objects) and energy associated with the relative positions of particles (objects).
- **HS-PS3-3** Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.
- **HS-PS3-1** Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.
- **HS-ESS3-2** Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.



SEPs, DCIs, & CCCs



Science & Engineering Practices (SEP)

- Developing and Using Models
- Constructing Explanations and Designing Solutions
- Engaging in Argument from Evidence

Disciplinary Core Ideas (DCI)

- PS3.A: Definitions of Energy
- S3.D: Energy in Chemical Processes
- ESS3.A Natural Resources

Crosscutting Concepts (CCC)

- Energy and Matter

Learning Sequence 1:

How does Electricity Transfer through Systems, and what causes Instability in those Systems?

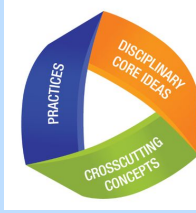
Lesson Level Questions:

- What can we learn from a blackout in Texas about producing reliable energy for our communities?
- What structures in the system enable energy transfer from one source to multiple devices, buildings, and neighborhoods?
- Could the blackouts in Texas have been caused by a broken or short-circuited circuit?
- What makes an energy source reliable?
- Where does electrical energy come from?
- How does energy transfer in wires?



Learning Sequence 1:

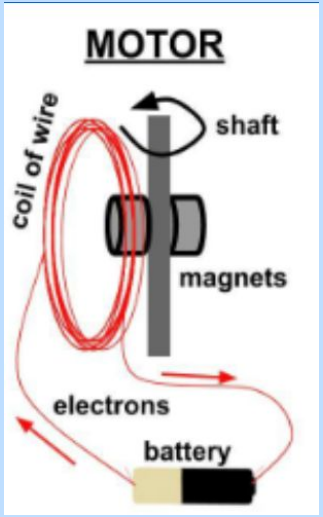
How does Electricity Transfer through Systems, and what causes Instability in those Systems?



Learning Objectives

- I can develop and use a model to explain how energy flows through systems to produce electricity in my community and how changes can cause blackouts.
- I can collect data and use models to explain how electrical energy moves through connected systems and where failures can occur.
- I can use evidence and data to explain how energy moves through the electric grid and how changes in the system contributed to the Texas power crisis.
- I can analyze data about energy sources to explain how different energy systems affect the reliability and stability of the electric grid.
- I can develop and test a model of a generator to explain how energy is transferred to produce electricity and light.
- I can use models and simulations to explain how electrical energy is transferred through particles and fields in a system.

Assessment:
Motors Transfer Task



Motor Speed (rpm)	Temperature After 5 min (°C)
100	25
200	31
300	39
400	48

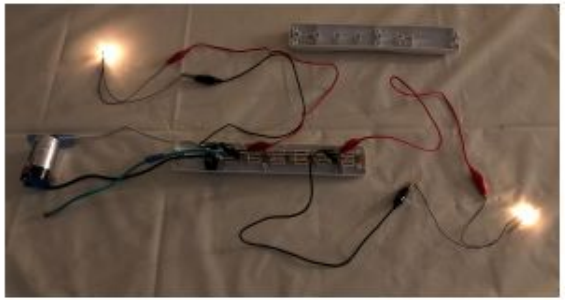


Learning Target: I can design, build, and improve a device that converts energy from one form into another within given constraints.

Success Criteria: I will…

- develop and use models to explain how energy is transferred and transformed in my device.
- design and test a device that successfully converts one form of energy into another.
- refine my design based on evidence, performance data, and design constraints.

What students figure out



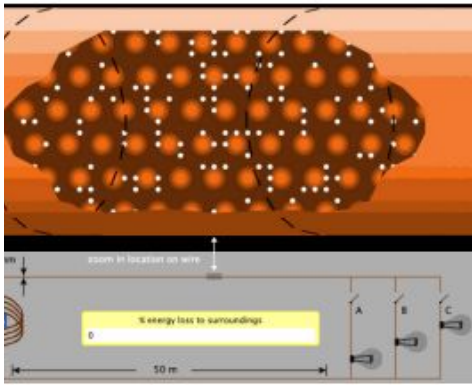
In a power strip, there are three pieces of metal that are each connected to three wires within the plug. Similar structures are found within a house, and even within electrical grid substations.



A light connected to generator glows and nearby compass needles change direction when either the magnet or wires in a generator moves.



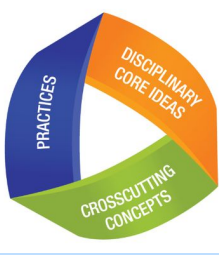
Descriptive and graphic data on a variety of energy sources reveal puzzling inconsistencies in each energy source's reliability during the blackout.



A simulation of electrons in a wire shows their motion with various circuit configurations and power sources, and it provides a measure of energy and current in various parts of the system.

Learning Sequence 2:

What could cause unbalanced effects on communities that experience blackouts?



Lesson Level Questions

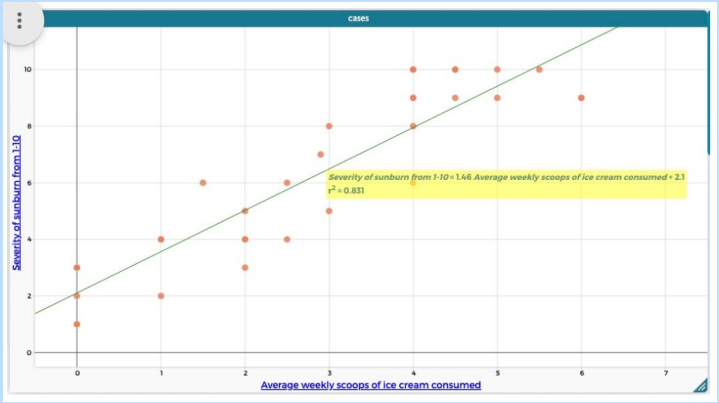
- What could have caused the disparities we saw in the blackouts in Texas?
- Why do design solutions affect some people differently than others?

Learning Targets

- I can develop and test explanations for how energy supply affects communities and evaluate tradeoffs involved in energy system decisions.
- I can analyze information from multiple sources to explain the challenges and tradeoffs involved in making energy decisions during periods of high demand and limited supply.

Assessment:

Electricity Trade Offs Transfer Task



Learning Target: I can use evidence from data and models to explain energy-related challenges and evaluate tradeoffs in energy decisions.

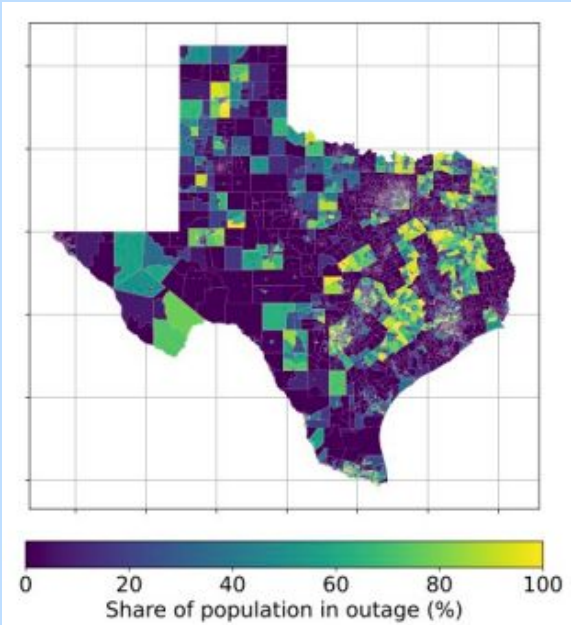
Success Criteria: I will…

- analyze data to identify patterns and distinguish between correlation and causation.
- explain how energy moves through systems and where energy can be transferred out of a system.
- use evidence to evaluate tradeoffs and propose solutions to energy challenges at different scales.

What students figure out



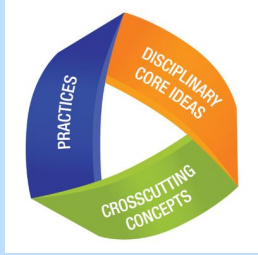
A data set shows disparities between counties impacted by the energy crisis in Texas that is not well explained by our model.



Scientists looking at satellite data uncovered patterns in the Texas power outages that we could not discern at a county-level scale.

Learning Sequence 3:

What Design Solutions could improve Electricity Systems in our Communities?



Lesson Level Questions

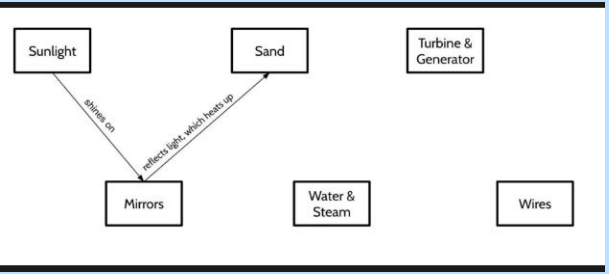
- How can energy storage make our systems more reliable during an energy crisis?
- What decisions do we need to make to design more reliable systems to meet our community's energy needs?
- What have we figured out, and what can we carry forward?

Learning Targets

- I can use models and calculations to evaluate how battery storage can improve the stability and reliability of an energy system.
- I can analyze community perspectives and tradeoffs to define criteria for improving the reliability and impact of energy systems.
- I can design and refine a solution to improve the electrical grid by using evidence, criteria, and trade off considerations.

Assessment:
Sand and Mirrors Transfer Task


Only prototypes of 'sand power plants' exist right now Amble, CC BY-SA 4.0



Learning Target: I can develop and use models to explain how energy is stored, transferred, and transformed in systems, and evaluate solutions that improve energy transfer.

Success Criteria: I will…

- develop and use models to show how energy is associated with the motion and positions of particles or objects.
- use evidence and calculations to explain how energy moves through and between systems.
- evaluate and justify solutions based on energy transfer, efficiency, and design criteria.

What students figure out



Batteries are not currently widely used in power grids.



There are multiple criteria, constraints, and tradeoffs to consider in making engineering decisions, and the interested parties in our communities don't always agree.



Complex global challenges manifest in our communities. Developing solutions will require science practices and creative design thinking.


Thank you!

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 c.

AGENDA REPORTING FORM

Agenda Topic: SHS Accelerated General Chemistry - Unit 1, Illuminating Matter - NEW - First Reading.

Summary of Issue: SHS Accelerated General Chemistry - Unit 1, Illuminating Matter- NEW - First Reading.

Background:

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

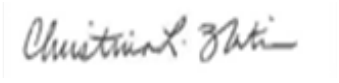
Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

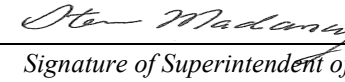
Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS Accelerated General Chemistry - Unit 1, Illuminating Matter - NEW– to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal



Signature of Staff Member Submitting Report



Signature of Superintendent of Schools

Unit Overview	
Unit Title:	General Chemistry Bundle 1: Illuminating Matter
Teacher:	Rich Niro & Lisa Daigle
Grade Level/Course:	9-12 Accelerated General Chemistry
Length/Dates:	8 weeks (22 Blocks)
Unit Summary:	Students figure out how a light bulb works by learning about atoms, subatomic particles, and electron behavior. Students learn that the electron produces what we see as light and mathematically calculate the energy required to see certain colors using Plack's equation which expands upon their understanding of the relationship between wavelength and frequency. Using periodic trends and reactivity, students understand why tungsten and argon are used in lightbulbs to get them to work and produce light.

Performance Expectations

This unit builds toward these performance expectations:

- HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.
- HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.
- HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

Essential Questions:

1. Why do some elements produce light in incandescent light bulbs but others can't?
2. How do light bulbs produce light and how do some types of light bulbs produce different colors of light?
3. Why do some elements react more than others and why is that important for designing and choosing materials for a light bulb?

Science and Engineering Practices (Skills)	Disciplinary Core Ideas (Knowledge)	Crosscutting Concepts (Enduring Understandings)
This unit **intentionally develops** students' engagement in these practice elements: **Developing and Using Models** Modeling in 9–12 builds on K–8 and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ● Use a model to predict the relationships between systems or between components of a system. **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and	**PS1.A: Structure and Properties of Matter** ● Each atom has a charged substructure consisting of a nucleus, which is made of protons and neutrons, surrounded by electrons. ● The periodic table orders elements horizontally by the number of protons in the atom's nucleus and places those with similar chemical properties in columns. The repeating patterns of this table reflect patterns of outer electron states. **PS1.B: Chemical Reactions** ● The fact that atoms are conserved, together with knowledge of the chemical properties of the elements involved, can be used to describe	This unit **intentionally develops** students' engagement in these crosscutting concept elements: **Patterns** ● Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena. **Cause and Effect** ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.

independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ● Construct and revise an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, models, theories, simulations, and peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future. **Using Mathematics and Computational Thinking** Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ● Use mathematical representations of phenomena or design solutions to	and predict chemical reactions. **PS4.A: Wave Properties** ● The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing.	

describe and/or support claims and/or explanations.		

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).
Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.
Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

C District Rubrics

Performance Assessment(s) and Evaluative Criteria:

1. LS1 Common Assessment: Illuminating Matter Assessment
   Success Criteria:
   - Use the periodic table to predict properties of elements
   - Analyze and interpret data
   - Use calculations when given a problem to figure out the number of protons, neutrons, electrons, and/or charge
   - Calculate the average atomic mass of an element using mathematics
   - Critical Thinking
     - Interpretation & Analysis
     - Reasoning
     - Problem Solving/Solution Finding

2. LS2 Common Assessment: Flame Test Performance Task
   Success Criteria: I will…

- Conduct an experiment
- Identify the unknown element
- Complete an orbital diagram and electron configuration of an element
- Calculate frequency and energy of the color of light of the unknown metal
- Write a CER to support the identification of your unknown metal
- Collaboration & Critical Thinking
    - Cooperation
    - Constructing Arguments

LS2 Common Assessment: Electron Energy Assessment

Success Criteria:

- Determine the number of subatomic particles of an atom
- Use the speed of light equation to solve for frequency or wavelength
- Use Planck's Equation to solve for energy or frequency
- Be able to explain and support the mathematical relationships between energy, frequency, and wavelengths
- Strong understanding of electron behavior and light
- Complete orbital diagrams of atoms using the periodic table
- Complete electron configurations of atoms using the periodic table
- Critical Thinking
    - Interpretation & Analysis
    - Reasoning
    - Problem Solving/Solution Finding

3. LS3 Common Assessment: Designing the Best Lightbulb Filament Performance task

Success Criteria:

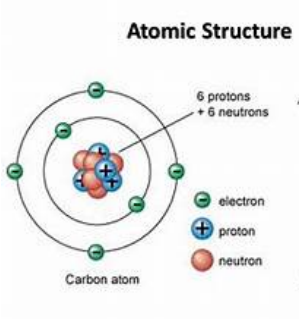
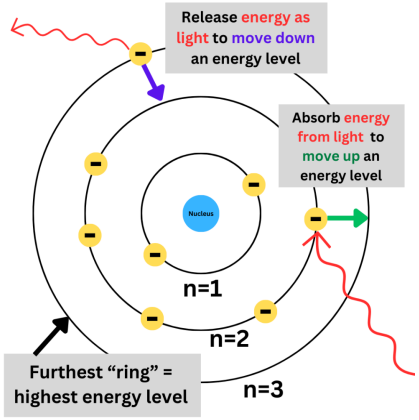
- Use the periodic table to predict properties of elements.
- Compare melting points and explain why they matter.
- Analyze ionization energy, electronegativity, and atomic radius.
- Use evidence to justify an engineering decision.
- Collaboration & Creativity
    - Cooperation
    - Creative Production & Innovation

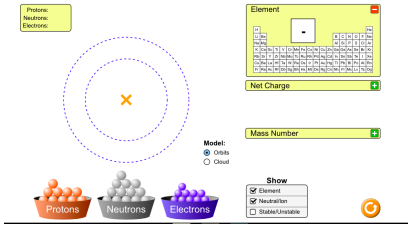
4. LS3 Common Assessment: Periodic Trends Assessment

Success Criteria:

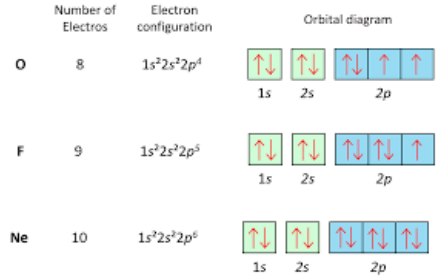
- Use Coulomb's Law to describe the trends on the periodic table
- Use trends on the periodic table to support reactivity for main group elements
- Critical Thinking
  - Interpretation & Analysis
  - Reasoning
  - Problem Solving/Solution Finding

Driving Question	Activity	Standard Objectives/Learning Target	Student will know and wonder
Learning Sequence 1: Why do some elements produce light in incandescent light bulbs but others can't?			
Lesson 1: What makes something glow, and why did early inventors struggle to create practical lightbulbs? (0.5 block) 	Light bulb Teacher Slides … 1. Initial model building: What do students think is happening inside a lightbulb? a. Article - Chemistry of the light bulb (can provide any time after initial model) b. Infographic	**Learning Target**: Develop a model to show how lightbulbs work at the subatomic level to produce light by identifying patterns in the data provided about how they work. **Success Criteria**: I will… • Create a detailed initial model about how lightbulbs work including the data provided. • Ask questions and make predictions about the chemistry of light bulbs **1.A** Develop a model to show how lightbulbs work at the subatomic level to produce light by identifying patterns in the	Students create a model based on how they think the lightbulb works based on what they think and the data provided. Students learn that the metal in the lightbulb is tungsten. They also learn about different types of lightbulbs and learn that different materials are more efficient than others. This helps students refine their initial models to add more details. Students will wonder how the light is produced and why tungsten is used in regular lightbulbs.

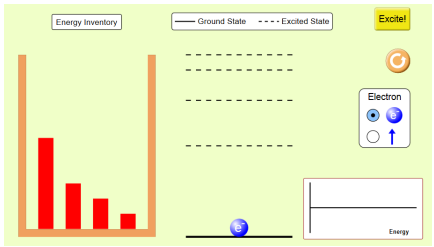
		data provided about how they work.	
Lesson 2: How does the arrangement of atoms and electrons determine what materials can produce light? (3 blocks)   	Light Bulb Teacher Slides… **Activities**: 1. Interactive Periodic Table a. PT Coloring b. Updated sheet i. Answer Key c. Families of the Periodic Table Graphic Organizer i. Key 2. **How Big is an Atom?** - Ted Ed Video 3. Build an Atom Phet Sim. With worksheet: Phet WS a. Check in: Calculating Subatomic Particles OR Canvas Check In 4. Average Atomic Mass a. Isotope Notation b. Calc Avg. Atomic Mass c. Abun. of Isotopes d. AMU Problems e. Optional Practice	**Learning Target**: Use the periodic table as a model to predict basic properties of different elements by identifying patterns in different families **Learning Target:** Use a computer simulation and the periodic table as a model to calculate the number of protons, neutrons, and electrons as well as find patterns with the subatomic particles to classify a neutral atom, an isotope, and an ion. **Learning Target**: Use math to solve for the average atomic mass to develop a deeper understanding of the decimal on the periodic table for each element. **Learning Target:** Develop or use the Bohr model to illustrate the subatomic particles in an atom and recognize patterns of subatomic particle placement in different materials when building or drawing these models **Success Criteria**: I will… ● Explain and define	Students become familiar with the periodic table and learn that it is arranged based on their basic properties and organized into families. Students learn about the structure of an atom and learn that protons, neutrons, and electrons are the subatomic particles. They learn that protons determine the element while in conjunction with neutrons, this determines the element's mass number. Electrons are the subatomic particles where their mass is negligible. Students will wonder why light bulbs can be different colors.

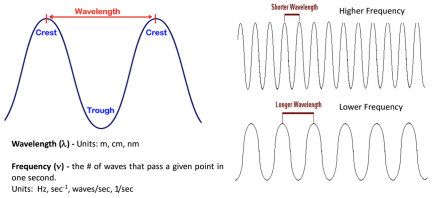
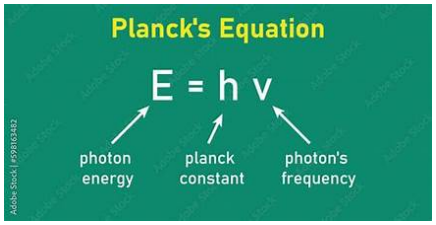
	 5. Bohr Models & Valence Electrons a. Only the last page is graded. Students should complete the last 2 pages independently. b. Extra Practice (optional): Bohr Model Practice c. Bohr Model Stations (Optional) **Optional Extension:** 1. Elements Bracket - Generates student-to-student discussion of the BEST element. **References:** 1. Review: Periodic Table Notes	different families of the periodic table and their properties • Use the periodic table to determine the number of protons, neutrons, and electrons in an atom and classify neutral atoms, isotopes, and ions • Develop a mathematical understanding for the average atomic mass • Differentiate between the average atomic mass of an element and the mass number of an atom • Develop or use a Bohr model to identify an element and their arrangement of electrons • Determine the number of valence electrons in an atom using the periodic table **2.A** Use the periodic table as a model to predict properties of elements by defining patterns in the different families of the periodic table. **2.B** Use mathematical thinking to solve for the average atomic mass to describe the decimal seen on the periodic table.	

	2. Or Periodic Families Notes 3. Periodic table notes 4. Bohr Model Notes **Textbook References:** **Note-taking guide** 5. 1.1 Chemistry in Context 6. 1.2 Phases and Classifications of Matter 7. 1.3 Physical and Chemical Properties 8. 2.1 Early Ideas in Atomic Theory 9. 2.2 Evolution of Atomic Theory 10. 2.3 Atomic Structure and Symbolism 11. 3.2 The Bohr Model 12. 3.6 The Periodic Table	**2.C** Use the Bohr model to illustrate the subatomic particles in an atom and recognize patterns of subatomic particle placement in different materials when building or drawing these models.	
Assess on Atomic Structure and Periodic Location **Lesson 3 Teacher Slides Light Bulb** **Lesson 3: Illuminating Matter, Quiz 1 Version 2** **Review options:** 1. **Study Guide & Practice:** **[As Stations] [As Worksheet] (45-60 min.)**		**Learning Target**: Interpret models, tables, and graphs to predict properties of elements and use mathematics and computational thinking to calculate subatomic particles or average atomic mass by utilizing your knowledge and patterns of the periodic table. **Success Criteria**: I will… • Use the periodic table to predict properties of elements • Analyze and interpret data related to physical properties of elements • Use calculations when given a problem to	

2 blocks with review		figure out the number of protons, neutrons, electrons, and/or charge for an atom, isotope, or ion • Calculate the average atomic mass of an element using mathematics • VoG: Critical Thinking ○ Interpretation & Analysis ○ Reasoning ○ Problem Solving/Solution Finding **3.A** Use and interpret models, tables, and graphs to predict properties of elements by identifying patterns on the periodic table or diagrams provided. **3.B** Use mathematics and computational thinking to calculate subatomic particles or average atomic mass by using the patterns on the periodic table or natural abundance of isotopes.	
Learning Sequence 2: How do light bulbs produce light and how do some types of light bulbs produce different colors of light?			
Lesson 4: How do electrons moving between energy levels produce light? (3 blocks)  	Lesson 4 Teacher Slides L… 1. Related Phenom. Intro - Science of Fireworks Article 2. Electron Configuration POGIL 3. Electron Configuration Interactive 4. Electron Configuration walkthrough a. Designed for Canvas b. Paper Version 5. Electron Configuration Practice OR Electron	**Learning Target**: Use the periodic table to illustrate orbital diagrams and write electron configurations in both the ground and excited states of different elements to find patterns on the periodic table of the arrangement of electrons **Success Criteria:** I will… • Draw ground state and excited state orbital diagrams • Write electron configurations using the periodic table, both longhand and shorthand	Students learn that electrons do not “orbit” the nucleus like planets. Instead, they are most likely found in suborbitals around the nucleus in more complex patterns. Students learn to model electron configurations and write them long-hand and shorthand to gain a better understanding of more modern thinking of electron behavior. Students understand that there is a pattern on the periodic table based on the electron arrangement of different elements which is another way the periodic table is organized,

	configuration practice worksheet **Supporting Resources:** 1. Electron Configuration Periodic Table Coloring Blank Periodic Table 2. Electron Configuration Notes 3. Periodic Table Method (Youtube) 4. Forbes Article a. Google Doc Version **Textbook References:** **Note-taking Guide** 1. 3.1 Electromagnetic Energy 2. 3.3 Development of Quantum Theory 3. 3.4 Electronic Structure of Atoms (Electron Configurations)	**4.A** Use the periodic table as a model to illustrate orbital diagrams and write longhand and shorthand electron configurations of ground states and excited states of elements to support patterns in electron arrangement of elements on the periodic table.	not simply based on families. Noble gases have full energy levels, which is why one of their properties is that they do not react. Now that they know how to write electron configurations and understand the modern way of thinking, students will wonder why there are different colors released when electrons return to their ground state.
Lesson 5: Why do light bulbs produce light? (2 blocks)	Lesson 5 Teacher Slides L… 1. Hahn version including exciting electrons ○ Original document: Exciting Electrons 2. Electron Arrangement	**Learning Target:** Use a simulation and Bohr models to demonstrate the energy needed to excite an electron and find patterns between frequency and wavelengths of different colors of light	Students gain a better understanding of exciting electrons- in order for electrons to be excited, they need to absorb some type of energy to be able to jump to the next suborbital or energy level.

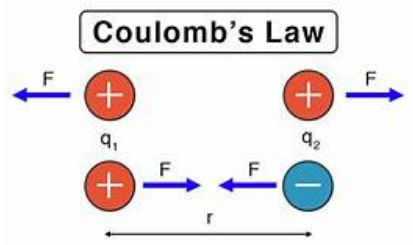
 	and Light Basics 3. Analyzing the Fingerprints of Light ○ Consider posting on Canvas to see the colors on the graphs 4. Electron Behavior and Light **Textbook References:** 4. 3.1 Electromagnetic Energy 5. 3.3 Development of Quantum Theory 6. 3.4 Electronic Structure of Atoms (Electron Configurations)	**Learning Target:** Use spectral graphs and 'light fingerprints' to identify elements and evaluate the emission patterns of various light bulbs (Incandescent, Fluorescent, and LED) **Learning Target:** Revise your initial model to include electron behavior and light to show how light bulbs produce light. **Success Criteria:** I will… ● Explain the electron's energy needs to produce light ● Describe how the color of light depends on the wavelength released from the photon and compare it to the frequency ● Interpret spectral graphs and apply to different light sources ● Revise your initial model of the light bulb to include energy **5.A** Use the Bohr model and computer simulation to help predict patterns in electron behavior to understand the conceptual mathematical relationships between	Students learn that different types of light bulbs need different types of energies to produce light. ● Incandescent: thermal energy excites electrons ● Fluorescence: photon absorption and re-emission ● LED: semiconductor electron transitions Students are now wondering how energy is related to light produced.

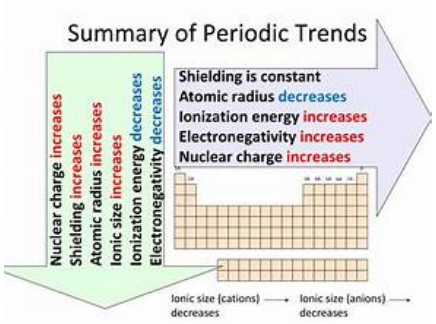
		wavelength and frequency to discover patterns with different colors of light produced. **5.B** Analyze and interpret spectral graphs and apply electron behavior to evaluate emissions patterns of various light production technologies. **5.C** Update the initial model to describe electron behavior to show how wavelength and frequency are related for light bulbs to produce the traditional yellow light.	
Lesson 6: How do wavelength, frequency, and energy help us understand the behavior of light? (2 Blocks)  	1. Lesson 6 Teacher … 2. Electromagnetic Radiation POGIL 3. Light Equation Worksheet 4. Planck's Equation Worksheet 5. Light and electronic transitions article a. (teacher's guide for article) 6. Bohr's Model and Energy Calculations **Textbook References:** 7. 3.1 Electromagnetic Energy	**Learning Target**: Use the speed of light and Planck's equation to mathematically support the relationships between the variables in the speed of light and Planck's equations to quantitatively understand different colors of light happen due wavelength, frequency, and electron energy **Learning Target**: Construct explanations from the article to explain how light is produced at the macroscopic and microscopic levels **Success Criteria**: I will… ● Understand the	Students understand the mathematics involved with the relationships between wavelength, frequency, and the speed of light. Wavelength and frequency are inversely related to light. Bringing in Planck's equation for the energy piece, it illustrates the direct relationship between energy and frequency. Now that students understand the fundamentals of electron behavior and light, students are now wondering about the material piece, so we need to revisit the periodic table and more trends.

	8. 3.3 Development of Quantum Theory 9. 3.4 Electronic Structure of Atoms (Electron Configurations)	relationships between different variables (speed of light, wavelength, frequency, energy) • Solve for an unknown variable in the speed of light equation • Solve for an unknown variable in Planck's equation • Read an article and answer questions explain real world and particle view ways in which light is produced **6.A** Use mathematical thinking to support the relationships between the speed of light, frequency, wavelength to determine the amount of energy and color of light produced. **6.B** Construct explanations for macroscopic and microscopic levels to describe electromagnetic radiation and the cause and effect of how light is produced instead of other energy types, such as heat.	
Performance Task Lesson 7: Why do fireworks produce different colors of light? (1 block)	Lesson 7 Teacher Slides L… 1. Flame Test Lab a. **x 1.5** in Powerschool	**Learning Target:** Conduct an experiment to determine the unknown element in the sample and use evidence from calculations, orbital diagrams,	Using a new phenomenon related to light, students put together what they have learned about electron behavior and light to fireworks. Students test

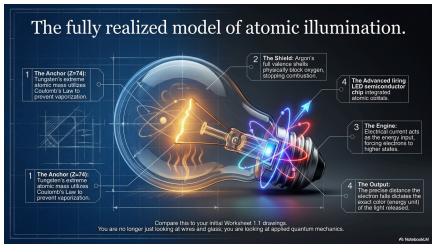
		and knowledge of chemistry to support the determination of the unknown element **Success Criteria:** I will… ● Conduct an experiment ● Identify the unknown element ● Complete an orbital diagram and electron configuration of an element ● Calculate frequency and energy of the color of light of the unknown metal ● Write a CER to support the identification of your unknown metal ● VoG: Collaboration & Critical Thinking ○ Cooperation ○ Constructing Arguments **7.A** Use the periodic table as a model to illustrate orbital diagrams and write longhand and shorthand electron configurations of ground states and excited states of elements to support patterns in electron arrangement of elements in fireworks.	multiple different metals to observe the light that is produced. Students rely on their ability to use orbital diagrams, electron configurations, electron energy, and mathematics to describe the fireworks phenomenon. Students may be wondering why some elements reacted faster in the flame than others.

		7.B Use mathematical thinking to support the relationships between the speed of light, frequency, wavelength to determine the amount of energy produced in the unknown metal.	
Lesson 8: Common Assessment Lesson 8 Teacher Slides Light Bulb **Illuminating Matter, Quiz # 2 (Similar to Previous) [Needs more versions]** **2 blocks, including review** **Review Options:** 1. **Study Guide & Practice:** **[As Stations] [As Worksheet] (60-75 min.)** 2. Electron Configuration Bingo		**Learning Target**: Use mathematics to determine the amount of subatomic particles in an atom and solve for and support mathematical relationships between energy, frequency, and wavelength and apply to different colors. **Learning Target**: Use the periodic table to complete orbital diagrams and electron configurations of different atoms. **Success Criteria**: ● Determine the number of subatomic particles of an atom ● Solve with the speed of light and Planck's equations to determine frequency, wavelength and/or energy from a given quantity ● Explain and analyze with the mathematical relationships between energy, frequency, and wavelength ● Describe electron behavior and its relationship to light emission or absorption ● Complete orbital diagrams of atoms using the periodic table ● Complete electron configurations of atoms using the periodic table ● VoG: Critical Thinking ○ Interpretation & Analysis ○ Reasoning ○ Problem Solving/Solution Finding	

		8.A Use mathematics to determine the amount of subatomic particles in an atom by identifying patterns among the elements **8.B** Use the periodic table as a model to determine orbital diagrams and electron configurations of different atoms by identifying electron patterns on the periodic table. **8.C** Use mathematics and computational thinking to solve for an unknown variable in the speed of light and Planck's equation to support mathematical patterns of energy, frequency, and wavelength to apply to colors.	
Learning Sequence 3: Why do some elements react more than others and why is that important for designing and choosing materials for a light bulb?			
Lesson 9: Why are some elements more reactive than others and which ones would be best in a lightbulb? (3.5 blocks)  	Lesson 9 Teacher Slides L… 1. Coulombic Attraction POGIL a. Simulation 2. Periodic Trends POGIL (At. Radius, Ionization Energy and Electronegativity) a. Answers b. Periodic Trends I (At. Radius, Ionization Energy and Ionic Radius) c. Periodic Trends II (Electron Affinity) **Supporting Review Optional Activities:**	**Learning Target:** Use Coulomb's Law to explain multiple trends observed on the periodic table going across periods and down groups to describe potential reactivity of the elements. **Success Criteria**: ● Provide reasoning for the periodic trends using Coulombic Attraction **Reasoning:** ○ Electron shielding effect ○ Effective Nuclear Charge **Trends:** ○ Atomic radius ○ Electronegativity/	Students learn that the number of valence electrons determine the basic reactivity of elements. They learn that metals lose electrons while nonmetals gain electrons when reacting; however, noble gases have a full outer shell of valence electrons and do not react. The reason why this happens is due to the periodic trends of the elements. Tungsten has a very high melting point and glows, producing light when heated. Gas inside the lightbulb needs to be stable so it should not react, meaning a noble gas like Argon would be great to use in a lightbulb due to it not reacting with the Tungsten.

	1. Periodic Trends Webquest 2. Periodic Trends Worksheet a. Key 3. Periodic Trends Task Cards 4. Periodic Trends Activity Card Sort 5. Periodic Trends Summary Chart 6. Mastering Periodic trends summary chart 7. Alien Periodic Trends (Thinking Question) Optional Extension (1 Extra Block) 1. Periodic Trends and Reactivity Lab **Textbook Reference:** 1. 3.5 Periodic Variations in Element Properties	electron affinity ○ First ionization energy **9.A** Construct an explanation using Coulomb's Law for the trends on the periodic table by noticing patterns across periods and down groups to describe simple reactivity of elements.	In terms of the periodic trends, to support this, students learn that Coulombic attraction explains these trends on the periodic table due to the proton pulling power across a period and the number of energy levels where the outermost electrons are found going down a group. The more energy levels, the higher the shielding effect. Students use this information to support: ● Atomic radius ● Electronegativity/electron affinity ● First ionization energy Now that students have learned the components of the lightbulb and why they work, they may be wondering why over time lightbulbs “blow out”.
Performance Task Lesson 10: Why is tungsten the best filament material, and how could we design an even better light bulb? (.5 block)	Lesson 10 Teacher Slides … Designing the Best Light bulb Filament ● Collaborative assignment (partners)	**Learning Target:** Construct an explanation and design a solution by using periodic trends to explain why tungsten is used as a filament and find a new metal that can be used as a filament.	Students are able to explain why tungsten is the best filament material. Using the periodic table and trends, students are able to identify that tungsten is less likely to react due to its ionization energy and

	• Each student turns in their own packet When designing a new light bulb, students will choose a new metal by using the periodic table only and their knowledge of trends. Some of these may include the following: • Molybdenum • Chromium • Rhenium • Tantalum • Osmium Less sophisticated answers include the following: • Iron • Nickel • Titanium	**Success Criteria**: I will… • Use the periodic table to predict properties of elements. • Compare melting points and explain why they matter. • Analyze ionization energy, electronegativity, and atomic radius. • Use evidence to justify an engineering decision. • VoG: Collaboration & Creativity ○ Cooperation ○ Creative Production & Innovation **10.A** Construct an explanation and design a solution by using the periodic trends and atomic properties to determine why tungsten is the best filament material and choosing another metal that can perform better as a filament in the light bulb.	electronegativity values. This element can conduct electricity and has a high melting point. Based on their understanding of the trends of the periodic table, students choose another metallic element that could be used as a filament in a light bulb.
Lesson 11: How has understanding atomic structure revolutionized lighting technology? (1 block)	Lesson 11 Teacher Slides … 1. The Quantum Revolution of Lighting Supporting Article	**Learning Target:** Apply Coulomb's Law, periodic trends, and knowledge of electron transitions to explain the evolution of lightbulbs, including the chemical prevention of oxidation and energy efficiency.	Students learn that current scientists are using the quantum model to produce certain light colors. The number of protons and electrons are important when considering the element of choice to produce certain colors

	1. Chem Matters - From Blue to Bright	**Success Criteria**: I will… • Use Coulomb's Law and periodic trends to relate to the development of more efficient light bulbs • Complete energy transition calculations to gain a better understanding of what it means for a light bulb to be energy efficient **11.A** Use the periodic table to apply periodic trends, Coulomb's law, and electron transitions to build on the structure and function of different types of light bulbs **11.B** Use mathematics and computational thinking to gain an understanding of what it means to be energy efficient based on the structure and function of different light bulbs	of light. They get a mathematical understanding of energy efficiency through their calculations to see that early light bulbs were not nearly as energy efficient as today's LED light bulbs. Over time as scientists understood atomic structure and the quantum model of the atom, they were able to produce energy efficient light by understanding electrons, energy, light, and periodic trends.
Interim Assessment Chemistry - **Structure and Properties of Matter PS 4-1**			
Lesson 12 Teacher Slides Light Bulb **Review: [As Stations] [As Worksheet] (75-90 min.)[Answer Key]** **Lesson 12: Common Assessment (60-80 min.)** **[Version B] [Version C]**		**Learning Target**: Construct an explanation using Coulomb's Law to support periodic trends and reactivity for main group elements by observing patterns on the periodic table or using data provided **Success Criteria**: • Use Coulomb's Law to describe the trends on the periodic table	

2 blocks including Review	• Use trends on the periodic table to support reactivity for main group elements • VoG: Critical Thinking ○ Interpretation & Analysis ○ Reasoning ○ Problem Solving/Solution Finding **12.A** Construct an explanation using Coulomb's Law to support the periodic trends on the periodic table in terms of reactivity for main group elements by observing patterns and trends through data or utilizing the periodic table.

Illuminating Matter



Accelerated General Chemistry
Unit 1
Written by Lisa Daigle & Rich Niro
Presentation Created by Lisa Daigle
October 21, 2026

Unit 1: Illuminating Matter



Students figure out how a light bulb works by learning about atoms, subatomic particles, and electron behavior. Students learn that the electron produces what we see as light and mathematically calculate the energy required to see certain colors using Planck's equation which expands upon their understanding of the relationship between wavelength and frequency. Using periodic trends and reactivity, students understand why tungsten and argon are used in lightbulbs to get them to work and produce light.

The Standards

HS-PS1-1

Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

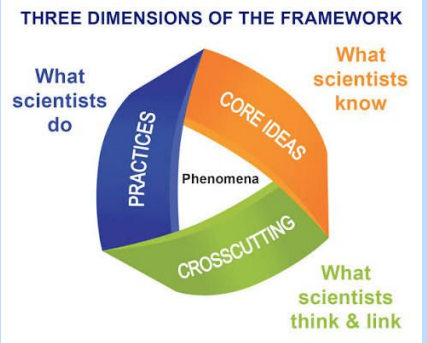
HS-PS1-2

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

HS-PS4-1

Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

SEPs, DCIs, & CCCs



Science & Engineering Practices

- Developing and Using Models
- Constructing Explanations and Designing Solutions
- Using Mathematics and Computational Thinking

Disciplinary Core Ideas

- PS1.A: Structure and Properties of Matter
- PS1.B: Chemical Reactions
- PS4.A: Wave Properties

Crosscutting Concepts

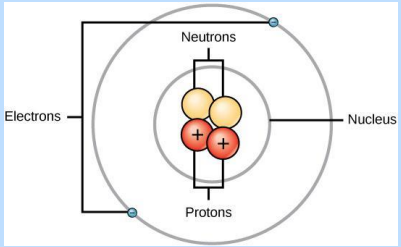
- Patterns
- Cause & Effect

Learning Sequence 1: Why do some elements produce light in incandescent light bulbs but others can't?

What makes something glow, and why did early inventors struggle to create practical light bulbs?

How does the arrangement of atoms and electrons determine what materials can produce light?

Develop a model to show how light bulbs work at the subatomic level to produce light by identifying patterns in the data provided about how they work.



Use the periodic table as a model to predict properties of elements by defining patterns in the different families of the periodic table.

Use mathematical thinking to solve for the average atomic mass to describe the decimal seen on the periodic table.

Use the Bohr model to illustrate the subatomic particles in an atom and recognize patterns of subatomic particle placement in different materials when building or drawing these models.

Assessment

Periodic Table Basics Assessment

Use and interpret models, tables, and graphs to predict properties of elements by identifying patterns on the periodic table or diagrams provided.

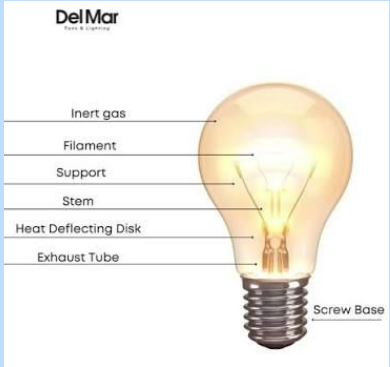
Use mathematics and computational thinking to calculate subatomic particles or average atomic mass by using the patterns on the periodic table or natural abundance of isotopes.



- Interpretation & Analysis
- Reasoning
- Problem Solving/Solution Finding

What students figure out

- Tungsten (W) is a transition metal and has a high melting point
- W has a unique amount of protons, which is what identifies the element
- W would have a really big Bohr model because in a neutral atom, it has a whopping 74!
- Noble gases are unreactive because they have a full outer shell of electrons, so it won't react with the tungsten inside of the bulb.



Learning Sequence 2: How do light bulbs produce light and how do some types of light bulbs produce different colors of light?

How do electrons moving between energy levels produce light?

Use the periodic table as a model to illustrate orbital diagrams and write longhand and shorthand electron configurations of ground states and excited states of elements to support patterns in electron arrangement of elements on the periodic table.

Why do light bulbs produce light?

Use the Bohr model and computer simulation to help predict patterns in electron behavior to understand the conceptual mathematical relationships between wavelength and frequency to discover patterns with different colors of light produced.

Analyze and interpret spectral graphs and apply electron behavior to evaluate emissions patterns of various light production technologies.

Update the initial model to describe electron behavior to show how wavelength and frequency are related for light bulbs to produce the traditional yellow light.

Learning Sequence 2: How do light bulbs produce light and how do some types of light bulbs produce different colors of light?

How do wavelength, frequency, and energy help us understand the behavior of light?

Use mathematical thinking to support the relationships between the speed of light, frequency, wavelength to determine the amount of energy and color of light produced.

Construct explanations for macroscopic and microscopic levels to describe electromagnetic radiation and the cause and effect of how light is produced instead of other energy types, such as heat.

$E=h\upsilon$ $\quad E = \frac{hc}{\lambda}$

$h = 6.626 \times 10^{-34}$ J·s

$c = 3.0 \times 10^{8}$ m/s

Performance Task & Assessment

Flame Test Lab!

Use the periodic table as a model to illustrate orbital diagrams and write longhand and shorthand electron configurations of ground states and excited states of elements to support patterns in electron arrangement of elements in fireworks.

Use mathematical thinking to support the relationships between the speed of light, frequency, wavelength to determine the amount of energy produced in the unknown metal.

Electron Behavior & Light Assessment

Use mathematics to determine the amount of subatomic particles in an atom by identifying patterns among the elements

Use the periodic table as a model to determine orbital diagrams and electron configurations of different atoms by identifying electron patterns on the periodic table.

Use mathematics and computational thinking to solve for an unknown variable in the speed of light and Planck's equation to support mathematical patterns of energy, frequency, and wavelength to apply to colors.

Performance Task & Assessment

Flame Test Lab!





- Cooperation
- Constructing Arguments

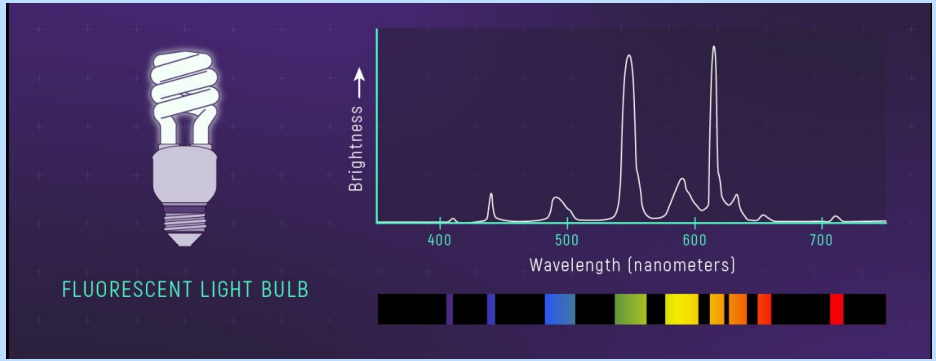
Electron Behavior & Light Assessment



- Interpretation & Analysis
- Reasoning
- Problem Solving/Solution Finding

What students figure out

- Electrons in atoms can get excited when energy is applied which makes them absorb the energy then release it- the energy we see is light
- Elements have unique electron configurations according to the quantum model (Bohr models are an older model).
- Each light produced has its own unique amount of energy, wavelength, and frequency.
- The light we see from light bulbs has a unique spectra of light.



Learning Sequence 3: Why do some elements react more than others and why is that important for designing and choosing materials for a light bulb?

Why are some elements more reactive than others and which ones would be best in a lightbulb?

How has understanding atomic structure revolutionized lighting technology?

Construct an explanation using Coulomb's Law for the trends on the periodic table by noticing patterns across periods and down groups to describe simple reactivity of elements.

Use the periodic table to apply periodic trends, Coulomb's law, and electron transitions to build on the structure and function of different types of light bulbs

Use mathematics and computational thinking to gain an understanding of what it means to be energy efficient based on the structure and function of different light bulbs

Performance Task & Assessment

Designing the Best Light Bulb Filament



- Cooperation
- Creative Production & Innovation

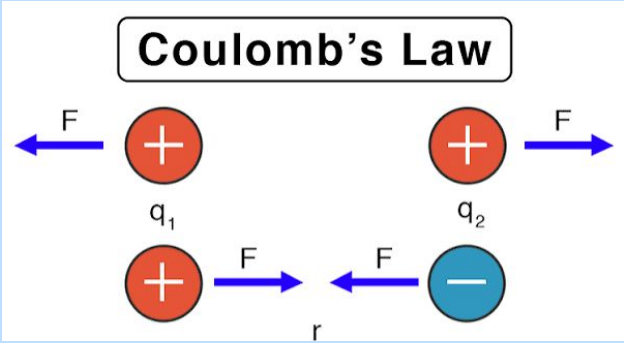
Electron Behavior & Light Assessment



- Interpretation & Analysis
- Reasoning
- Problem Solving/Solution Finding

What students figure out

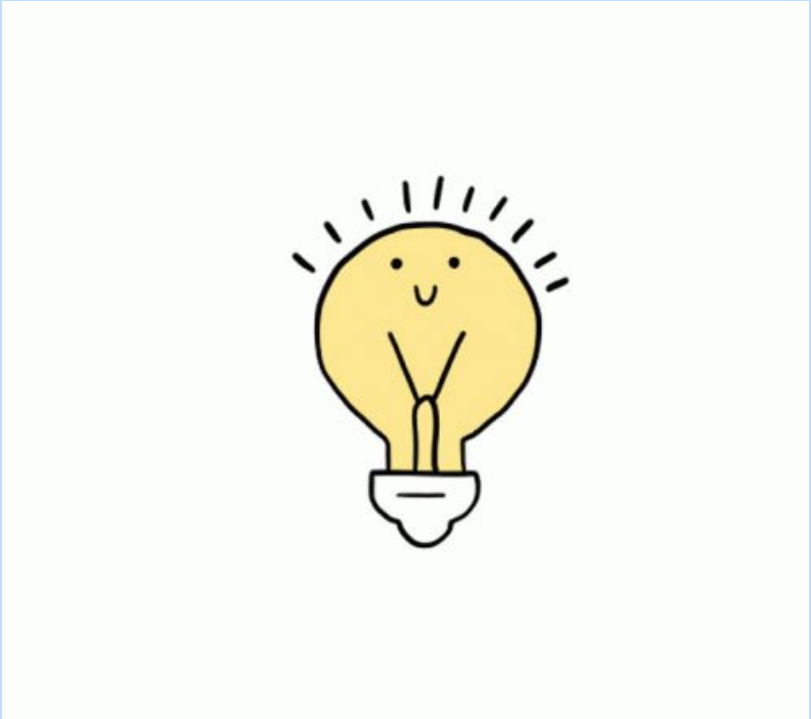
- Students learn that Coulombic attraction between the protons and valence electrons play a crucial role in reactivity.
  - Effective Nuclear Charge
  - Electron Shielding Effect
- They get a mathematical understanding of energy efficiency through their calculations to see that early light bulbs were not nearly as energy efficient as today's LED light bulbs.



Thank you!

Accelerated General Chemistry

Illuminating Matter



BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 d.

AGENDA REPORTING FORM

Agenda Topic: SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACC - Revised - First Reading.

Summary of Issue: SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACC - Revised - First Reading.

Background:

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

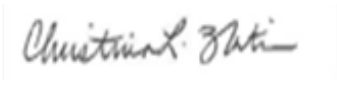
Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

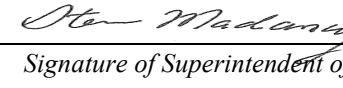
Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACC - Revised – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal



Signature of Staff Member Submitting Report



Signature of Superintendent of Schools

Unit Overview	
Unit Title:	ES: Astronomy - Guest Stars and the Big Bang ACC
Teacher:	Kelsey Duffy and Nicole Raccio
Grade Level/Course:	9 Earth Science
Length/Dates:	10 weeks
Unit Summary:	This unit is anchored in historical observations of stars that suddenly appeared and then disappeared within a short period of time. These phenomena prompt students to question why most stars seem constant while others change so dramatically. From this, students begin to wonder what causes stars to shine and what processes might lead to such rapid changes. Students organize their questions around key ideas of matter, energy, and forces, and decide to investigate the regions of the sky where these events were recorded using modern astronomical tools. In Lesson Set 1 (Lessons 2–5), students analyze images and spectral data from the remnants of these events. They then develop and pursue research questions in small groups, ultimately coming together in Lesson 5 to build a shared understanding of nuclear fusion and the life cycles of stars.Throughout the unit, students engage in structured research supported by scaffolded tools introduced over time, including the Planning for Obtaining Information Tool, the Obtaining Information Tool, and the Evaluating Sources of Information Tool. Building off these curricula, combined: Astronomy Skeleton Updated 2019 Astronomy Skeleton- Stars & the Big Bang OpenSciEd Unit P.6 Stars & the Big Bang OpenSciEd Unit P.5 Electromagnetic Radiation

Performance Expectations
• **HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.** • **HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.** • **HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.** • **HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes ~~of fission~~, fusion,~~ and radioactive decay~~.**

- **HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media**
  - **HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.**
  - **HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.***
  - HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

Essential Questions:

1. How can Electromagnetic Radiation help us understand why some stars remain stable while others change?
2. How Do Stars Produce Energy and Matter?
3. How can we use our knowledge of Guest stars as supporting evidence of the Big Bang?

Unit's Essential Question-Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?

Lesson Level Essential Questions:

Learning Sequence 1: Energy from Stars

- 1.a: Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?
- 1.b: How does energy transfer through a wave?
- 1.c: What other types of EM radiation are there, and how do we use them?
- 1.d: Does all electromagnetic radiation cause damage? Wave/Particle Duality
- 1.e: Should we send astronauts into space?

Learning Sequence 2: Matter and Forces within Stars

- 2.a: How does the matter in guest stars compare to stable stars?
- 2.b: What new questions can we ask about stable and unstable stars?
- 3: What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars?
- 4: How does running out of fuel cause a star to change?
- 5: Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?

Learning Sequence 3: Stars and the Big Bang

- 6: How has the matter in the Universe changed over time, and how do we know?
- 7: How can we use the practices and crosscutting concepts we have developed to figure things out on our own?

Science and Engineering Practices (Skills)	Disciplinary Core Ideas (Knowledge)	Crosscutting Concepts (Enduring Understandings)
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions. ● Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations. **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs. ● Communicate scientific ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). ● Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible. ● Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.	**PS4.A: Wave Properties** ● The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the type of wave and the medium through which it is passing. **PS4.B: Electromagnetic Radiation** ● Atoms of each element emit and absorb characteristic frequencies of light. These characteristics allow identification of the presence of an element, even in microscopic quantities. (secondary) ● When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells. ○ Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation,	**Cause and Effect** ● Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects. ● Cause and effect relationships can be suggested and predicted for complex natural and human-designed systems by examining what is known about smaller scale mechanisms within the system. **Scale, Proportion, and Quantity** ● The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs. **Energy and Matter** ● In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved. ● Energy cannot be created or destroyed–only moved between one place and another place, between objects and/or fields, or between systems.

Developing and Using Models Modeling in 9–12 builds on K–8 experiences and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ● Develop a model based on evidence to illustrate the relationships between systems or between components of a System. **Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 9–12 builds on K–8 experiences and progresses to explanations and designs that are supported by multiple and independent student-generated sources of evidence consistent with scientific ideas, principles, and theories. ● Construct an explanation based on valid and reliable evidence obtained from a variety of sources (including students' own investigations, theories, simulations, peer review) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.	and the particle model explains other features **PS3.D: Energy in Chemical Processes and Everyday Life** ● Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. (secondary) **ESS1.A: The Universe and Its Stars** ● The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years. ● The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth. ● Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova and explode ● The Big Bang theory is supported by observations of distant galaxies receding from our own, of the measured composition of stars and nonstellar gases, and of the maps of spectra of the primordial radiation (cosmic microwave background) that still fills the universe.	

	PS1.C: Nuclear Processes ● Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.	

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).
Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.
C District Rubrics

Performance Assessment(s) and Evaluative Criteria:

1. LS1 Common Assessment: Part 1: Properties of Light Transfer Task: Students use properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials and evaluate scientific claims about electromagnetic radiation. **HS-PS4-1; ; VoG: Communication**
   Success Criteria:
   - calculate the speed of a wave using wavelength and frequency with correct units.
   - compare different types of electromagnetic waves using wavelength and frequency.
   - explain how and why the speed of light changes when it enters different materials.
   - construct a scientific explanation (claim, evidence, reasoning) based on data
2. LS1 Common Assessment: Part 2: Evaluating 5G Safety Transfer Task: Students can *critically think by* evaluating arguments about the dangers of 5G radiation. **HS-PS4-4, VoG: Critical Thinking**
   Success Criteria:
   - identify the claim
   - identify the evidence being used to support each of the author's claims

- Identify the author's reasoning or explanation of the evidence.
- consider the validity of the evidence provided by each claim in the social media post

3. LS2 Common Assessment: Algol Transfer Task: Students can *critically think* about evidence and models to explain how fusion changes matter in stars and how those changes can be used to determine a star's age. HS-ESS1-3, HS-PS1-8 ; **VoG: Critical Thinking**

   Success Criteria:
   - analyze data about star composition, fusion reactions, and energy production.
   - develop and use models to explain how elements are formed through nuclear fusion.
   - use evidence to make and support a claim about the relative ages of stars.
4. LS2 Common Assessment: Students can construct a model to *effectively communicate* how feedback loops keep stars stable, and how disruptions in these loops can cause sudden dramatic changes depending on a star's mass.. HS-ESS1-1, **VoG: Communication**

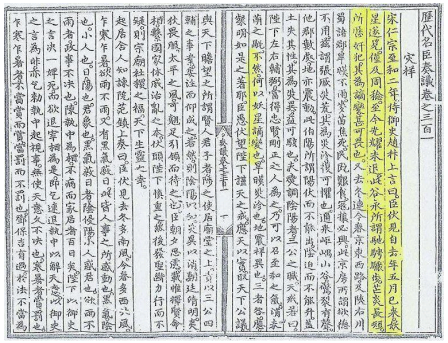
   Success Criteria:
   - create and update models of stellar systems based on evidence from multiple sources.
   - describe how feedback loops regulate matter, energy, and forces within stars.
   - explain how the mass of a star affects its stability and response to disruptions.
   - illustrate how changes in these loops can lead to sudden, catastrophic events.
   - support my explanations with evidence from data, simulations, or observations of real stars.
5. LS3 Common Assessment: Jupiter Transfer Task: Students will ask meaningful scientific questions about real-world phenomena and plan how to find, evaluate, and share information to answer them using the science and engineering practices I've learned. HS-ESS1-1

   Success Criteria:
   - reflect on my own life experiences to identify puzzling phenomena I want to explain.
   - ask testable and relevant questions that connect to ideas from this course.
   - plan how to obtain and evaluate information to investigate my questions.
   - decide how to communicate my findings clearly using scientific reasoning and evidence.
   - apply the science and engineering practices and crosscutting concepts I've developed throughout this and other units.

Target Question	Activity	Standard Objectives/Learning Target	Student will know and wonder
Learning Sequence 1: Energy from Stars **Class Notes - LS1: Stars: Electromagnetic Radiation (ES)- Duffy**			
Lesson 1.a: Why do some stars seem unchanging, while others	**P.6 Lesson 1 Teacher Edition**	**Learning Target:** I can create and use models to explain why most	Why do some stars seem unchanging, while others appear

appear briefly, change dramatically, and fade away?

Lesson 1 - P.6 Stars & the B…


宋仁宗至和二年待御史趙抃言去年五月己亥夜

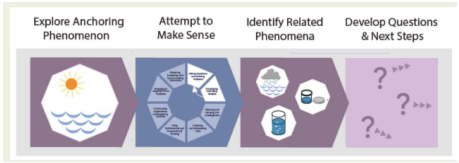


Duffy combined handout version of Lesson 1:

Handout Historical Guest St…

-INTRODUCE A NEW PHENOMENON
common "guest stars" in ancient cultures' recordings

Engage in the Anchoring Phenomena Routine



Explore Anchoring Phenomena: Introduce Guest Star 1054 slides A-S and/or

-READ ABOUT OTHER GUEST STARS

P.6 Lesson 1 Handout Histor…

Attempting to Make Sense: Students will create a notice and wonder chart in their notebook about the guest star.

-DISCUSS IN JIGSAW GROUPS

#1 Handout Historical Guest…
#2 Handout Historical Guest…
#3 Handout Historical Guest…
#4 Handout Historical Guest…

-1987 GUEST STAR DEEP DIVE

stars we see in the night sky appear stable over time, while some "guest stars" change suddenly and dramatically.

Success Criteria: I will…

- develop a system model that shows the parts and processes of a star (matter, energy, and forces).
- use my model to explain why most stars appear constant in brightness and position over long periods.
- ask scientific questions based on historical observations of stars that changed in brightness, shape, or color, and use those questions to improve and clarify models of how stars change over time.

1.A Develop system models (or sets of models) to explain why the stars we see at night appear stable over time, while historical accounts of guest stars describe them changing dramatically. (SEP: 2.3; CCC: 7.1; DCI: ESS1.A.1)

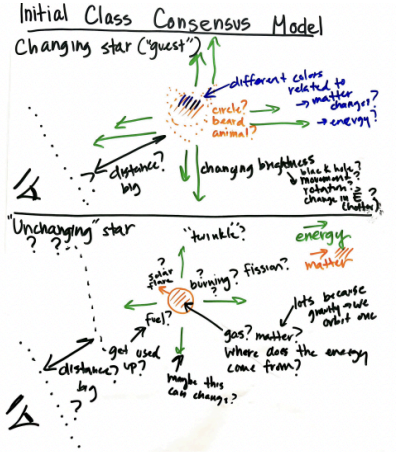
1.B Ask questions that arise from historical observations of dramatic

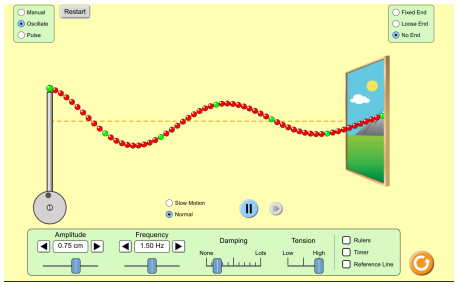
briefly, change dramatically, and fade away? We examine historical evidence that some stars appear in the night sky even though we could not see a star there previously. The star fades away and seems to disappear. We map these events on a star map and look for patterns. We figure out: A guest star is a star that appears and then seems to disappear a short time later. Guest stars are distributed across the sky but seem to be concentrated along the plane of our galaxy (the Milky Way).

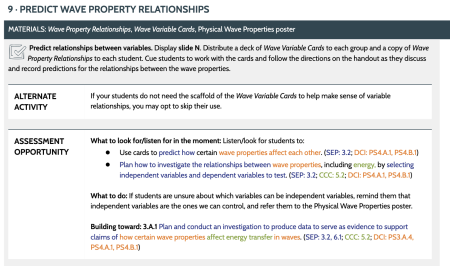
What students will figure out:

- A guest star is a star that appears and then seems to disappear a short time later.
- Guest stars are distributed across the sky but seem to be concentrated along the plane of our galaxy (the Milky Way).

What's next?
Since students asked questions about the energy released by the guest star they will examine how energy moves away from stars to provide us information about the guest star.

	Driving Questions and Next Steps Students will develop a model of a change and unchange star and develop questions about their models as well as the historical information. **-INDIVIDUAL MODELING** **-DEVELOP INITIAL CONSENSUS MODEL**  **-BUILD THE DQB**	changes in the brightness, shape, and color of stars to clarify our models, and seek additional information. (SEP: 1.1, 1.4; CCC: 7.1; DCI: ESS1.A.2)	
Lesson 1.b: How does energy transfer through a wave? **Lesson 3 - P.5 Electromagn…**	**P.5 Lesson 3 Teacher Edition** **Lesson Summary:** **Engage:** What is given off by the supernova? Teacher slides template: **How does energy travel?**	**Learning Target:** I can plan and conduct an investigation to make claims about how certain wave properties affect energy transfer in waves **Success Criteria:** I will..	We recall examples of physical waves. We produce waves with a spring. We develop a model for how physical waves transfer energy through solids. We use a computer simulation to plan and carry out four investigations. Using our results, we make claims about how various wave properties affect





9 · PREDICT WAVE PROPERTY RELATIONSHIPS

MATERIALS: *Wave Property Relationships*, *Wave Variable Cards*, Physical Wave Properties poster

Predict relationships between variables. Display **slide N**. Distribute a deck of *Wave Variable Cards* to each group and a copy of *Wave Property Relationships* to each student. Cue students to work with the cards and follow the directions on the handout as they discuss and record predictions for the relationships between the wave properties.

ALTERNATE ACTIVITY

If your students do not need the scaffold of the *Wave Variable Cards* to help make sense of variable relationships, you may opt to skip their use.

ASSESSMENT OPPORTUNITY

What to look for/listen for in the moment: Listen/look for students to:

- Use cards to predict how certain wave properties affect each other. (SEP: 3.2; DCI: PS4.A.1, PS4.B.1)
- Plan how to investigate the relationships between wave properties, including energy, by selecting independent variables and dependent variables to test. (SEP: 3.2; CCC: 5.2; DCI: PS4.A.1, PS4.B.1)

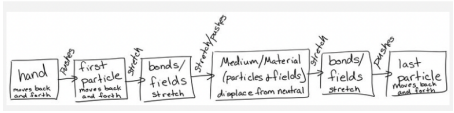
What to do: If students are unsure about which variables can be independent variables, remind them that independent variables are the ones we can control, and refer them to the Physical Wave Properties poster.

Building toward: 3.A.1 Plan and conduct an investigation to produce data to serve as evidence to support claims of how certain wave properties affect energy transfer in waves. (SEP: 3.2, 6.1; CCC: 5.2; DCI: PS3.A.4, PS4.A.1, PS4.B.1)

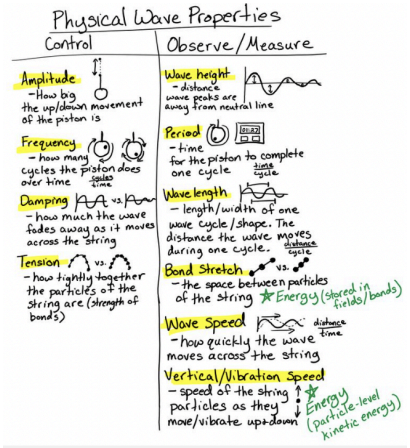
Explore/Explain (class share out after each section)

How are the properties/char…

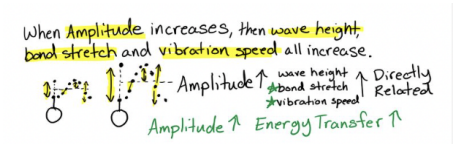
Part I: How does energy travel?

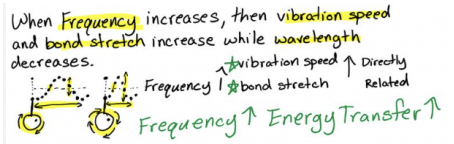


Part 2: What are the characteristics of this moving energy?



Part 3: How are these properties related to frequency and amplitude?





- establish and model how energy is transferred into the system
- identify and select independent variables and dependent variables to test to investigate the relationships between wave properties, including energy.
- plan and conduct an investigation to produce data to serve as evidence to support claims of how certain wave properties (amplitude and frequency) affect energy transfer in waves.

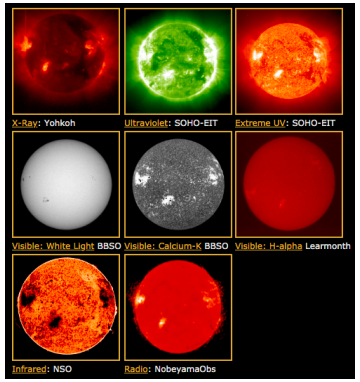
3.A Plan and conduct an investigation to produce data to serve as evidence to support claims about how certain wave properties affect energy transfer in waves. (SEP: 3.2, 6.1; CCC: 5.2; DCI: PS3.A.4, PS4.A.1, PS4.B.1)

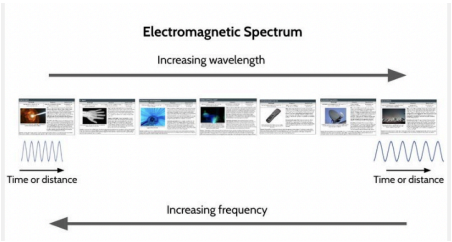
3.B Use algebraic techniques to develop a mathematical model to identify and test the relationship between frequency, wave speed, and wavelength. (SEP: 5.3; CCC: 1.4; DCI: PS4.A.1)

energy transfer. We develop a mathematical model of the relationship between frequency, wave speed, and wavelength.

What students will figure out:

- When the first particle in the wave on a string is moved (as a force is applied to it, which transfers energy to it), it stretches the electric field (bond) between it and the next particle.
- When a bond is stretched (or compressed), energy is transferred to the fields that produce the bond, and when it is unstretched (or uncompressed), that energy transfers out of the fields and back into the motion of the particles around it.
- A larger amplitude means that the electric fields (bonds) between particles will be stretched farther in either direction in a given amount of time (period); this increase in vibration speed transfers more energy along the wave.
- A larger frequency means that the bonds will be

	Evaluate:(Student responses to claim questions) **Making Claims about Energ…** Lesson 3 Exit Ticket (built in canvas called "Waves Check-in (Mini Transfer Task") ***Use the simulation to derive the formula***	**Learning Target:** I can analyze and interpret wavelength, frequency and energy data of the EM spectrum to calculate the speed of light. **Success Criteria:** I will… • identify (numerical and graphical) relationships between wavelength, frequency, energy • calculate the speed of light waves using the relationship between frequency and wavelength. • analyze speed of light in various materials	stretched back and forth more times per second; this increase in vibration speed transfers more energy along the wave. • The wavelength of a wave can be determined by the wave speed across the medium and its frequency. **What is next?** The students will go back to the driving question board to identify all the questions related to energy and realize that stars can give off energy that we can not see. The students will next explore all times of light energy coming from stars.
Lesson 1.c: What other types of EM radiation are there, and how do we use them? **Lesson 9 - P.5 Electromagn…**  	**P.5 Lesson 9 Teacher Edition** **Engage:** What type of energy is given off by the sun? Is it dangerous? Hubble images (or one to the left) Chandra - RCW 103 **Explore/Explain:** (How do we categorize the EM radiations from the sun? Is the EM radiation released by the sun dangerous?) • **Raccio Electromagne…**	**Learning Target:** I can develop an argument about why EM radiation can be harmful based on its frequency, wavelength, and interactions with matter. **Success Criteria:** I will.. • organize electromagnetic (EM) radiation energy by its physical properties • write a definition of the EM spectrum • obtain and evaluate information about how the	We examine the remaining categories of questions on the Driving Question Board. We explore various types of EM radiation and construct the EM spectrum based on their wavelength and frequency. We write an argument about the relationship between the frequency and wavelength of EM radiation and its interactions with matter, and how this relationship helps explain some of the uses of EM radiation. We add new

	• **EM card sort - slides…**  **Evaluate:** Why do we think some forms of high-frequency EM radiation (ultraviolet, X-rays, and gamma rays) would cause more damage than others? OR Is the radiation from the sun dangerous? **EM Radiation Applications - …**	interactions with matter of EM radiation determines its use **9.A** Develop an argument about why EM radiation can be used in multiple technologies to do specific tasks based on its frequency, wavelength, and interactions with matter. (SEP: 7.4; CCC: 4.1; DCI: PS4.B.2, PS4.C.1) **9.B** Ask questions that arise from examining a model of the electromagnetic spectrum related to the uses and material interactions of different types of electromagnetic radiation. (SEP: 1.2; CCC: 4.1; DCI: PS4.B.2, PS4.C.1)	questions to the DQB and decide to examine why some types of EM radiation can harm living organisms and others do not. **What students will figure out:** • EM radiation with high frequencies has short wavelengths; EM radiation with low frequencies has long wavelengths. • The EM radiation spectrum is arranged from high- to low-frequency EM waves. • Different types of EM radiation have different interactions with matter, including heating it, ionizing it, or breaking apart its molecules. • These interactions can be harnessed for various applications, such as medical imaging, telecommunications, and energy production. • Ionizing radiation can harm living organisms. ***What's next?*** *We will sort cards and identify the wave properties that better characterize harmful EM radiation. We will use various data sources to identify the pattern of increased*

			frequency and increased cancer risk. We will analyze a wave model and a photon model of EM radiation and determine that the photon model better explains our evidence.
Lesson 1.d: Does all electromagnetic radiation cause damage? Wave/Particle Duality **Lesson 10 - P.5 Electromag…**	**P.5 Lesson 10 Teacher Edition** **Lesson Teacher Resources:** **P.5 Lesson 10 Slides** **Engage:** Pull out the EM cards that cause the most harm. What do they have in common? Followed by slinky demonstration of high energy waves. **Explore:** jigsaw reading to complete table/Show video on slide with solar cell and demo solar cell in class **Amplitude/Frequency Effects…** **Amplitude Frequency Evide…** **Explain:** Which causes greater changes in matter (humans and/or solar cells): high amplitude or high frequency? What evidence do we have from class to support your answer? Does this align with our	**Learning Target:** I can develop an argument about why EM radiation can be harmful based supported by data. **Success Criteria:** I will… • read articles and categorize information based on low-amplitude vs high-amplitude for various frequencies • collect data on how various frequencies and amplitudes affect solar cells. • evaluate the merits of the wave and photon models of light to determine which reasoning better explains how high-frequency EM radiation can cause ionization of atoms and emission of electrons from a solar cell • create an analogy for the photon model of light	We sort cards to identify the wave properties that characterize harmful EM radiation. We use various data sources to identify the pattern of increased frequency and increased cancer risk. We use a water wave analogy to explain this pattern but find the wave model insufficient. We analyze a photon model, develop our own analogies of the model, and compare the model with our evidence. We determine that the photon model better explains this behavior of EM radiation. **What students will figure out:** • Some radiation is ionizing and some radiation is not. • The photons of high-frequency EM radiation have enough energy to knock out electrons of atoms and molecules, turning them into ions with different chemical properties.

	wave model of light? **Elaborate:** Introduce the Photon Model of Light **Evaluate** **Photon Model Analogy** **Past examples:** **1A - Our Photon Model Anal…** **2A - Our Photon Model Anal…** **2A - Our Photon Model Anal…** **4A -2025 Photon Model Anal…**	**10.A** Use data about the effect of EM radiation on human beings and solar cells to look for patterns at a macroscopic scale to revise our working explanation of the types of EM radiation that can cause damage to living cells. (SEP: 4.5; CCC: 1.1; DCI: PS4.B.2) **10.B** Evaluate the merits of the wave and photon models of EM radiation to determine which reasoning better explains how high-frequency EM radiation can cause ionization of atoms and emission of electrons from a solar cell. (SEP: 7.2; CCC: 2.2; DCI: PS4.B.1, PS4.B.2, PS4.B.3)	• The photons of visible EM radiation or higher frequency have enough energy to cause emission of electrons from photovoltaic materials in solar cells. • Ionizing radiation can cause changes in the structure of the DNA molecule, potentially altering its function. • More high-frequency ionizing radiation puts you at greater risk of cancer, but how much the risk increases depends on the type of radiation and the total exposure time. • The photon model of EM radiation can better explain the interactions of high-frequency EM radiation and matter. ***What's next?*** *We will wonder how EM radiation can be used to create and store digital images. We will read about how the interactions of X-rays with matter can be harnessed to create images of the internal structure of our body, and the advantages and disadvantages of digital and*

			conventional radiography. We will wonder about how EM radiation is used in wireless communication to transmit information.
Lesson 1.e: Should we send astronauts into space? Assessment: Working towards **HS-PS4-4**	CER emphasis on the wavelength, frequency and energy of light) **Morality in Space ACC '25-26** **Morality in Space group org…**	**Learning Target:** I can construct a written argument for the following prompt: should we send astronauts in space? **Success Criteria:** I will… • identify the most important benefit and drawback of sending astronauts into space. • write a clear claim and support my claim with the best evidence • explain how the evidence supports my claim using scientific vocabulary AND include a counter argument • argue if we should send astronauts in space including evidence to support your position as well as the counterargument.	*Students will learn about the guidance given to NASA by the Institute of Medicine to inform decision making regarding human space travel. Students will assess the risk-reward dynamic inherent to sending human beings into space to conduct scientific research, and will ultimately be asked to grapple with the ethics of the scenarios of the missions.* *Students will analyze relevant data sets in order to make practical and moral judgments on NASAs decisions to send humans into space.* *Students will construct an argument which promotes a moral stance in support of or against sending human beings into space for the sake of advancing scientific knowledge.*
LS1 Common Assessment - Part 1: Properties of Light Transfer Task **Properties of Light & 5G Assessment ACC 25-26** **Built on Canvas using this:**		Learning Target: I can use properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials and evaluate scientific claims about electromagnetic radiation. **HS-PS4-1; ; VoG: Communication**	

Types of Light check-in ACC 23-24

Data Table 1: Optical Density and Speed

Common Materials Composition	Optical Density (M/L)	Average Speed of light (m/s)
Air	1.00	3.00×10^8
Liquid Hydrogen	1.10	2.73×10^8
Water	1.33	2.26×10^8
Vegetable Oil	1.47	2.04×10^8
Mercury	1.62	1.85×10^8

Image 2: Radio Wave entering Exoplanet Surface

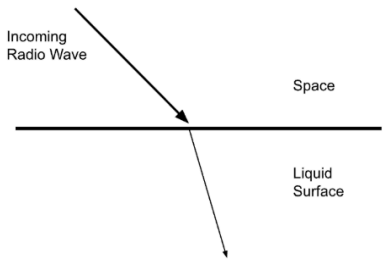


Image 2: Incoming Radio Wave refracting (bending) through a different material

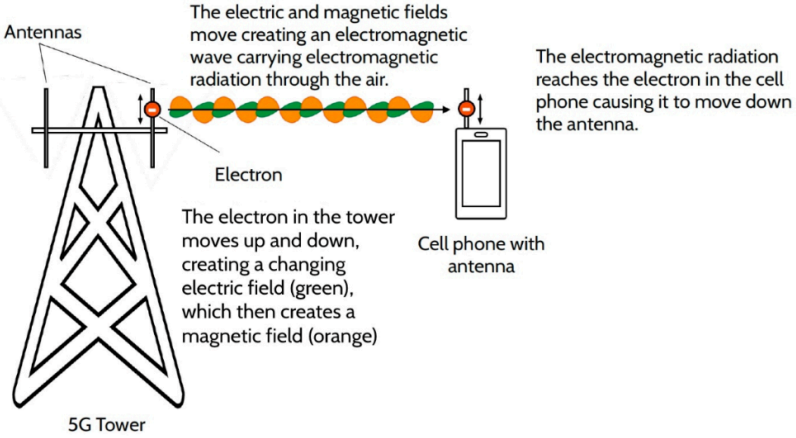
Success Criteria:

- calculate the speed of a wave using wavelength and frequency with correct units.
- compare different types of electromagnetic waves using wavelength and frequency.
- explain how and why the speed of light changes when it enters different materials.
- construct a scientific explanation (claim, evidence, reasoning) based on data

LS1 Common Assessment - Part 2: Evaluating 5G Safety Transfer Task

Built on Canvas using this:

Evaluating 5G Safety - Raccio



-Answer key and worksheets here:

Lesson 13 - P.5 Electromagnetic Radiation

Learning Target: I can *critically think by* evaluating arguments about the dangers of 5G radiation. HS-PS4-4, **VoG: Critical Thinking**

Success Criteria:

- identify the claim
- identify the evidence being used to support each of the author's claims
- Identify the author's reasoning or explanation of the evidence.
- consider the validity of the evidence provided by each claim in the social media post

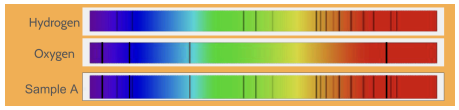


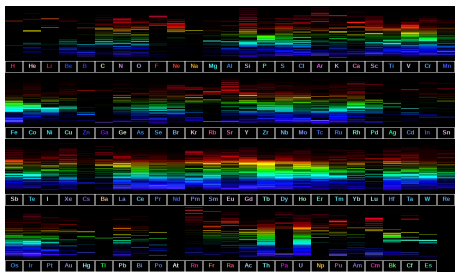
Learning Sequence 2: Matter and Forces within Stars

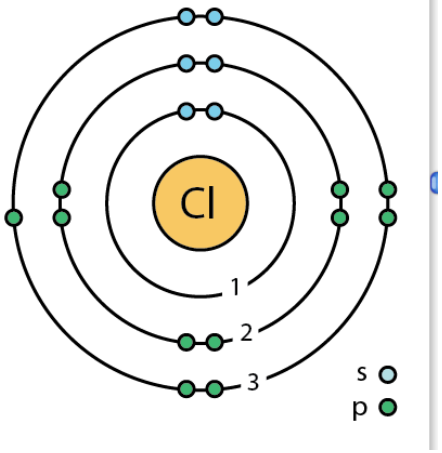
Class Notes - LS2: Stars: How do Stars Produce Energy and Matter? (ES Astronomy) - Duffy

Lesson 2.a: How does the matter in guest stars compare to stable stars?

Lesson 2 - P.6 Stars & the B…







P.6 Lesson 2 Teacher Edition

-ANALYZE IMAGES OF GUEST STAR REMNANTS AND THE SUN

Star Spectra- Duffy

-SPECTRAL TUBES DEMO (no worksheet? I don't think it is necessary)

-INTRODUCE PLASMA AND ATOMIC STRUCTURE

Plasma and Atomic Structur…

-Atomic Structure Simulation

-Ptable

Hatch versions

Plasma and Atomic Structur…

Atoms & Bohr Models ACC '…

Learning Target: I can use and compare different spectra to explain how the composition and temperature of stable stars differ from stars that suddenly change, like guest stars.

Success Criteria: I will…

- analyze and interpret light spectra from different stars.
- identify the patterns of absorption or emission lines that reveal what elements are present in a star.
- describe how the color and shape of a spectrum relate to a star's composition and temperature.
- use evidence from multiple spectra to explain why guest stars appear brighter or change color during stellar events.

2.A Integrate information from multiple spectra representations to describe differences in the composition and temperature

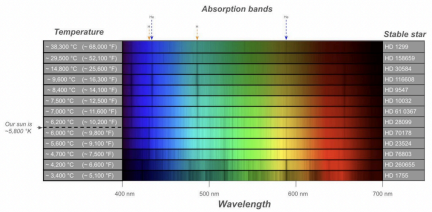
How does the matter in guest stars compare to stable stars? We compare photos of the parts of the sky where some of these guest star events were observed and notice remnants of what looks like gas or dust. We analyze spectra to determine the composition of the matter that these remnants are made of and its temperature. We compare these to the spectra of stable stars and add to our Progress Trackers. We ask new questions and add them to our Driving Question Board.

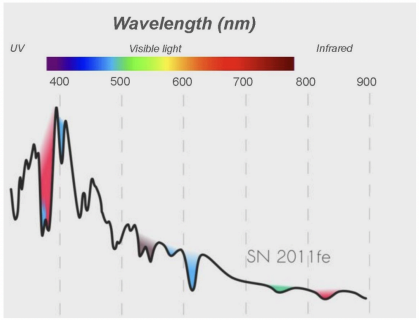
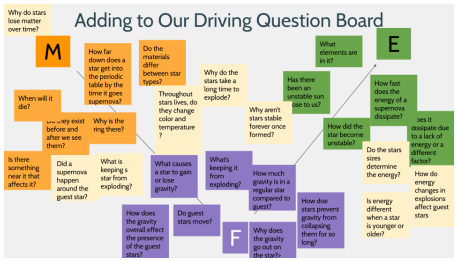
What students will figure out:

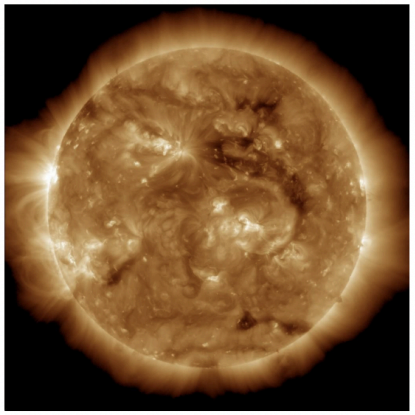
- Stable stars are made of mostly hydrogen and helium, and their temperatures vary across a certain range.
- Hydrogen and helium are the two lowest-mass elements.

What's next?

We will consider how studying energy and matter in stable stars could help us answer our questions. We will be introduced to two new tools, the Planning for

		scale of a stable star versus guest stars. (SEP: 8.2; CCC: 3.1; DCI: ESS1.A.2) **Learning Target:** I can analyze and interpret the periodic table to determine the total number of an element's subatomic particles. **Success Criteria: I will…** • use a model of atoms to identify the subatomic particles. • use a periodic table to identify the protons, neutrons and electrons for stable atoms. • create models of elements from the periodic table.	*Obtaining Information Tool and the Obtaining Information Tool, and we will use them to research answers to our questions. We will come to consensus and record our ideas in our Progress Trackers and Personal Glossaries. We will revisit the DQB.*
Lesson 2.b: What new questions can we ask about stable and unstable stars? **Lesson 2 - P.6 Stars & the B…**  *Semi-spherical shaped clouds of dust and gas can be seen in telescopic images from locations in the sky where guest stars were once observed.*	**P.6 Lesson 2 Teacher Edition** **-ANALYZE DATA TO IDENTIFY THE COMPOSITION AND TEMPERATURE OF STABLE STARS** **Blackbody Spectrum** **-MAKE PREDICTIONS AND ANALYZE GUEST STAR REMNANTS** **-ASK QUESTIONS**	**Learning Target:** I can ask questions based on the spectra of a guest star to figure out why some stars stay stable for a long time while others change suddenly. **Success Criteria:** I will… • examine spectra from guest stars and stable stars to notice patterns and differences. • ask scientific questions about what causes changes in a star's	How does the matter in guest stars compare to stable stars? We compare photos of the parts of the sky where some of these guest star events were observed and notice remnants of what looks like gas or dust. We analyze spectra to determine the composition of the matter that these remnants are made of and its temperature. We compare these to the spectra of stable stars and add to our Progress Trackers. We ask new questions and add them to our Driving Question Board. **What students will figure out:**

	 **-EXIT TICKET: complete Atomic Structure/Bohr Model Check-In individually**	brightness, color, or composition. • use my questions to guide further research or investigation about star stability and change. **2.B** Ask questions that arise from the spectra of a guest star to seek additional information about how and why some stars appear to remain stable for so long and others change so quickly. (SEP: 1.1; CCC: 7.1; DCI: ESS1.A.2)	• Stable stars are made of mostly hydrogen and helium, and their temperatures vary across a certain range. • Hydrogen and helium are the two lowest-mass elements. ***What's next?*** *We will consider how studying energy and matter in stable stars could help us answer our questions. We will be introduced to two new tools, the Planning for Obtaining Information Tool and the Obtaining Information Tool, and we will use them to research answers to our questions. We will come to consensus and record our ideas in our Progress Trackers and Personal Glossaries. We will revisit the DQB.*
Lesson 3: What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars? **Lesson 3 - P.6 Stars & the B…**	**P.6 Lesson 3 Teacher Edition** **Nuclear Fusion card sort** **Fusion Card Sort (to make copies if needed)** **Nuclear Fusion Cardsort (virt…** **-INTRODUCE THE PLANNING FOR OBTAINING INFORMATION TOOL**	**Learning Target:** I can use information from multiple sources to explain how nuclear processes in stars affect their behavior and changes during the beginning and middle stages of their lives. **Success Criteria:** I will… • find and compare information about nuclear fusion	What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars? We consider how studying energy and matter in stable stars, including the Sun, could help us answer our questions about guest stars and form research groups. We are introduced to the [material: PB.L3.HO1] and consider the



Stars like the Sun are very hot and transfer energy out toward the Earth. The remnant cloud of gas left over after a guest star event also appears to transfer energy and contain different types of matter than stable stars.

Planning for Obtaining Infor…

-CONTINUE FIRST RESEARCH CYCLE

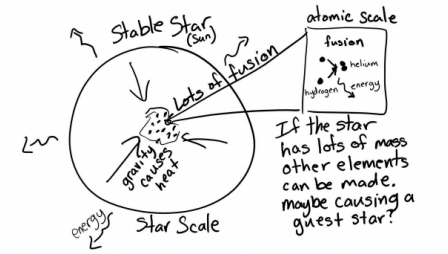
-BUILD CONSENSUS IN A SCIENTISTS CIRCLE

-AFTER CONSENSUS CIRCLE:

Fusion in Stars ACC '23-24

Fusion in Stars ACC '25-26

-MODELING OUR SUN, A STABLE STAR



processes in stars using multiple web sources.
- use the information to answer questions about how stars like the Sun change over time.
- integrate evidence from different sources to update or refine my explanations.
- explain my findings clearly, showing how nuclear processes drive changes in matter and energy inside stars.
- create, analyze and draw fusion reactions to show and explain how atoms behave in stars to create light.

3.A Compare and integrate information about nuclear processes in stars and how their scale affects their significance from a list of web sources in order to obtain information to address a question and make progress on

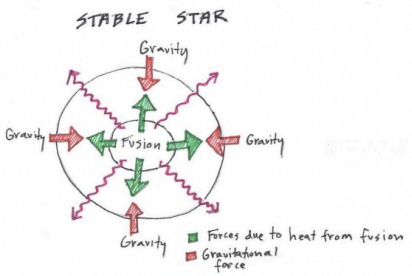
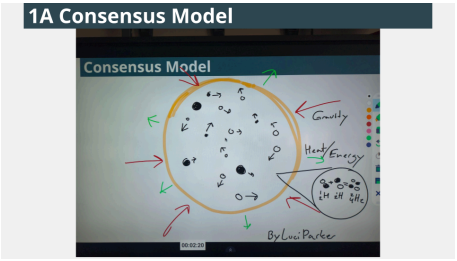
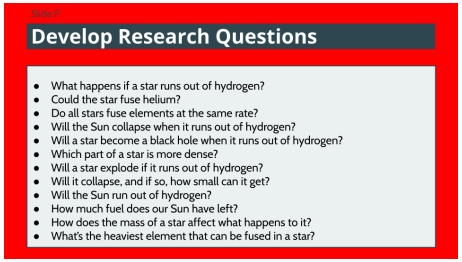
credibility of sources. We use a new tool called the Obtaining Information Tool to keep track of what we find out. We come to consensus around the answers to our research questions and record our ideas in our Progress Trackers and Personal Glossaries. We revisit questions on the DQB.

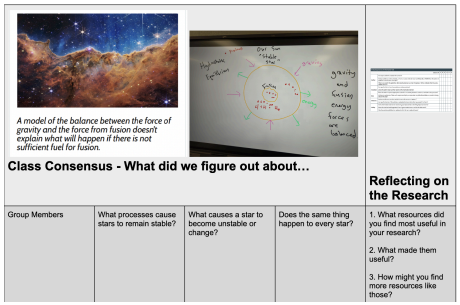
What students will figure out:

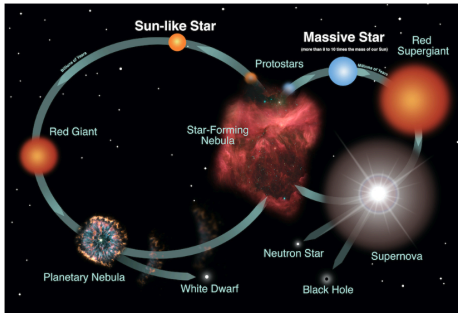
- A star is an object that is massive enough to ignite fusion.
- Energy from fusion causes stars to emit electromagnetic energy.
- Fusion results in new elements as multiple nuclei become one.

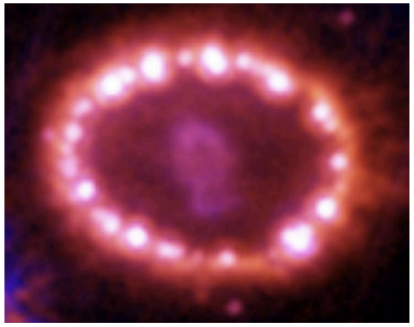
What's next?

We will model the macro forces of a star to help us figure out what keeps stars stable. We will develop research questions, and we will be introduced to a new tool for evaluating sources. We will gather information and communicate our findings in a gallery tour. We will come to consensus on what causes stars to remain stable or become unstable and change and record

		our models of why and how stars like the Sun change at the beginning and middle of their lives. (SEP: 8.2; CCC: 3.1, 5.2, 5.5; DCI: ESS1.A.4, PS1.C.1, PS3.D.4, ESS1.A.1)	*those ideas in our Progress Trackers.*
Lesson 4: How does running out of fuel cause a star to change? **Lesson 4 - P.6 Stars & the B…**   *A model of the balance between the force of gravity and the force from fusion doesn't explain what will happen if there is not sufficient fuel for fusion.*	**P.6 Lesson 4 Teacher Edition** **-MODEL STABILITY IN STAR SYSTEMS**  **-DEVELOP RESEARCH QUESTIONS**  **-BEGIN SECOND RESEARCH CYCLE WITH EVALUATE SOURCES AND OBTAIN INFORMATION** **Evaluating Sources of Infor…** **P.6 Lesson 4 Reference Eva…**	**Learning Target:** I can gather and use information from multiple reliable sources to explain how stars, including the Sun, remain stable and how they can become unstable over their life cycles. **Success Criteria:** I will… • evaluate the quality and usefulness of multiple sources for answering my questions. • integrate information from different sources to refine my explanations of star behavior. • explain how changes in matter and energy within a star cause it to stay stable or become unstable over time. **4.A** Ask questions that arise from our research on fusion and from modeling the forces in stars when they are stable to clarify and seek additional information about how stars change when their fuel runs	How does running out of fuel cause a star to change? We model the macro forces of a star to help us figure out what keeps stars stable and make sense of the balance between gravity and outward pressure in stable stars. We develop research questions and are introduced to a new tool: the [material:PB.L4.HO1]. We gather information and communicate our findings in a gallery tour. We come to consensus on what causes stars to remain stable or become unstable and change and record those ideas in our Progress Trackers. **What students will figure out:** • Stars exist because there is a balance (or equilibrium) between gravity forces pushing inward and the outward pushing forces of the hot, fast moving particles at the center of the star (due to

	Star Research Posters - Duffy **-GALLERY TOUR** **(insert student examples)** **-COME TO CONSENSUS ON WHAT WE FIGURED OUT**  A model of the balance between the force of gravity and the force from fusion doesn't explain what will happen if there is not sufficient fuel for fusion. **Class Consensus - What did we figure out about…** **Reflecting on the Research** Group Members | What processes cause stars to remain stable? | What causes a star to become unstable or change? | Does the same thing happen to every star? 1. What resources did you find most useful in your research? 2. What made them useful? 3. How might you find more resources like those? **AFTER RESOURCE POSTERS:** **Star In A Box ACC '25-26 (with HR questions)** **How are Stars Different?- D…** **Stellar Evolution Pictures - D…** **Stellar Evolution Card Sort - …** **Stellar Evolution Card Sort - Duffy** **EXAMPLE Stellar Evolution …** **Stellar Evolution Readings A…** **Use this simulation to validate their card sort decisions:** **WWTA | Life Cycle of Stars** **Teacher Reference Diagram for**	out. (SEP: 1.1, 1.4; CCC: 5.2, 7.1, 7.3; DCI: ESS1.A.4, PS3.D.4) **4.B** Gather, read, evaluate, and integrate information from multiple authoritative internet sources, assessing the evidence and usefulness of each source in answering our questions about how stars (including our Sun) remain stable and can become unstable over their life cycles and communicate the information with graphics and text. (SEP: 8.2, 8.3, 8.5; CCC: 7.1, 7.3; DCI: ESS1.A.1, ESS1.A.4, PS1.C.1) **Learning Target:** I can illustrate the paths that stars of different mass will take over time. **Success Criteria:** I will... • analyze the HR diagram to identify patterns between stars and explain how they are different. • describe how the mass of a star affects the lifespan and life stages of the star. • describe how fusion in a star changes over time (using specific reactions) • describe how the brightness, radius, and temperature of a star	energy released by fusion). • A feedback loop between gravity and fusion maintains this equilibrium. • Stars eventually run out of hydrogen in their cores. When there is not enough concentration of particles to keep fusing heavier elements, the equilibrium is broken, and the star will die. • What happens to a star when it dies depends on its mass. More massive stars run out of fuel faster because their gravity will cause the concentration of particles in the core to be higher, increasing fusion rates. • When a star like the Sun runs out of hydrogen to produce energy, the core will cool and condense. The Sun will become a red giant because of a multi-step process kicked off by this cooling and condensing and eventually fade away. • Massive stars can fuse heavier elements, up to iron for super-massive stars.

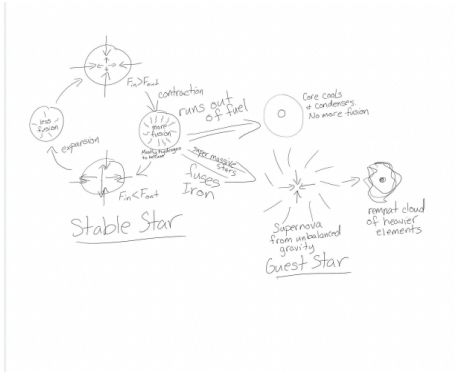
	student models:  	changes between its main stages over time.	• When a very massive star fuses iron in its core, the reaction will no longer release energy, and there will not be enough outward force to balance gravity, disrupting the stable feedback loop. The star collapses and bounces back in what is called a supernova. • Supernovae transfer a lot of energy into space. What ancient astronomers called "guest stars" are actually the light that results from this transfer of energy. ***What's next?*** *We will create a Gotta-Have-It Checklist to explain what cause-effect relationships occur within stars. We will model the feedback loop that keeps stars stable and what happens when this loop is disrupted. We will update the Scale Chart and revisit the DQB.*
Lesson 5: Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away? **Lesson 5 - P.6 Stars & the B…** **P.6 Lesson 5 Answer Key El…**	**P.6 Lesson 5 Teacher Edition** **BEFORE LESSON 5 STARTS:** **Why Do Stars Change? AC…** **-INDIVIDUAL MODELING AND PEER FEEDBACK**	**Learning Target:** I can develop and revise models to show how feedback loops keep stars stable, and how disruptions in these loops can cause sudden, dramatic changes depending on a star's mass.	Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away? We think we are ready to explain why a guest star appears and disappears, so we create a Gotta-Have-It Checklist to

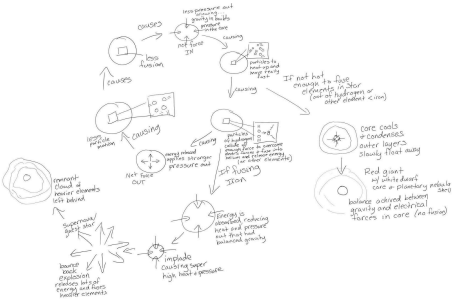


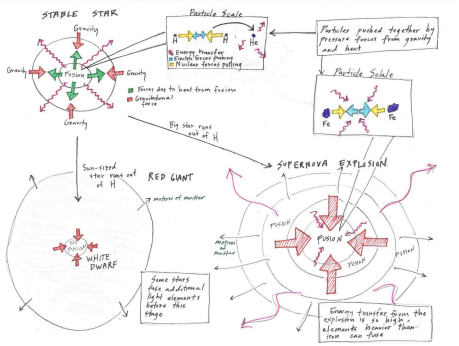
A guest star appears and then disappears, but other stars shine with steady light. The cloud left over after a supernova is hotter than the original star and contains different matter.

Modeling Stellar Stability - D…

-CONSENSUS MODELING







-UPDATE THE SCALE CHART

Success Criteria: I will…

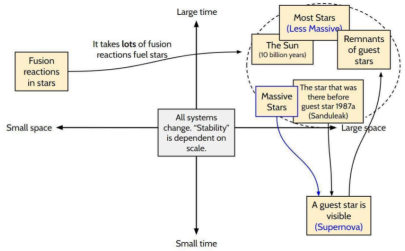
- explain how the elements being produced are different among the different types of stars
- create and update models of stellar systems based on evidence from multiple sources.
- describe how feedback loops regulate matter, energy, and forces within stars.
- explain how the mass of a star affects its stability and response to disruptions.

5.A Develop and revise models based on evidence from a variety of sources to illustrate how feedback loops keep stellar systems stable and how, depending on the mass of the star, disruptions in these loops can cause sudden, catastrophic changes.(SEP: 2.3; CCC: 3.1, 7.1, 7.3; DCI: ESS1.A.4, ESS1.A.1)

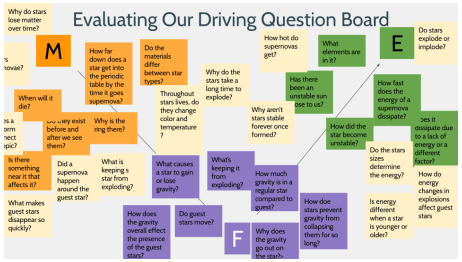
explain what cause-effect relationships occur within stars. We individually, then collectively, model the feedback loop that keeps stars stable and what happens when this loop is disrupted. We update the Scale Chart and revisit the DQB. We begin to wonder where the stuff for the first stars came from.

What students will figure out:

- A guest star is a star that tried to fuse iron in its core, which is an endothermic reaction (it needs energy). This breaks the feedback loop that keeps stars stable.
- The stable period for a star ranges from a few million years for the most massive to trillions of years for the least massive.
- When the feedback loop is broken for a super-massive star, the star will collapse and bounce back out. releasing a lot of energy and fusing elements heavier than iron. When this happens, the star in the sky appears very bright.
- After this event, the energy



-DQB REVISIT



will move outward into space, and the star will fade away as the gas begins to disperse into a remnant cloud of heavier elements.

What's next?

We will look at spectra of stars, galaxies, and empty space and notice puzzling patterns in each that might hold clues to how the matter in the Universe has changed over time. We will be introduced to the Communicating Information Planning Tool and use all four research tools in small groups to obtain, evaluate, and communicate our ideas. We will come to a consensus about the evidence we uncovered, which points to an event called the Big Bang, and read about what it means that people call the Big Bang a "theory."

LS2 Common Assessment:
Algol Transfer Task

Built in Canvas using:

- **Stellar Evolution Assessment ACC '25-26**

Above is a combined:

- ~~**Matter & Fusion Assessment ACC 24-25**~~
- ~~**Stellar Evolution Assessment ACC '24-25**~~

Learning Target: I can *critically think* about evidence and models to explain how fusion changes matter in stars and how those changes can be used to determine a star's age. HS-ESS1-3, HS-PS1-8 ; **VoG: Critical Thinking**

Success Criteria:

- analyze data about star composition, fusion reactions, and energy production.
- develop and use models to explain how elements are formed through nuclear fusion.

Table 1: Comparison of Sun to White Dots

Object	Composition	Brightness (Watts)	State of Matter	Shape
Sun	Hydrogen (73%), Helium (24%), Beryllium (2%), Carbon (1%)	3.8×10^{26}	Plasma	Spherical
White Dot #1	Helium (50%), Carbon (20%), Beryllium (22%), Oxygen (5%), Silicon (2%) and Sulfur (1%)	5.8×10^{26}	Plasma	Spherical
White Dot #2	Hydrogen (90%), Helium (9%), Beryllium (1%)	2.8×10^{26}	Plasma	Spherical

Study guide built on Canvas

~~**Matter and Fusion study guide 23-24**~~
~~**Life of Stars Study Guide**~~

- use evidence to make and support a claim about the relative ages of stars.

Common Assessment:
Built in Canvas based on this google form
Also incorporated feedback loop model from Lesson 5
P.6 Lesson 5 Answer Key Electronic Exit Ticket

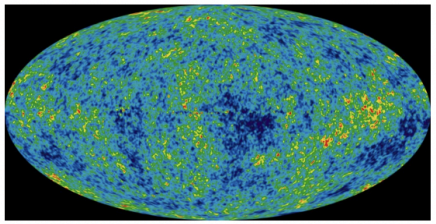


Learning Target: I can construct a model to *effectively communicate* how feedback loops keep stars stable, and how disruptions in these loops can cause sudden dramatic changes depending on a star's mass.. HS-ESS1-1, **VoG: Communication**

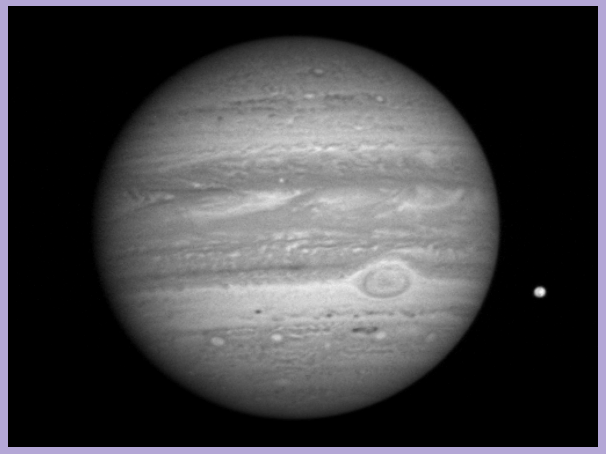
Success Criteria: I will…

- create and update models of stellar systems based on evidence from multiple sources.
- describe how feedback loops regulate matter, energy, and forces within stars.
- explain how the mass of a star affects its stability and response to disruptions.
- use my models to illustrate how changes in these loops can lead to sudden, catastrophic events.
- support my explanations with evidence from data, simulations, or observations of real stars.

5.A Develop and revise models based on evidence from a variety of sources to illustrate the feedback loop processes within star systems that keep them stable and the disruptions in these loops that can cause sudden change in the system and what happens then, based on the

		mass of the star. (SEP: 2.3; CCC: 3.1, 7.1, 7.3; DCI: ESS1.A.4, ESS1.A.1)	
Learning Sequence 3: Stars and the Big Bang			
Lesson 6: How has the matter in the Universe changed over time, and how do we know? **Lesson 6 - P.6 Stars & the B…**  *When we look at spectra of stars, galaxies, and empty space, we notice puzzling patterns that cannot yet be explained by our model.*	**P.6 Lesson 6 Teacher Edition** **Duffy combined handout version of Lesson 6:** **-LOOK AT SPECTRA OF STARS, GALAXIES, AND SPACE** **-THIRD RESEARCH CYCLE** **-TIMED GALLERY TOUR'**	**Learning Target:** I can explain how evidence from spectra, galaxy motion, element composition, and cosmic radiation supports the Big Bang theory. **Success Criteria:** I will… ● read and evaluate information from multiple reliable sources about the Big Bang theory. ● identify empirical evidence that supports the theory, including: ○ spectral patterns from distant galaxies, ○ the redshift showing galaxies moving away from us, ○ the composition	How has the matter in the Universe changed over time, and how do we know? We look at spectra of stars, galaxies, and empty space and notice puzzling patterns in each that might hold clues to how the matter in the Universe has changed over time. We decide to research each question and come back together to communicate our findings. We are introduced to the [material: PB.L6.HO2] and use all four research tools in small groups to obtain, evaluate, and communicate our ideas. We come to consensus about the evidence we uncovered, which points to an event called the Big Bang, and read about what it means that people call the Big Bang a "theory." Finally, we add to our Progress Trackers and our Personal Glossaries. **What students will figure out:** ● The Big Bang theory is supported by evidence. ● Evidence for the Big Bang

		of stars and gases, and ○ maps of cosmic background radiation. • explain how my researched evidence shows that the Universe has expanded over time. • communicate my understanding using clear graphics, models, or text-based explanations. • connect each type of evidence to the scientific reasoning that supports the Big Bang model. **6.A** Read, evaluate, and communicate information about the Big Bang to explain that the theory is supported by empirical evidence of spectral patterns, including observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of maps of radiation permeating the Universe. (SEP: 8.3, 8.5, 7.2;	includes observations of distant galaxies moving away from us, the measured composition of stars, and maps of spectra of the cosmic microwave background, which all match Big Bang models. ***What's next?*** *We will record questions we still want answered on our DQB and then broaden to think about questions we have about other types of phenomena. We will reflect on what investigations we can through online research, future science classes, a career in STEM, and/or a lifetime of*

		CCC: 1.5; DCI: ESS1.A.3, ESS1.A.2, ESS1.A.4)	
Common Assessment: **-LS1 Summative Assessment: Jupiter Transfer Task** Lesson 7: How can we use the practices and crosscutting concepts we have developed to figure things out on our own? Built in Canvas:  P.6 Lesson 7 Answer Key Jupiter Transfer Task		**Learning Target:** I can ask meaningful scientific questions about real-world phenomena and plan how to find, evaluate, and share information to answer them using the science and engineering practices I've learned. **Success Criteria:** I will… ● reflect on my own life experiences to identify puzzling phenomena I want to explain. ● ask testable and relevant questions that connect to ideas from this course. ● plan how to obtain and evaluate information to investigate my questions. ● decide how to communicate my findings clearly using scientific reasoning and evidence. ● apply the science and engineering practices and crosscutting concepts I've developed throughout this and other OpenSciEd High School units.	**What students will wonder:** How can we use the practices and crosscutting concepts we have developed to figure things out on our own? We consider how the M-E-F triangle frames and our understanding of stability and change help us make sense of our phenomena. We record questions we still want answered on our DQB and then broaden to think about questions we have about other types of phenomena. We reflect on what investigations we can through online research, future science classes, a career in STEM, and/or a lifetime of curiosity. We then engage in a final transfer task. **What students will figure out:** ● Stability and change and the M-E-F triangle frames are valuable tools for making sense of our natural world. ● We can use the lenses we have developed and our research tools to continue to investigate our questions outside of class and beyond ***What's next?***

		END OF UNIT.

Astronomy

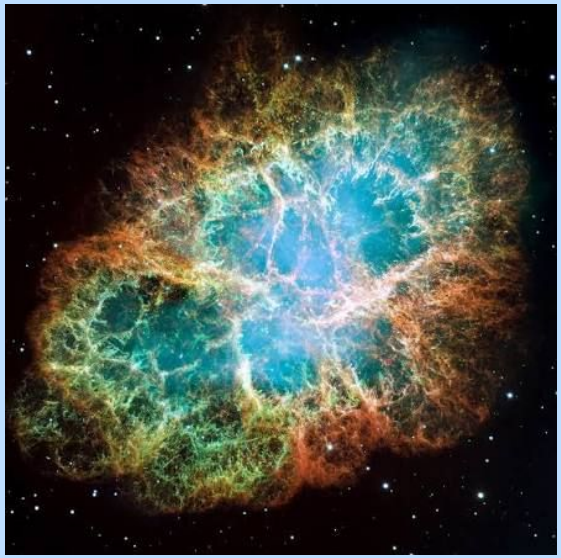


ACC & ACA Earth Science Course-Unit 4

Written by Nicole Raccio & Kelsey Duffy
Presentation Created by Nicole Raccio
October 21, 2026

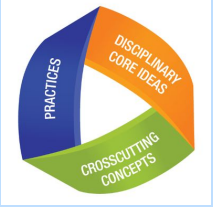
Unit 4: Astronomy

This unit is anchored in historical observations of stars that suddenly appeared and then disappeared within a short period of time. These phenomena prompt students to question why most stars seem constant while others change so dramatically. Students analyze images and spectral data from the remnants of these events. Students build a shared understanding of nuclear fusion and the life cycles of stars.

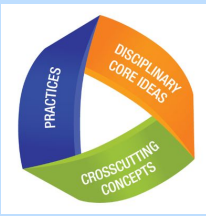


Standards Assessment

- HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.
- HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. (ACC ONLY)
- HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.
- HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes ~~of fission~~, fusion, ~~and radioactive decay~~.
- HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media
- HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
    - HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* (ACC ONLY)
    - HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.



SEPs, DCIs, & CCCs



Science & Engineering Practices (SEP)

- Using Mathematics and Computational Thinking
- Obtaining, Evaluating, and Communicating Information
- Developing and Using Models
- Constructing Explanations and Designing Solutions (ACC ONLY)

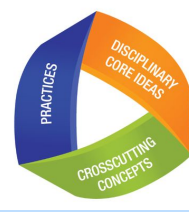
Disciplinary Core Ideas (DCI)

- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS3.D: Energy in Chemical Processes and Everyday Life
- ESS1.A: The Universe and Its Stars
- PS1.C: Nuclear Processes

Crosscutting Concepts (CCC)

- Cause and Effect
- Scale, Proportion, and Quantity
- Energy and Matter

Learning Sequence 1: Energy from Stars



Lesson Level Question:

- Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?
- How does energy transfer through a wave?
- What other types of EM radiation are there, and how do we use them?
- Does all electromagnetic radiation cause damage? Wave/Particle Duality
- Should we send astronauts into space?

Learning Objectives

- I can develop a model to explain why most stars we see in the night sky appear stable while some "guest stars" change over time.
- I can use and make a physical model of energy transfer in stars by comparing and contrasting different waves.
- I can plan and conduct an investigation using a pHet simulation to identify how certain wave properties affect energy transfer in waves.
- I can use mathematics to calculate the speed of light by using wavelength, frequency, and energy as variables to analyze the speed of light through different materials (cause and effect).
- I can obtain and evaluate information about how EM radiation can be harmful based on its frequency, wavelength, and interactions with matter.
- I can obtain, evaluate, and communicate information about how high amplitude or low frequency electromagnetic radiation is more dangerous and how it affects various materials.
- I can obtain, evaluate, and communicate information to explain why some types of EM radiation can cause damage to living cells by understanding the scale, proportion, and quantity of different EM radiation waves.
- I can obtain, evaluate, and communicate information about if we should send astronauts to space and make a connection to electromagnetic radiation by understanding the cause and effect of the dangers of electromagnetic radiation.
- I can revise my initial model of a guest star and a stable star to include the transfer of energy released.

Assessment:

Properties of Light and Evaluating 5G Safety

Part 1: Properties of Light
The NASA "Planets Beyond Our Solar System" Team has used various techniques to locate planets outside of our solar system, which are known as ***exoplanets***. Once an exoplanet is identified, scientists use observational data to learn more about the planet.

Scientists detect radio waves moving toward a newly discovered exoplanet. They discover the radio wave entering a liquid surface.
Your task is to determine the composition of the liquid on the planet.

Data Table 1: Optical Density and Speed

Common Materials Composition	Optical Density (M/L)	Average Speed of light (m/s)
Air	1.00	3.00×10^8
Liquid Hydrogen	1.10	2.73×10^8
Water	1.33	2.26×10^8
Vegetable Oil	1.47	2.04×10^8
Mercury	1.62	1.85×10^8

Graph 1: Speed of Light vs Optical Density

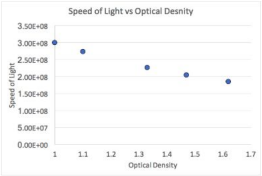


Image 1: Electromagnetic Spectrum

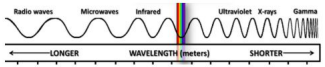


Image 2: Radio Wave entering Exoplanet Surface

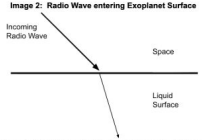


Image 2: Incoming Radio Wave refracting (bending) through a different material

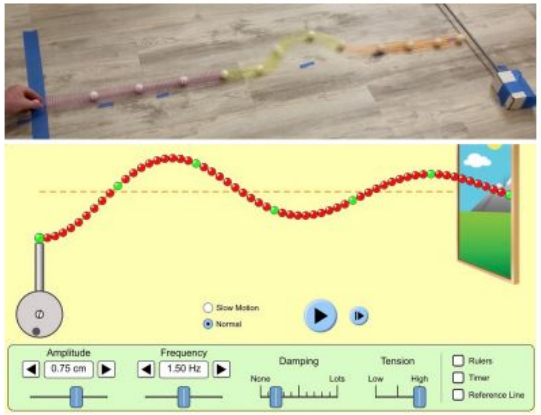
Part 2: Evaluating 5G Safety
You have probably heard the phrase "5G" thrown around a lot lately. It's in cell phone commercials and on the news. Many people are calling it a game-changer for wireless technology. A 5G network should be able to offer significantly faster data transmission speeds than 3G or 4G, and can accommodate much more traffic. This is possible, in part, because 5G networks use a portion of the electromagnetic (EM) radiation spectrum to transmit digital information that isn't currently being used by other wireless communication devices. Companies are racing to increase their 5G coverage nationwide. To support this transition, some companies are building as many as 1 5G tower per block!



Learning Target: I can use models such as diagrams and mathematical models to support scientific explanations about properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials.

Learning Target: I can *critically think* by obtaining, evaluating, and communicating evidence and reasoning to support the validity of evidence provided on social media posts about the dangers of 5G radiation by recognizing the scale, proportion, and quantity of 5G waves.

What students figure out



Shaking the end of a slinky creates a wave pattern. A computer simulation of a wave on a string produces similar patterns.

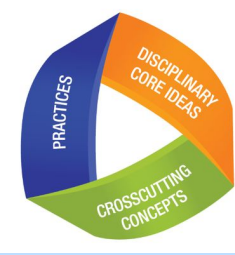


The electromagnetic spectrum includes various types of radiation with a wide range of frequencies, wavelengths, and uses, such as communication and medical imaging, but some types can also pose health risks.



EM radiation affects different materials in different ways.

Learning Sequence 2: Matter and Forces within Stars



Lesson Level Questions

- How does the matter in guest stars compare to stable stars?
- What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars?
- How does running out of fuel cause a star to change?

Learning Targets

- I can use multiple models to describe differences in the composition and temperature scale of stable star stars versus guest stars by identifying patterns of absorption and emission spectra of different elements.
- I can revise my models of a guest star and a stable star to include the specific matter that makes them up using Bohr models to account for the atomic scale.
- I can obtain, evaluate, and communicate information about nuclear processes in stars and understand how their behavior is affected by these changes during their life stages.
- I can use a computer simulation model to explain how stable stars remain stable and how they can become unstable over their life cycles by describing the nuclear and subatomic scale of atoms.
- I can obtain, evaluate, and communicate information to refine my explanations of how and why stars change temperature, composition and size over their lifespan by describing the macro and microscales of stars during their lifespans.

Assessment:

Final Model and Algol A Transfer Task

The Life of Stars Assessment (mod)

Stars are the most widely recognized astronomical objects, and represent the most fundamental building blocks of galaxies. The study of the birth, life, and death of stars is central to the field of astronomy. Read, analyze and interpret the following information about the two stars called Algol A and Algol B to determine the history and future of these two stars.

Figure 1: Algol A (left) and Algol B (right) Currently

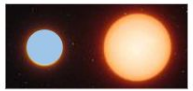


Table 1: Characteristics of Algol A and Algol B

Characteristic	Algol A	Algol B
Current Stage	Main Sequence	Giant
Current Color	Light Blue	Orange
Main Sequence Color	Light Blue	White
Initial Main Sequence Mass	10 x the sun	4 x the sun

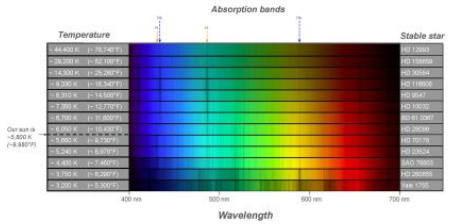
Table 2: The Relationship Between Temperature, Color, and Initial Mass of Stars

Temperature (K)	Color	Average Initial Mass of a Main Sequence Star (x Sun)	Time on the Main Sequence (million years)
More than 33,000	Dark Blue	More than 40	10 or less
10,000-30,000	Light Blue	10	25
7,500-10,000	White	4	200
5,200-7,500	Yellow	1	1200
3,700-5,200	Orange	0.5	60,000
Less than 3,700	Red	Less than 0.5	850,000 or more

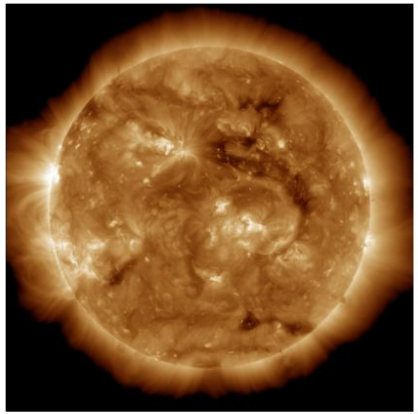
I can construct a model to *effectively communicate* how stable stars remain stable and how they can become unstable over their life cycles by describing the macro and micro scales of stars and their lifespans.

I can *critically think* about evidence and models to explain how fusion changes in matter in stars and how those changes can be used to determine the star's age by observing the macro and micro scales of stars and their lifespan.

What students figure out



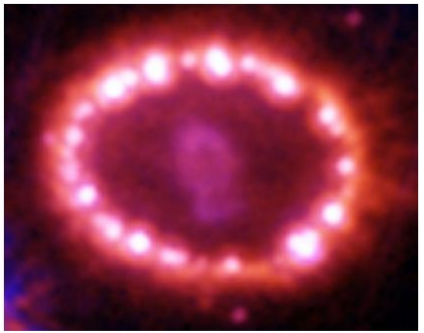
Semi-spherical shaped clouds of dust and gas can be seen in telescopic images from locations in the sky where guest stars were once observed.



Stars like the Sun are very hot and transfer energy out toward the Earth. The remnant cloud of gas left over after a guest star event also appears to transfer energy and contain different types of matter than stable stars.

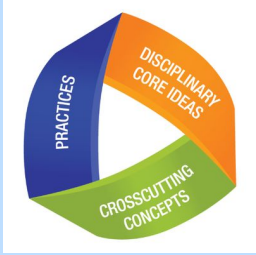


A model of the balance between the force of gravity and the force from fusion doesn't explain what will happen if there is not sufficient fuel for fusion.



A guest star appears and then disappears, but other stars shine with steady light. The cloud left over after a supernova is hotter than the original star and contains different matter.

Learning Sequence 3: Stars and the Big Bang [ACC ONLY]



Lesson Level Questions

- How has the matter in the Universe changed over time, and how do we know?

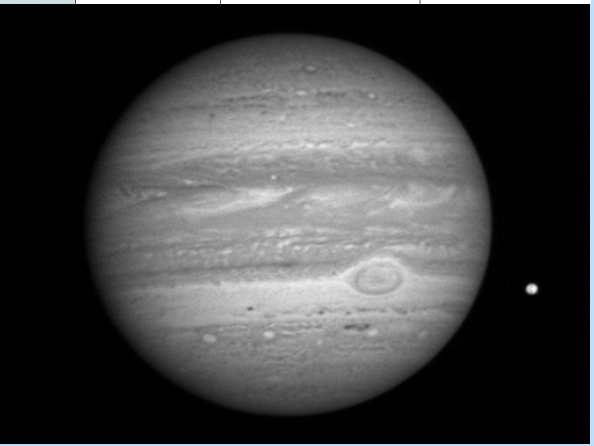
Learning Targets

- Read, evaluate, and communicate information about the Big Bang to explain that the theory is supported by empirical evidence of spectral patterns, including observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of maps of radiation permeating the Universe.

Assessment:

Jupiter Transfer Task

	Earth	Sun	Jupiter
Mass	1 x mass of Earth	333,000 x mass of Earth	318 x mass of Earth
Diameter	12,756 km	1,392,500 km	142,984 km
Volume	1 x Earth volume	1,300,000 x Earth volume	1,323 x Earth volume



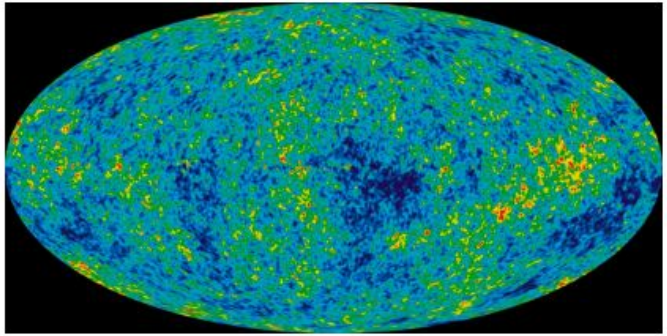
HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth in the form of radiation. (SEP: 2.3; CCC: 3.1; DCI: ESS1.A.1, PS3.D.4)

Learning Target: I can develop models of the Jupiter and Sun systems to explain the source of the light we observe and how an object's scale affects interactions in its core.

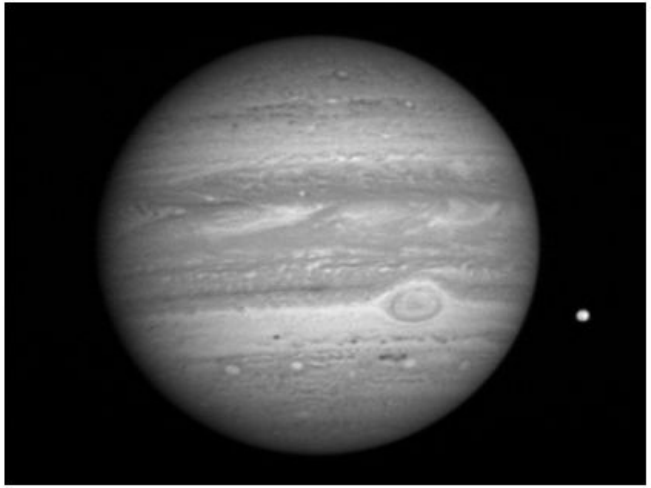
Success Criteria: I will…

- model where the light from Jupiter and the Sun originates.
- compare how differences in scale affect conditions and interactions (fusion) in Jupiter's and the Sun's cores.
- use evidence to explain how core interactions relate to the light each object emits.

What students figure out

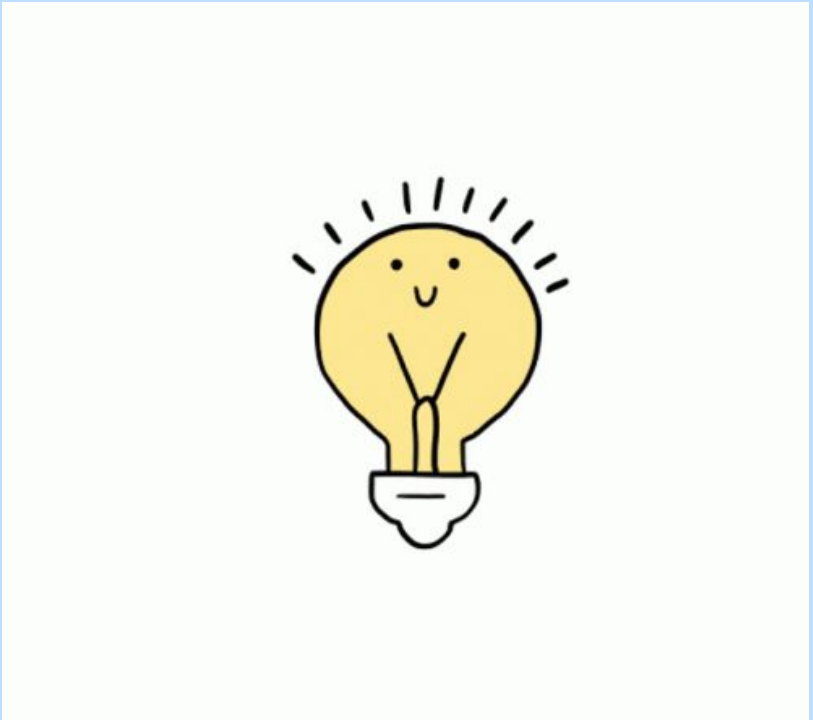


When we look at spectra of stars, galaxies, and empty space, we notice puzzling patterns that cannot yet be explained by our model.



We have so many questions about phenomena that we would like to explore in the future.

Thank you!



BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 e.

AGENDA REPORTING FORM

Agenda Topic: SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACA - Revised - First Reading.

Summary of Issue: SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACA - Revised - First Reading.

Background: _____

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

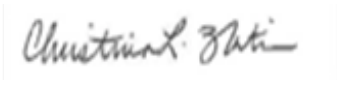
Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

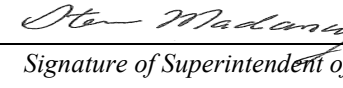
Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS Earth Science - Unit 4, Astronomy - Guest Stars and the Big Bang ACA - Revised – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal



Signature of Staff Member Submitting Report



Signature of Superintendent of Schools

Unit Overview	
Unit Title:	ES: Astronomy - Guest Stars
Teacher:	Kelsey Duffy and Nicole Raccio
Grade Level/Course:	9 Earth Science
Length/Dates:	About 10 weeks
Unit Summary:	This unit is anchored in historical observations of stars that suddenly appeared and then disappeared within a short period of time. These phenomena prompt students to question why most stars seem constant while others change so dramatically. From this, students begin to wonder what causes stars to shine and what processes might lead to such rapid changes. Students organize their questions around key ideas of matter, energy, and forces, and decide to investigate the regions of the sky where these events were recorded using modern astronomical tools. In Learning Sequence 1 the students will explore the energy or electromagnetic radiation that is released from stars. In Learning Sequence 2 the students will analyze images and spectral data from the remnants of these events. They then develop a shared understanding of how the matter is changing in stars that results in this transfer of energy. The students will then explore the macro forces of stars that result in their stability vs instability. This unit can be expanded upon if students were to enroll in the 0.5 credit Astronomy courses. Building off these curricula, combined: Astronomy Skeleton Updated 2019 Astronomy Skeleton- Stars & the Big Bang OpenSciEd Unit P.6 Stars & the Big Bang OpenSciEd Unit P.5 Electromagnetic Radiation

Performance Expectations

- **HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.**

- **HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.**
    - HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.

- **HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.**
- **HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.**
- **HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes ~~of fission~~, fusion, ~~and radioactive decay~~.**

Unit's Essential Question: Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?

Lesson Level Essential Questions:

Learning Sequence 1: Energy from Stars

1. How does energy transfer away from a stable star vs a guest star?
2. How are the properties/characteristics of waves related?
3. What other types of light are coming from stars, and are they harmful?
4. What property of light makes it harmful?
5. Why do some types of EM radiation cause damage to living cells and not others?
6. Should we send astronauts into space?
7. What can be causing this energy transfer in guest and stable stars, how is it different between the two?

Learning Sequence 2: Matter and Forces within Stars

8. How does the matter in guest stars compare to stable stars?
9. What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars?
10. How does running out of fuel cause a star to change?

Science and Engineering Practices (Skills)	Disciplinary Core Ideas (Knowledge)	Crosscutting Concepts (Enduring Understandings)
Using Mathematics and Computational Thinking Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and	**PS4.A: Wave Properties** • The wavelength and frequency of a wave are related to one another by the speed of travel of the wave, which depends on the	**Cause and Effect** • Empirical evidence is required to differentiate between cause and correlation and make claims about

analysis; a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms; and computational tools for statistical analysis to analyze, represent and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

- Use mathematical representations of phenomena or design solutions to describe and/or support claims and/or explanations.

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 9–12 builds on K–8 experiences and progresses to evaluating the validity and reliability of the claims, methods, and designs.

- Communicate scientific ideas (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically).
- Evaluate the validity and reliability of multiple claims that appear in scientific and technical texts or media reports, verifying the data when possible.
- Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments.

Developing and Using Models
Modeling in 9–12 builds on K–8 experiences

type of wave and the medium through which it is passing.

PS4.B: Electromagnetic Radiation

- When light or longer wavelength electromagnetic radiation is absorbed in matter, it is generally converted into thermal energy (heat). Shorter wavelength electromagnetic radiation (ultraviolet, X-rays, gamma rays) can ionize atoms and cause damage to living cells.
    - Electromagnetic radiation (e.g., radio, microwaves, light) can be modeled as a wave of changing electric and magnetic fields or as particles called photons. The wave model is useful for explaining many features of electromagnetic radiation, and the particle model explains other features

PS3.D: Energy in Chemical Processes and Everyday Life

- Nuclear fusion processes in the center of the sun release the energy that ultimately reaches Earth as radiation. (secondary)

ESS1.A: The Universe and Its Stars

- The star called the sun is changing and will burn out over a lifespan of approximately 10 billion years.
- The study of stars' light spectra and brightness is used to identify compositional elements of stars, their movements, and their distances from Earth.
- Other than the hydrogen and helium formed at the time of the Big Bang, nuclear fusion

specific causes and effects.

- Cause and effect relationships can be suggested and predicted for complex natural and human-designed systems by examining what is known about smaller scale mechanisms within the system.

Scale, Proportion, and Quantity

- The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.

Energy and Matter

- In nuclear processes, atoms are not conserved, but the total number of protons plus neutrons is conserved.

and progresses to using, synthesizing, and developing models to predict and show relationships among variables between systems and their components in the natural and designed world(s). ● Develop a model based on evidence to illustrate the relationships between systems or between components of a System.	within stars produces all atomic nuclei lighter than and including iron, and the process releases electromagnetic energy. Heavier elements are produced when certain massive stars achieve a supernova and explode **PS1.C: Nuclear Processes** ● Nuclear processes, including fusion, fission, and radioactive decays of unstable nuclei, involve release or absorption of energy. The total number of neutrons plus protons does not change in any nuclear process.	

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

C District Rubrics

Performance Assessment(s) and Evaluative Criteria:

1. LS1 Common Assessment: Part 1: Properties of Light Transfer Task: Students use properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials and evaluate scientific claims about electromagnetic radiation. **HS-PS4-1; VoG: Communication**
   Success Criteria:
   - calculate the speed of a wave using wavelength and frequency with correct units.
   - compare different types of electromagnetic waves using wavelength and frequency.
   - explain how and why the speed of light changes when it enters different materials.
   - construct a scientific explanation (claim, evidence, reasoning) based on data
2. LS1 Common Assessment: Part 2: Evaluating 5G Safety Transfer Task: Students can demonstrate *critical thinking* by evaluating

arguments about the dangers of 5G radiation. HS-PS4-4, **VoG: Critical Thinking**

Success Criteria:

- identify the claim
- identify the evidence being used to support each of the author's claims
- Identify the author's reasoning or explanation of the evidence.
- consider the validity of the evidence provided by each claim in the social media post

3. LS2 Common Assessment: Algol Transfer Task: Students can *critically think* about evidence and models to explain how fusion changes matter in stars and how those changes can be used to determine a star's age. HS-ESS1-3, HS-PS1-8, **VoG: Critical Thinking**

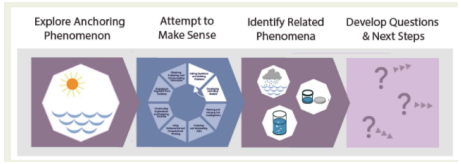
   Success Criteria:

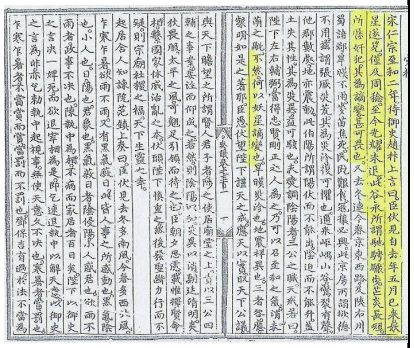
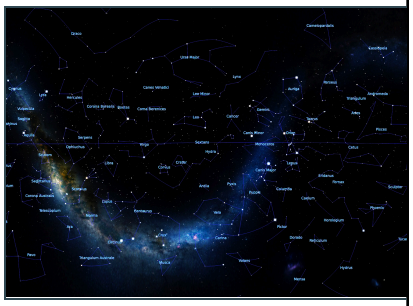
   - analyze data about star composition, fusion reactions, and energy production.
   - develop and use models to explain how elements are formed through nuclear fusion.
   - use evidence to make and support a claim about the relative ages of stars.

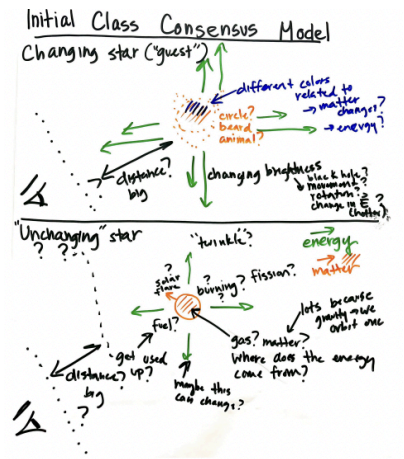
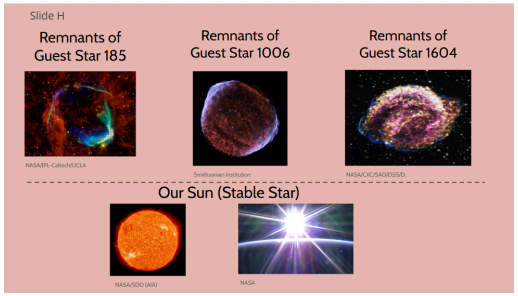
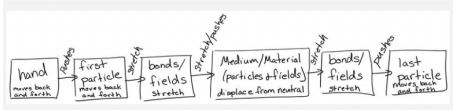
4. LS2 Common Assessment: Students can construct a model to *effectively communicate* how stable stars remain stable and how they can become unstable over their life cycles by describing the macro and microscales of stars and their lifespans. HS-ESS1-1, **VoG: Communication**

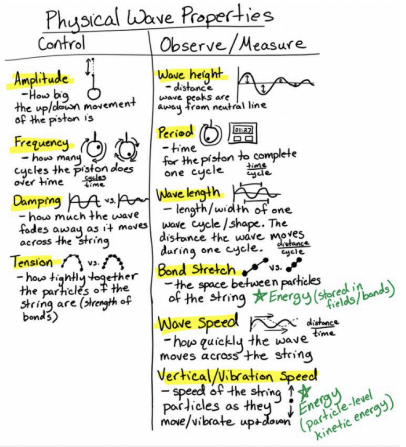
   Success Criteria:

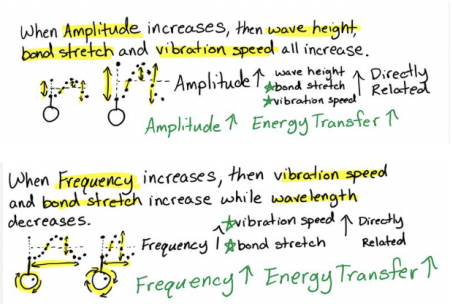
   - use graphics and text to update models of stellar systems based on evidence from multiple sources
   - explain how the mass of a star affects its stability and response to disruptions.

Target Question	Activity (estimated time 88 min for each)	Standard Objectives/Learning Target	Student will know and wonder
Learning Sequence 1: Energy from Stars **Raccio Class Notes - LS1: Stars: Electromagnetic Radiation (ES Astronomy)**			
Phenomena-Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away? **All Lesson Resources:** Lesson 1 - P.6 Stars & t…	**P.6 Lesson 1 Teacher Edition** **Engage in the Anchoring Phenomena Routine** 	**Learning Target:** I can develop a model to explain why most stars we see in the night sky appear stable while some "guest stars" change over time. **Success Criteria:** I will…	Students will examine historical evidence that some stars appear in the night sky even though we could not see a star there previously. The star fades away and seems to disappear. The students will map these events on a star map and look for patterns. Students will attempt to make sense by making initial models of changing and unchanging stars

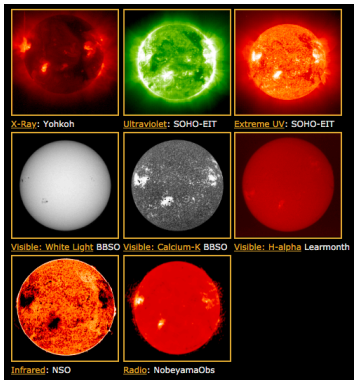
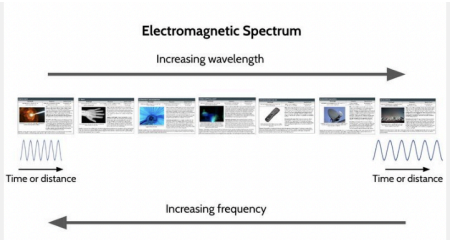
 	**Explore Anchoring Phenomena:** Introduce Guest Star 1054 slides A-S and Handout Historical Guest Stars - … **Attempting to Make Sense:** Students will create a notice and wonder chart in their notebook about the guest star. **Identify Related Phenomena:** 1. Students will remember what causes objects to release energy 2. Students will read about another guest stars **#1 Handout Historical Guest Star…** **#2 Handout Historical Guest Star…** **#3 Handout Historical Guest Star…** **#4 Handout Historical Guest Star…** **3.** Students will plot quest stars, including 1987A, on the sky chart and identify similarities and differences in historical guest stars. **Driving Questions and Next Steps** Students will develop a model of a change and unchange star and develop questions about their models as well as the historical information.	• Obtain information about historical guest stars to identify their location and appearance in the sky. • develop a model that shows why a star would change and would not change • use my model to explain why the stars we see at night appear stable over time, while historical accounts of guest stars describe them changing dramatically • ask scientific questions based on historical and current observations of stars	and use the models to ask questions about the historical observations of dramatic changes of stars to clarify our models, and seek additional information. **What students will figure out:** • A guest star is a star that appears and then seems to disappear a short time later. • Guest stars are distributed across the sky but seem to be concentrated along the plane of our galaxy (the Milky Way). ***What's next?*** *Since students asked questions about the energy released by the guest star they will examine how energy moves away from stars to provide us information about the guest star.*

			
Lesson 1-How does energy transfer away from a stable star vs a guest star? **All Lesson Resources:** Lesson 3 - P.5 Electrom…	**P.5 Lesson 3 Teacher Edition** **Engage:** What is given off by the remnants of the guest stars? How are these stars changing across different scales?  **Explore-**Remind students light is a form of energy. Ask students to transfer energy from between two people using a slinky/string. (Part I)	**Learning Target:** I can use and make a physical model of energy transfer in stars by comparing and contrasting different waves. **Success Criteria:** I will.. • physically model how energy is transferred from one object to answer • create an explanatory model showing energy is transferred into the system • use a computer simulation to define the properties of waves • construct an explanation for high	Students manually transfer energy as a wave with a slinky and use a computer simulation to identify energy transfers as a wave. Students will recall examples of physical waves. Students will develop a model for how physical waves transfer energy through solids using a computer simulation.  Students will define characteristics of waves and use a computer simulation to explain the difference between high and low energy waves in terms of the properties. **What students will figure out:**

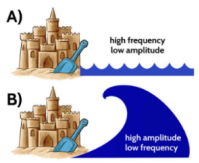
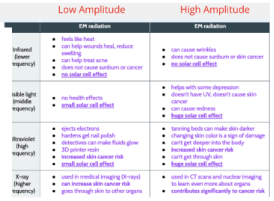
	How does energy travel? **Explain-**Discuss how energy can travel as a particle and wave and we are going to explore a wave first. **Explore/Explain-**Use the computer simulation to develop a model of a wave (Part 2) **Explore/Explain-**Use the computer simulation to explore high and low energy waves and define the properties of waves (Part 3) **Evaluate-**Construct an explanation for how the energy may be different traveling from a guest star and a stable star. (#7)	energy vs low energy waves	• When the first particle in the wave on a string is moved (as a force is applied to it, which transfers energy to it), it stretches the electric field (bond) between it and the next particle. • When a bond is stretched (or compressed), energy is transferred to the fields that produce the bond, and when it is unstretched (or uncompressed), that energy transfers out of the fields and back into the motion of the particles around it. • Waves have physical properties that can be defined as the following:  • Guest stars are high energy events compared to stable stars. **What is next?**

			Students will explore the relationship between wave properties and develop a mathematical model of the relationship between frequency, wave speed, and wavelength.
Lesson 2- How are the properties/characteristics of waves related? **All Lesson Resources:** Lesson 3 - P.5 Electrom…	**P.5 Lesson 3 Teacher Edition** **Engage:** Have students identify and define the identify variables they can test with the pHet simulation. **Explore:** Students will conduct their investigation (Part I). How are the properties/character… **Explain:** Students will share their results and then write claims based on the class results (Part II). **Elaborate:** Students will derive mathematical relationships and explore the speed in various mediums (Part III &IV). **Evaluate:** Lesson 3 Exit Ticket built in canvas called “Waves Check-in (Mini Transfer Task”)	**Learning Target:** I can plan and conduct an investigation using a pHet simulation to identify how certain wave properties affect energy transfer in waves. **Learning Target:** I can use mathematics to calculate the speed of light by using wavelength, frequency, and energy as variables to analyze the speed of light through different materials (cause and effect). **Success Criteria:** I will.. • identify independent variables as well as controls of your investigation • identify a quantitative and qualitative dependent variable • make a claim based on your investigation • identify mathematical relationships between	Students will plan and carry out an investigation to determine how one wave characteristic can affect wavelength and energy. Students will write evidence based claims. Students will learn that all forms of light travel through a vacuum travel at the same speed ($3x10^8$ m/s) due to the negative/indirect relationship between wavelength and frequency. Wavelength and frequency are multiplied to determine the speed of a wave. The students will revisit the DQB to identify and evaluate (and add to) all energy questions. **What students will figure out:**  • A larger amplitude means that

		wavelength, frequency, energy • calculate the speed of light waves using the relationship between frequency and wavelength. • analyze speed of light in various materials	the electric fields (bonds) between particles will be stretched farther in either direction in a given amount of time (period); this increase in vibration speed transfers more energy along the wave. • A larger frequency means that the bonds will be stretched back and forth more times per second; this increase in vibration speed transfers more energy along the wave. • The wavelength of a wave can be determined by the wave speed across the medium divided by its frequency or wave speed is determined by the wavelength times the frequency. • The wave model can explain how to calculate the speed of light. **What is next?** The students will go back to the driving question board to identify all the questions related to energy and realize that stars can give off energy that we can not see. The students will next explore all times of light energy coming from stars.
Lesson 3-What other types of light are coming from stars, and are they harmful?	**P.5 Lesson 9 Teacher Edition** **Engage:**	**Learning Target:** I can obtain and evaluate information about how EM radiation can be	The students will examine the remaining questions in the energy category of questions on the Driving

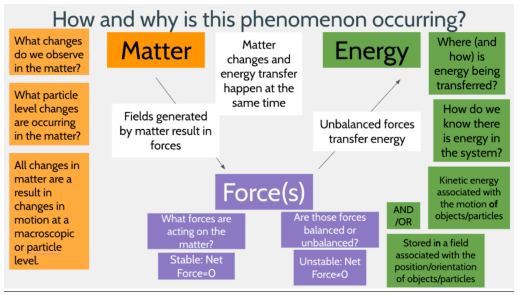
All Lesson Resources: Lesson 9 - P.5 Electrom…	What type of energy is given off by the sun? Is it dangerous? Hubble images Chandra - RCW 103  **Explore in EM Cards (Part I & II)** • Raccio Electromagnetic … **Explain (Part III)**-class discussion of selected question • EM Radiation Application… **Evaluate: (Part VI-Exite Ticket)** **Elaborate:** **Speed of Light EM Spectrum**	harmful based on its frequency, wavelength, and interactions with matter. **Success Criteria:** I will.. • organize electromagnetic (EM) radiation energy by its physical properties • write a definition of the EM spectrum • obtain and evaluate information about how the interactions with matter of EM radiation determines its use • ask questions that arise from examining a model of the electromagnetic spectrum related to the uses and material interactions of different types of electromagnetic radiation.	Question Board. They will then explore various types of EM radiation released by stars by constructing the EM spectrum based on their wavelength and frequency. The students will write an argument about the relationship between the frequency and wavelength of EM radiation and its interactions with matter, and how this relationship helps explain some of the uses of EM radiation. They will have a chance to add new questions to the DQB and decide to examine why some types of EM radiation can harm living organisms and others do not. **What students will figure out:** • EM radiation with high frequencies has short wavelengths; EM radiation with low frequencies has long wavelengths. • The EM radiation spectrum is arranged from high- to low-frequency EM waves.  • Different types of EM radiation have different interactions with matter, including heating it,

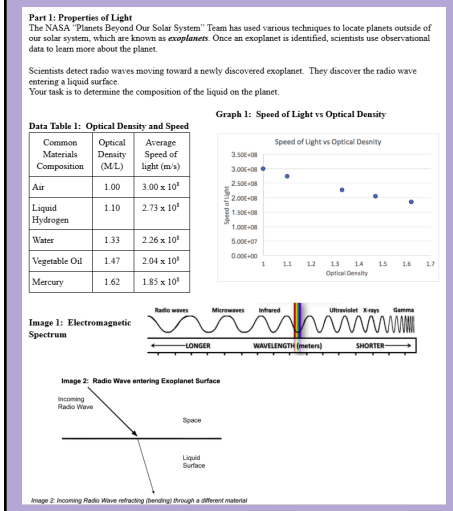
			ionizing it, or breaking apart its molecules. ● These interactions can be harnessed for various applications, such as medical imaging, telecommunications, and energy production. **What is next?** *The students will sort cards and identify the wave properties that better characterize harmful EM radiation. The students will use various data sources to identify the pattern of increased frequency and increased cancer risk.*
Lesson 4-What property of light makes it harmful? **All Lesson Resources:** Lesson 10 - P.5 Electro…	**P.5 Lesson 10 Teacher Edition (pgs 1-13)** **Engage:** Distribute the EM Radiation cards and have students identify the EM cards that cause the most harm. What do they have in common? **Explore:** Jigsaw reading to complete table/show video on slide with solar cell and demo solar cell in class Amplitude Frequency Evidence -… **Explain:** Which causes greater changes in matter (humans and/or solar cells): high amplitude or high frequency? What evidence do we have from class to support your answer?	**Learning Target:** I can obtain, evaluate, and communicate information about how high amplitude or low frequency electromagnetic radiation is more dangerous and how it affects various materials. **Success Criteria:** I will… ● read articles and categorize information based on low-amplitude vs high-amplitude for various frequencies ● collect data on how various frequencies and	The students will identify the wave properties that characterize harmful EM radiation. We use various data sources to identify the pattern of increased frequency and increased cancer risk. **What students will figure out:** ● Some radiation is cancer causing and some radiation is not. ● More high-frequency radiation puts you at greater risk of cancer, but how much the risk increases depends on the type of radiation and the total exposure time.

	Does this align with our wave model of light? **Evaluate:** Part III	amplitudes affect solar cells. • write a claim about what causes more harm to human beings: high-amplitude EM radiation or high-frequency EM radiation. • Identify the most important evidence to support my claim	**What is next?** *The students will analyze a wave model and a photon model of EM radiation and determine that the photon model better explains why high frequency radiation causes damage to human cells.*
Lesson 5-Why do some types of EM radiation cause damage to living cells and not others? **All Lesson Resources:** Lesson 10 - P.5 Electro…	**P.5 Lesson 10 Teacher Edition (pgs 14-22)** **Engage- Bell Work on handout or**   roup | Which wave would cause the most damage to the sand castle, A or B? | Which TWO types of EM radiation can cause damage to matter? **Explore/Explain:** Photon Model (navigate through Part's I-III and develop class consensus throughout) **Evaluate:** Part VI	**Learning Target:** I can obtain, evaluate, and communicate information to explain why some types of EM radiation can cause damage to living cells by understanding the scale, proportion, and quantity of different EM radiation waves. **Success Criteria:** I will… • define a photon(Part I) • Evaluate the merits of the wave model and photon model of EM radiation ((Part II) • define ionization and connect this to either	The students will use a water wave analogy to explain this pattern but find the wave model insufficient. The students will analyze a photon model and compare the model with our evidence. We determine that the photon model better explains this behavior of EM radiation. **What students will figure out:** • The photons of high-frequency EM radiation have enough energy to knock out electrons of atoms and molecules, turning them into ions with different chemical properties. • The photon model of EM radiation can better explain the interactions of

		the wave model or particle model of light (Part III) • Construct an explanation using valid and reliable evidence obtained from a variety of sources (Part VI)	high-frequency EM radiation and matter. • Some radiation is ionizing and some radiation is not. • Ionizing radiation can cause changes in the structure of the DNA molecule, potentially altering its function. • More high-frequency ionizing radiation puts you at greater risk of cancer, but how much the risk increases depends on the type of radiation and the total exposure time. • Ionizing radiation is released from both stable and unstable stars and this radiation can damage cells. **What is next?** *The students have learned that space contains ionizing radiation. They will next decide we should be sending humans into space.*
Lesson 6-Should we send astronauts into space?	**Engage:** Show video of recent space travel **Explore:** Read and identify pros and con(Morality in Space ACA '25-26 / Morality in Space (EL/red read)**)** **Explain:** As a class identify the BEST evidence via a class summary table	**Learning Target:** I can obtain, evaluate, and communicate information about if we should send astronauts to space and make a connection to electromagnetic radiation by understanding the cause and effect of the dangers of electromagnetic radiation.	*Students will learn about the guidance given to NASA by the Institute of Medicine to inform decision making regarding human space travel. Students will assess the risk-reward dynamic inherent to sending human beings into space to conduct scientific research, and will ultimately be asked to grapple with the ethics of the scenarios of the missions.*

	and/or discussion Morality in Space Evidence or Morality in Space group organize… **Evaluate:** CER emphasis on the wavelength, frequency and energy of light) OR Communication Activity for Moral…	Prompt: Should we send astronauts in space? **Success Criteria:** I will… • identify the most important benefit and drawback of sending astronauts into space. • write a clear claim and support my claim with the best evidence • explain how the evidence supports my claim using scientific vocabulary AND include a counter argument • Argue (written or verbal) if we should send astronauts in space including evidence to support your position	*Students will analyze relevant data sets in order to make practical and moral judgments on NASAs decisions to send humans into space.* *Students will construct an argument which promotes a moral stance in support of or against sending human beings into space for the sake of advancing scientific knowledge.* **What is next?** *The students will revisit the DQB and their initial model. Or they may take the unit's assessment.*
Lesson 7-What can be causing this energy transfer in guest and stable stars, how is it different between the two?	**Engage-** Show the classes initial model and solicit changes based on new knowledge **Explore/Explain**- Show the EMF triangle from the previous unit and ask students to summarize the relationship between matter-	**Learning Target:** I can revise my initial model of a guest star and a stable star to include the transfer of energy released. **Success Criteria:** I will… • Accurately represent the energy released	The students will revisit their initial models to ensure energy is accurately represented on their models. They will also be prompted to remember the Energy-Matter-Force triangle and develop questions about the forces that are causing the energy transfer and how the matter may be changing in the star as a result of this force. **What is next?**

	 **Evaluate:** Have students come up with questions about the driving force and matter within the stars 	from a stable and guest star. • Answer all the questions related to energy on the DQB • Ask questions about the force and matter that is causing this energy transfer.	The students will take an assessment on light. If this lesson is completed after the assessment, *remind students that guest stars are stars that seem to appear suddenly and then disappear in a relatively short time. These events happen within our galaxy and have occurred recently (1987). Students should wondered what we would see if we looked at the night sky with a telescope and pointed it in the area where these events occurred*
LS1 Common Assessment - Part 1: Properties of Light Transfer Task-HS-PS4-1; VoG: Communication **Properties of Light & 5G Assessment ACA 25-26** **Properties of Light & 5G Assessment ACA MOD 25-26**		**Learning Target:** I can use models such as diagrams and mathematical models to support scientific explanations about properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials. **Success Criteria:** • calculate the speed of a wave using wavelength and frequency with correct units.	



Part 1: Properties of Light
The NASA "Planets Beyond Our Solar System" Team has used various techniques to locate planets outside of our solar system, which are known as ***exoplanets***. Once an exoplanet is identified, scientists use observational data to learn more about the planet.

Scientists detect radio waves moving toward a newly discovered exoplanet. They discover the radio wave entering a liquid surface.
Your task is to determine the composition of the liquid on the planet.

Data Table 1: Optical Density and Speed

Common Materials Composition	Optical Density (M/L)	Average Speed of light (m/s)
Air	1.00	3.00 x 10^8
Liquid Hydrogen	1.10	2.73 x 10^8
Water	1.33	2.26 x 10^8
Vegetable Oil	1.47	2.04 x 10^8
Mercury	1.62	1.85 x 10^8

Graph 1: Speed of Light vs Optical Density

Image 1: Electromagnetic Spectrum

Image 2: Radio Wave entering Exoplanet Surface

Image 2: Incoming Radio Wave refracting (bending) through a different material

- compare different types of electromagnetic waves using wavelength and frequency.
- explain how and why the speed of light changes when it enters different materials.
- construct a scientific explanation (claim, evidence, reasoning) based on data

LS1 Common Assessment - Part 2: Evaluating 5G Safety Transfer Task- HS-PS4-4, VoG: Critical Thinking

Part 2: Evaluating 5G Safety
You have probably heard the phrase "5G" thrown around a lot lately. It's in cell phone commercials and on the news. Many people are calling it a game-changer for wireless technology. A 5G network should be able to offer significantly faster data transmission speeds than 3G or 4G, and can accommodate much more traffic. This is possible, in part, because 5G networks use a portion of the electromagnetic (EM) radiation spectrum to transmit digital information that isn't currently being used by other wireless communication devices. Companies are racing to increase their 5G coverage nationwide. To support this transition, some companies are building as many as 1 5G tower per block!



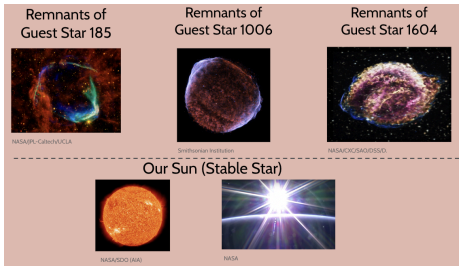
-Answer key and worksheets here:
Lesson 13 - P.5 Electromagnetic Radiation

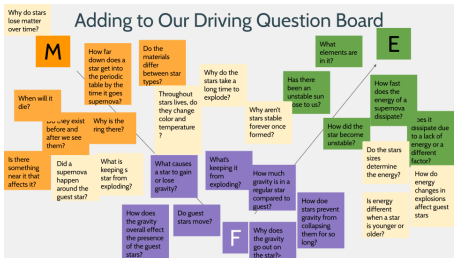
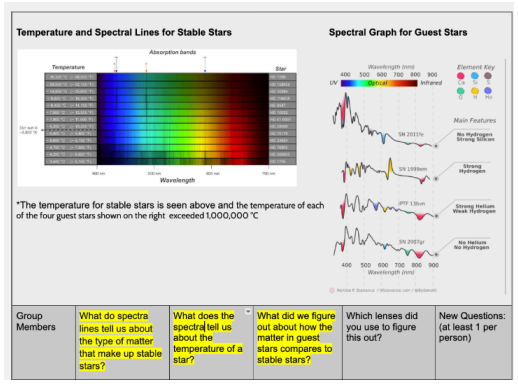
Learning Target: I can *critically think* by obtaining, evaluating, and communicating evidence and reasoning to support the validity of evidence provided on social media posts about the dangers of 5G radiation by recognizing the scale, proportion, and quantity of 5G waves.

Success Criteria:
- identify the claim
- identify the evidence being used to support each of the author's claims
- Identify the author's reasoning or explanation of the evidence.
- consider the validity of the evidence provided by each claim in the social media post

Learning Sequence 2: Matter and Forces within Stars
LS2: Stars: How do Stars Produce Energy and Matter? (Raccio)

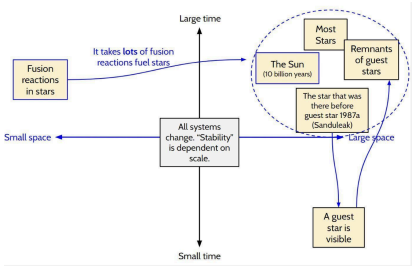
Lesson 8a: How does the matter in guest stars compare to stable stars? Day 1 **All Lesson Resources:**	**P.6 Lesson 2 Teacher Edition** **Engage**	**Learning Target:** I can use multiple models to describe differences in the composition and temperature scale of stable star stars versus guest	*Students will compare photos of the parts of the sky where some of these guest star events were observed and notice remnants of what looks like gas or dust.*

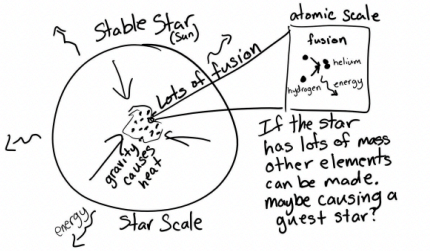
Lesson 2 - P.6 Stars & t…	Slides A-H Followed by Notice and Wonder chart  **Explore:** Spectra tube observations–students will observe the classroom light, several emission tubes as well the sun's light through the window. Highlight the connection between absorption and emission lines as well as element signatures. **Explain:** Spectral Line Analysis Reach class consensus on the difference between stable and guest starts. **Evaluate:** Answer to questions 6-8 following class discussion. **Elaborate:** Ask questions that arise from the spectra of a guest star and classify questions as either matter energy or forces.	stars by identifying patterns of absorption and emission spectra of different elements. **Success Criteria:** I will… • analyze and interpret light spectra from different stars to identify the composition • identify the patterns of absorption or emission lines that reveal what elements are present in a guest and stable stars. • describe how the color relates to a star's composition and temperature. • ask questions based on the spectra of a guest star to figure out why some stars stay stable for a long time while others change suddenly.	Students will analyze spectra of these regions to determine the chemical composition as well as its temperature. Students will then compare these to the spectra of stable stars. Students will then ask new questions focused on matter and add them to our Driving Question Board. Students will also classify their questions as matter or forces (or energy.) **What students will figure out:** • Stable stars are made of mostly hydrogen and helium, and their temperatures vary across a certain range. • Hydrogen and helium are the two lowest-mass elements. • Guest star remnants contain elements other than hydrogen and helium and in some cases no hydrogen and helium. • Temperatures of stable stars range from thousands to ten thousands °C or °F. Temperatures of guest star remnants are millions °C or °F. ***What's next?*** *We will consider how studying energy and matter in stable stars could help us answer our questions. We will be introduced to two new tools, the Planning for Obtaining Information*

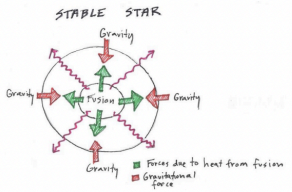
			*Tool and the Obtaining Information Tool, and we will use them to research answers to our questions. We will come to consensus and record our ideas in our Progress Trackers and Personal Glossaries. We will revisit the DQB.*
Lesson 8b: How does the matter in guest stars compare to stable stars? Day 2	**Engage**  **Explore:** Atomic Structure Interactive **Explain:** Have students use a periodic table to determine the number of subatomic particles (protons, neutrons and electrons) as well as draw Bohr Models of the atoms in the first three rows of the period table **Evaluate:** Bohr Model CheckIn **Elaborate:** Model revisions	**Learning Target:** I can revise my models of a guest star and a stable star to include the specific matter that makes them up using Bohr models to account for the atomic scale. **Success Criteria:** I will… • use an Atomic Structure Interactive model to identify the properties of subatomic particles. • create Bohr models of atoms in the first three rows of the period table • examine the spectra signature and model the matter of guest starts vs stable stars	*The students will reexamine the spectra of guest and stable stars. They will realize that stable stars, like our Sun, are very hot and mostly contain hydrogen and helium (small atomic nuclei). The remnant cloud of gas left over after a guest star event contains different types of matter than stable stars, larger atomic nuclei. The students will also learn how to model atoms using the periodic table to create Bohr models.* **What students will figure out:** • Stable stars are made of mostly hydrogen nuclei (1 proton, 0 neutrons) and helium (2 protons and 2 neutrons) • Guest star remnants contain larger atomic nuclei, they have more than 2 protons in the atomic nucleus ***What's next?***

			Students will consider how studying energy and matter in stable stars could help us answer our questions about forces. Students will be introduced to two new tools, the Planning for Obtaining Information Tool and the Obtaining Information Tool, and use them to research answers to our questions.
Lesson 9a: What is happening with matter (and energy) in stable stars, like our Sun, and how does this help us understand guest stars? **All Lesson Resources:** **Lesson 3 - P.6 Stars & t…**	**P.6 Lesson 3 Teacher Edition (pg 1-15)** **Engage:** Prepare two example websites ahead of time for students to assess credibility (one from Fake News site and another from a gov or university site, and one from wikipedia. Ask students the following: • What makes an online source *credible*? • Why might getting information from a *non*-credible source be a problem? **Explore:** Research one of the driving research questions using the obtaining information worksheet **Obtaining Information Tool - Racci** **Explain:** Consensus building discussion around: • Option 1: Where does the energy come from to power	**Learning Target:** I can obtain, evaluate, and communicate information about nuclear processes in stars and understand how their behavior is affected by these changes during their life stages. **Success Criteria:** I will… • research information about nuclear fusion processes in stars using multiple web sources. • identify if the source website was credible • construct and explanation about how stars like the Sun get their energy and change over time. • use periodic cards to identify patterns in the type of elements	Students will research energy and matter in stable stars, including the Sun, to help us answer our questions about guest stars. Students will consider the credibility of sources while tracking information regarding their research questions. Students will reach a class consensus around the answers to their research questions using information from websites as well as a card sort activity. **What students will figure out:** • A star is an object that is massive enough to cause Hydrogen nuclei to collide, igniting fusion • Energy from fusion causes stars to emit electromagnetic energy which travels to Earth (and throughout the Universe.) • Fusion results in new elements as multiple nuclei become one, i.e. Two

	stable stars like our Sun? • Option 2: How does the matter in stable stars change as energy transfers? **Explore:** Nuclear Fusion card sort [Fusion Card Sort] (to make copies if needed) Nuclear Fusion Cardsort (virtual) • Round 1: Use the provided periodic cards to create nuclear reactions that follow the Law of Conservation of Matter. • *Round 2:* Pile your elements together and organize them from lightest to heaviest. Hydrogen is the lightest and most abundant element in the universe. Starting with only the Hydrogen cards, create nuclear reactions that occur in a star. **Explain:** Reach class consensus for the following questions as a class: • What pattern do you see in the type of elements that are produced over time in a star? • What can you determine about the age of a star based on the fusion reactions that occur in it? **Evaluate:** **Fusion in Stars**	produced (fused) over time • create, analyze and draw fusion reactions to show and explain how atoms behave in stars to create light.	hydrogen atoms fuse to become one helium atom. Other elements can be made in more massive stars. • The total number of protons plus neutrons are conserved but atoms change. • Stars exist because there is a balance (or equilibrium) between gravity forces pushing inward and the outward pushing forces of the hot, fast moving particles at the center of the star (due to energy released by fusion). ***What's next?*** *Students will next gather information from an online simulation about how stars change over time. Students will communicate their findings in a gallery tour and reach a consensus about what* happens to the matter and energy of various mass stars over time including guest stars.

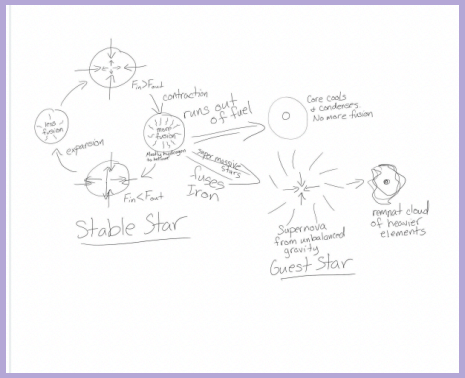
	Elaborate: Have students consider scale. Discuss the original ideas of stable stars, guest stars, remnants of guest stars as they relate to time and space. Once the existing phenomena have been adjusted for both scales, suggest that students add the new phenomena from this lesson to the chart, such as fusion and the Sun as an example of a stable star.  		
Lesson 9b: What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars? **All Lesson Resources:** **Lesson 3 - P.6 Stars & t…**	**P.6 Lesson 3 Teacher Edition (pg 16-19+stellar evolution)** **Engage-***Use the ideas we obtained from the various sources to develop a model that explains what is happening with matter and energy within stars?*See page 16-19 for ideas on how to run this **Explore** **Star In A Box (ACA)** **Explain-Class Consensus**	**Learning Target:** I can use a computer simulation model to explain how stable stars remain stable and how they can become unstable over their life cycles by describing the nuclear and subatomic scale of atoms. **Success Criteria:** I will… • update my model of a stable star to specific include matter	*Students will create a model of a stable star, like our sun. They will include information about stars fusing hydrogen to release energy as electromagnetic radiation. This fusion creates new elements, where the protons and neutrons are conserved even though the atoms change. In order to start the fusion process gravity pulls the particles together, that is why stars are so massive.* Examples of models are below.

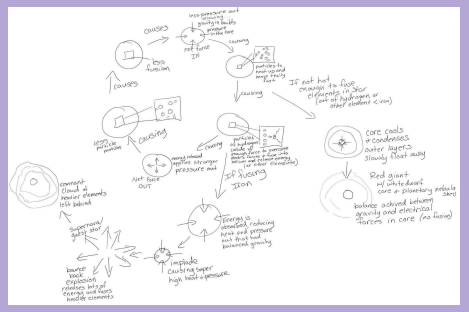
	• What factor/characteristic determines the stages a star goes through in its life cycle? • What pattern do you see between the mass of a star and the time the star is on the main sequence? **Evaluate-Answer to questions in Part III (25-29)**	• can use an online simulation to observe how different mass stars change with time • describe how the brightness, radius, and temperature of different mass stars changes over time. • model the forces on stars as they transfer between stages • construct an explanation of a stable star vs a guest star	 Next the students will use an online simulation to observe how stars' energy (brightness and temperature) as well as it's size change over time. **What students will figure out:** • What happens to a star when it dies depends on its mass. More massive stars run out of fuel faster because their gravity will cause the concentration of particles in the core to be higher, increasing fusion rates. • Stars eventually run out of hydrogen in their cores. When there is not enough concentration of particles to keep fusing heavier elements, the equilibrium is broken, and the star will die. • When a star like the Sun runs out of hydrogen to produce energy, the core will cool and condense. The Sun will become a red giant because

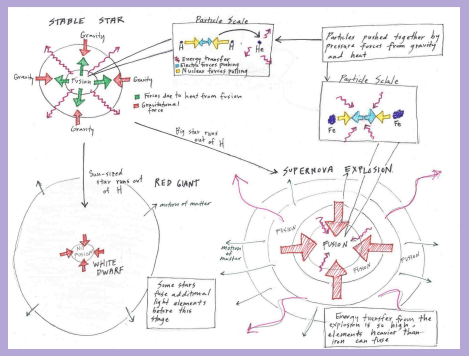
			of a multi-step process kicked off by this cooling and condensing and eventually fade away. ● Supernovae transfer a lot of energy into space. What ancient astronomers called “guest stars” are actually the light that results from this transfer of energy. ***What’s next?*** *Students will come to consensus on what causes stars to remain stable or become unstable and change and record those ideas in our Progress Trackers.*
Lesson 10: How does running out of fuel cause a star to change?	**Engage:** Observations of Orion Constellation (possible question ideas– Conclusions about Orion-Raccio) **Explore** ● **Stellar Evolution Pictures …** ● **Stellar Evolution Card So…** ● Stellar Evolution Readings (all stages)-(have ACA read only the ones that are not mentioned in star in box) **Explain** 1. Create and annotate a flow chart of a stars life cycle stages, see sample to the left and -Students conduct a gallery walk sharing their thinking (Use this simulation to validate their	**Learning Target:** I can obtain, evaluate, and communicate information to refine my explanations of how and why stars change temperature, composition and size over their lifespan by describing the macro and microscales of stars during their lifespans. **Success Criteria:** I will… ● use various sources (online simulation and readings) to create a stellar evolution flow chart	Students will develop a stellar evolution flow chart to include life cycle stages, fusion reactions as well as hydrostatic diagrams. An example of a hydrostatic diagram is seen  below: Students will come to consensus on what causes stars to remain stable or become unstable and change and record those ideas in our Progress Trackers.

	thinking: **WWTA | Life Cycle of Stars**) **Explore**- Raccio Why Do Stars Change? … **Explain-** Discuss the last slide and Develop a consensus model around How does running out of fuel cause a star to change? Annotate the flow chart of a star's life cycle stages to include hydrostatic diagrams and fusion information **Evaluate- (make copy for your students)** *https://docs.google.com/forms/d/1rFvIqjzL9cQuZ8HoLw3-zK8XcbS5fbhZd_KCUFfKKkA/edit* P.6 Lesson 5 Answer Key Electro…	• describe how fusion in a star changes over time (using specific reactions) • analyze hydrostatic models of stars to determine if they are stable or unstable. • explain how changes in matter and energy within a star cause it to stay stable or become unstable over time.	**What students will figure out:** • Massive stars can fuse heavier elements, up to iron for super-massive stars. • Stars will eventually run out of hydrogen in their cores. This causes the star to condense and if the star is massive enough, creates enough concentration of particles colliding together to fuse some other elements. • When a very massive star fuses iron in its core, the reaction will no longer release energy, and there will not be enough outward force to balance gravity, making the star unstable. The star collapses and bounces back in what is called a supernova. • Stable stars have a balance between gravity and fusion maintaining equilibrium gravity forces pushing inward and the outward pushing forces of the hot, fast-moving particles at the center of the star (due to fusion). • Once the star no longer has enough gravity to keep fusing heavier elements, the equilibrium is broken, and the star will die. • What happens to a star when

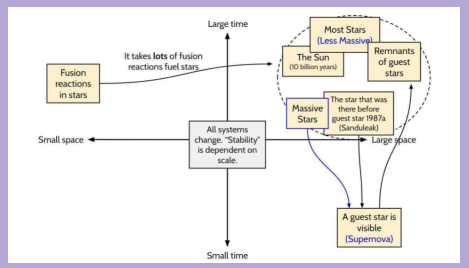
			it dies depends on its mass. More massive stars run out of fuel faster, and the particle concentration is higher in the core, so they can fuse heavier elements. ● When a star like the Sun runs out of hydrogen to produce energy, the core will cool and condense. The Sun will burn out/die and become a red giant because of a complicated process kicked off by this cooling and condensing and eventually fade away. ● Stars with way more mass than our Sun stars can fuse elements up to iron. The fusion of iron absorbs energy instead of releasing it. ***What's next?*** *We will create a Gotta-Have-It Checklist to explain what cause-effect relationships occur within stars. We will model the feedback loop that keeps stars stable and what happens when this loop is disrupted. We will update the Scale Chart and revisit the DQB.*
Lesson 11: Why do some stars seem unchanging, while	**Engage:** Revisit phenomena (slides/images for lesson 1)	**Learning Target:** I can construct a model to *effectively*	Students are ready to explain why a guest star appears and disappears.

others appear briefly, change dramatically, and fade away? HS-ESS1-1, **VoG: Communication ASSESSMENT** **All Lesson Resources this was ADAPTED FROM:** Lesson 5 - P.6 Stars & t…	**Explore: Part I of the following** **Stable vs Guest Star** **Explain:** *Do we have ideas represented on our checklist that help explain:* • *Matter changes* • *Energy transfer* • *The effect of forces being balanced or unbalanced* • *How stars remain stable* • *How stars change suddenly* Call on one pair per bullet and ask them to identify an idea on the checklist corresponding to that bullet. **Evaluation:** Create a series of models to tell the feedback loops story of what keeps some star systems stable and what happens that cause others to change dramatically. I **Student Examples**  	*communicate* how stable stars remain stable and how they can become unstable over their life cycles by describing the macro and microscales of stars and their lifespans. **Success Criteria:** I will… • use graphics and text to update models of stellar systems based on evidence from multiple sources. • explain how the mass of a star affects its stability and response to disruptions.	**What students will figure out:** • A guest star is a star that tries to fuse iron in its core, which is an endothermic reaction (it needs energy). This breaks the feedback loop that keeps stars stable. • The stable period for a star ranges from a few million years for the most massive to trillions of years for the least massive. • For a super-massive star, the star will collapse and bounce back out. releasing a lot of energy and fusing elements heavier than iron. When this happens, the star in the sky appears very bright. • After this event, the energy will move outward into space, and the star will fade away as the gas begins to disperse into a remnant cloud of heavier elements. ***What's next?*** *Unit Assessment*





-UPDATE THE SCALE CHART



-DQB REVISIT

INTERIM ASSESSMENT **(HS ESS1-3)**

- Earth Science Interim Assessments
- INTERIM ASSESSMENT (HS ESS1-3) (paper version)

Common Assessment: HS-ESS1-3, HS-PS1-8, **VoG: Critical Thinking**	LS2 Common Assessment: Algol Transfer Task: Students can *critically think* about evidence and models to explain how fusion changes matter in stars and how those changes can be used to determine a star's age.

Stellar Evolution Assess… Stellar Evolution Assess… Alternative Assessment Idea	**Learning Target:** I can use models as evidence to explain how fusion changes in matter in stars and how those changes can be used to determine the star's age by observing the macro and microscales of stars and their lifespan. **Success Criteria:** ● analyze data about star composition, fusion reactions, and energy production. ● develop and use models to explain how elements are formed through nuclear fusion. ● use evidence to make and support a claim about the relative ages of stars.

Astronomy

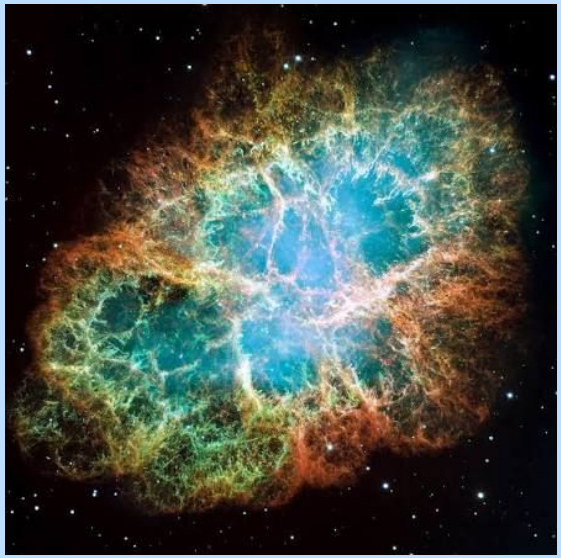


ACC & ACA Earth Science Course-Unit 4

Written by Nicole Raccio & Kelsey Duffy
Presentation Created by Nicole Raccio
October 21, 2026

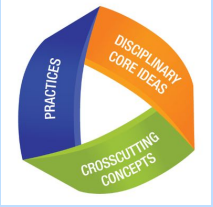
Unit 4: Astronomy

This unit is anchored in historical observations of stars that suddenly appeared and then disappeared within a short period of time. These phenomena prompt students to question why most stars seem constant while others change so dramatically. Students analyze images and spectral data from the remnants of these events. Students build a shared understanding of nuclear fusion and the life cycles of stars.

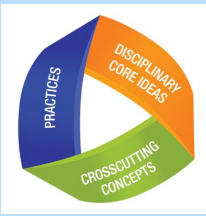


Standards Assessment

- HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy in the form of radiation.
- HS-ESS1-2 Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. (ACC ONLY)
- HS-ESS1-3 Communicate scientific ideas about the way stars, over their life cycle, produce elements.
- HS-PS1-8 Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes ~~of fission~~, fusion, ~~and radioactive decay~~.
- HS-PS4-1 Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media
- HS-PS4-4 Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.
    - HS-PS4-5 Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* (ACC ONLY)
    - HS-PS4-3 Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.



SEPs, DCIs, & CCCs



Science & Engineering Practices (SEP)

- Using Mathematics and Computational Thinking
- Obtaining, Evaluating, and Communicating Information
- Developing and Using Models
- Constructing Explanations and Designing Solutions (ACC ONLY)

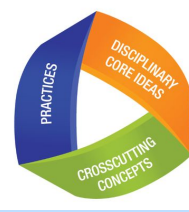
Disciplinary Core Ideas (DCI)

- PS4.A: Wave Properties
- PS4.B: Electromagnetic Radiation
- PS3.D: Energy in Chemical Processes and Everyday Life
- ESS1.A: The Universe and Its Stars
- PS1.C: Nuclear Processes

Crosscutting Concepts (CCC)

- Cause and Effect
- Scale, Proportion, and Quantity
- Energy and Matter

Learning Sequence 1: Energy from Stars



Lesson Level Question:

- Why do some stars seem unchanging, while others appear briefly, change dramatically, and fade away?
- How does energy transfer through a wave?
- What other types of EM radiation are there, and how do we use them?
- Does all electromagnetic radiation cause damage? Wave/Particle Duality
- Should we send astronauts into space?

Learning Objectives

- I can develop a model to explain why most stars we see in the night sky appear stable while some "guest stars" change over time.
- I can use and make a physical model of energy transfer in stars by comparing and contrasting different waves.
- I can plan and conduct an investigation using a pHet simulation to identify how certain wave properties affect energy transfer in waves.
- I can use mathematics to calculate the speed of light by using wavelength, frequency, and energy as variables to analyze the speed of light through different materials (cause and effect).
- I can obtain and evaluate information about how EM radiation can be harmful based on its frequency, wavelength, and interactions with matter.
- I can obtain, evaluate, and communicate information about how high amplitude or low frequency electromagnetic radiation is more dangerous and how it affects various materials.
- I can obtain, evaluate, and communicate information to explain why some types of EM radiation can cause damage to living cells by understanding the scale, proportion, and quantity of different EM radiation waves.
- I can obtain, evaluate, and communicate information about if we should send astronauts to space and make a connection to electromagnetic radiation by understanding the cause and effect of the dangers of electromagnetic radiation.
- I can revise my initial model of a guest star and a stable star to include the transfer of energy released.

Assessment:

Properties of Light and Evaluating 5G Safety

Part 1: Properties of Light
The NASA "Planets Beyond Our Solar System" Team has used various techniques to locate planets outside of our solar system, which are known as ***exoplanets***. Once an exoplanet is identified, scientists use observational data to learn more about the planet.

Scientists detect radio waves moving toward a newly discovered exoplanet. They discover the radio wave entering a liquid surface.
Your task is to determine the composition of the liquid on the planet.

Data Table 1: Optical Density and Speed

Common Materials Composition	Optical Density (M/L)	Average Speed of light (m/s)
Air	1.00	3.00×10^8
Liquid Hydrogen	1.10	2.73×10^8
Water	1.33	2.26×10^8
Vegetable Oil	1.47	2.04×10^8
Mercury	1.62	1.85×10^8

Graph 1: Speed of Light vs Optical Density

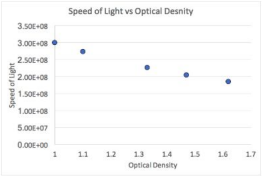


Image 1: Electromagnetic Spectrum

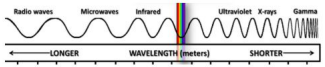


Image 2: Radio Wave entering Exoplanet Surface

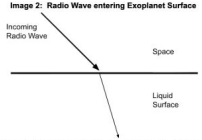


Image 2: Incoming Radio Wave refracting (bending) through a different material

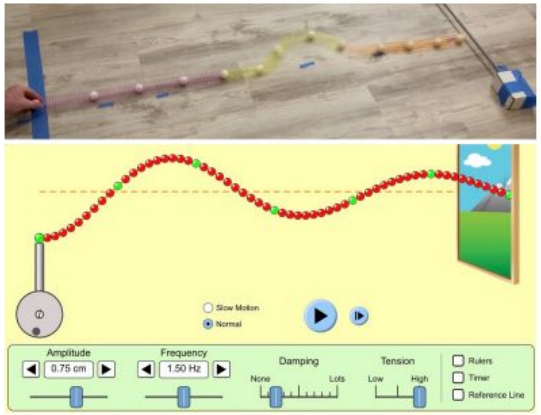
Part 2: Evaluating 5G Safety
You have probably heard the phrase "5G" thrown around a lot lately. It's in cell phone commercials and on the news. Many people are calling it a game-changer for wireless technology. A 5G network should be able to offer significantly faster data transmission speeds than 3G or 4G, and can accommodate much more traffic. This is possible, in part, because 5G networks use a portion of the electromagnetic (EM) radiation spectrum to transmit digital information that isn't currently being used by other wireless communication devices. Companies are racing to increase their 5G coverage nationwide. To support this transition, some companies are building as many as 1 5G tower per block!



Learning Target: I can use models such as diagrams and mathematical models to support scientific explanations about properties of electromagnetic waves (wavelength, frequency, and speed) and patterns in data (optical density) to *effectively communicate* how light behaves in different materials.

Learning Target: I can *critically think* by obtaining, evaluating, and communicating evidence and reasoning to support the validity of evidence provided on social media posts about the dangers of 5G radiation by recognizing the scale, proportion, and quantity of 5G waves.

What students figure out



Shaking the end of a slinky creates a wave pattern. A computer simulation of a wave on a string produces similar patterns.

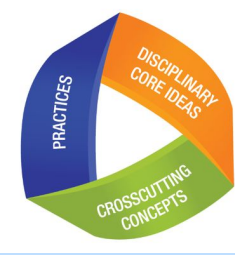


The electromagnetic spectrum includes various types of radiation with a wide range of frequencies, wavelengths, and uses, such as communication and medical imaging, but some types can also pose health risks.



EM radiation affects different materials in different ways.

Learning Sequence 2: Matter and Forces within Stars



Lesson Level Questions

- How does the matter in guest stars compare to stable stars?
- What is happening with matter and energy in stable stars, like our Sun, and how does this help us understand guest stars?
- How does running out of fuel cause a star to change?

Learning Targets

- I can use multiple models to describe differences in the composition and temperature scale of stable star stars versus guest stars by identifying patterns of absorption and emission spectra of different elements.
- I can revise my models of a guest star and a stable star to include the specific matter that makes them up using Bohr models to account for the atomic scale.
- I can obtain, evaluate, and communicate information about nuclear processes in stars and understand how their behavior is affected by these changes during their life stages.
- I can use a computer simulation model to explain how stable stars remain stable and how they can become unstable over their life cycles by describing the nuclear and subatomic scale of atoms.
- I can obtain, evaluate, and communicate information to refine my explanations of how and why stars change temperature, composition and size over their lifespan by describing the macro and microscales of stars during their lifespans.

Assessment:

Final Model and Algol A Transfer Task

The Life of Stars Assessment (mod)

Stars are the most widely recognized astronomical objects, and represent the most fundamental building blocks of galaxies. The study of the birth, life, and death of stars is central to the field of astronomy. Read, analyze and interpret the following information about the two stars called Algol A and Algol B to determine the history and future of these two stars.

Figure 1: Algol A (left) and Algol B (right) Currently

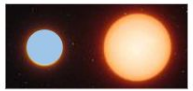


Table 1: Characteristics of Algol A and Algol B

Characteristic	Algol A	Algol B
Current Stage	Main Sequence	Giant
Current Color	Light Blue	Orange
Main Sequence Color	Light Blue	White
Initial Main Sequence Mass	10 x the sun	4 x the sun

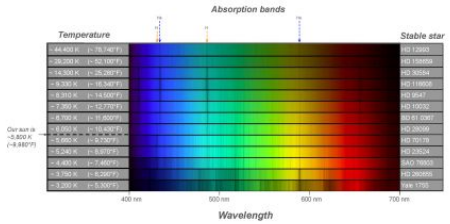
Table 2: The Relationship Between Temperature, Color, and Initial Mass of Stars

Temperature (K)	Color	Average Initial Mass of a Main Sequence Star (x Sun)	Time on the Main Sequence (million years)
More than 33,000	Dark Blue	More than 40	10 or less
10,000-30,000	Light Blue	10	25
7,500-10,000	White	4	200
5,200-7,500	Yellow	1	1200
3,700-5,200	Orange	0.5	60,000
Less than 3,700	Red	Less than 0.5	850,000 or more

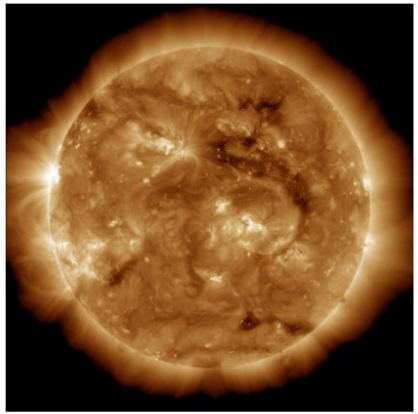
I can construct a model to *effectively communicate* how stable stars remain stable and how they can become unstable over their life cycles by describing the macro and micro scales of stars and their lifespans.

I can *critically think* about evidence and models to explain how fusion changes in matter in stars and how those changes can be used to determine the star's age by observing the macro and micro scales of stars and their lifespan.

What students figure out



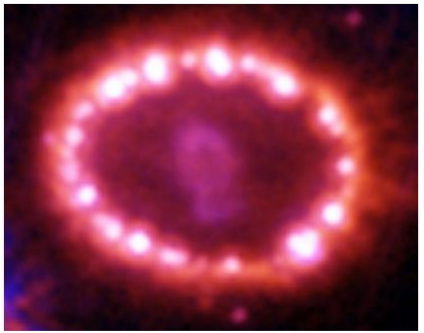
Semi-spherical shaped clouds of dust and gas can be seen in telescopic images from locations in the sky where guest stars were once observed.



Stars like the Sun are very hot and transfer energy out toward the Earth. The remnant cloud of gas left over after a guest star event also appears to transfer energy and contain different types of matter than stable stars.

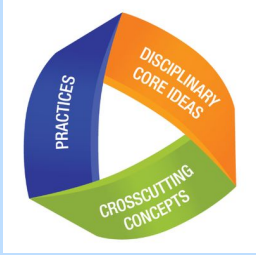


A model of the balance between the force of gravity and the force from fusion doesn't explain what will happen if there is not sufficient fuel for fusion.



A guest star appears and then disappears, but other stars shine with steady light. The cloud left over after a supernova is hotter than the original star and contains different matter.

Learning Sequence 3: Stars and the Big Bang [ACC ONLY]



Lesson Level Questions

- How has the matter in the Universe changed over time, and how do we know?

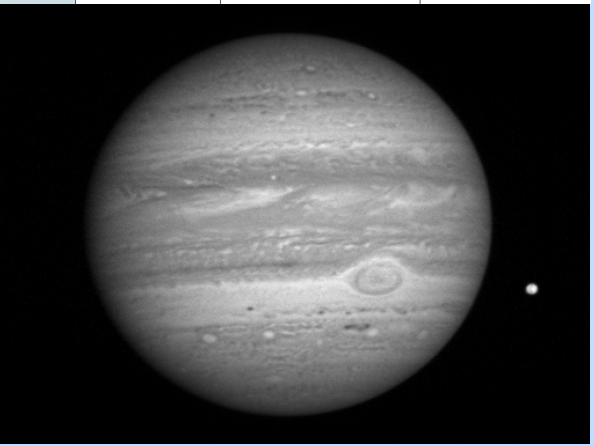
Learning Targets

- Read, evaluate, and communicate information about the Big Bang to explain that the theory is supported by empirical evidence of spectral patterns, including observations of distant galaxies receding from our own, of the measured composition of stars and non-stellar gases, and of maps of radiation permeating the Universe.

Assessment:

Jupiter Transfer Task

	Earth	Sun	Jupiter
Mass	1 x mass of Earth	333,000 x mass of Earth	318 x mass of Earth
Diameter	12,756 km	1,392,500 km	142,984 km
Volume	1 x Earth volume	1,300,000 x Earth volume	1,323 x Earth volume



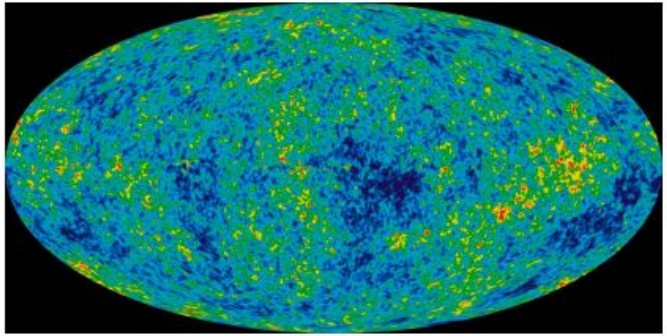
HS-ESS1-1 Develop a model based on evidence to illustrate the life span of the Sun and the role of nuclear fusion in the Sun's core to release energy that eventually reaches Earth in the form of radiation. (SEP: 2.3; CCC: 3.1; DCI: ESS1.A.1, PS3.D.4)

Learning Target: I can develop models of the Jupiter and Sun systems to explain the source of the light we observe and how an object's scale affects interactions in its core.

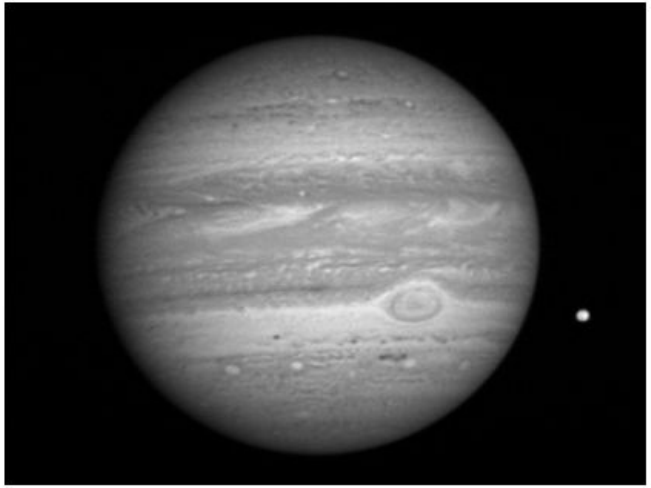
Success Criteria: I will…

- model where the light from Jupiter and the Sun originates.
- compare how differences in scale affect conditions and interactions (fusion) in Jupiter's and the Sun's cores.
- use evidence to explain how core interactions relate to the light each object emits.

What students figure out

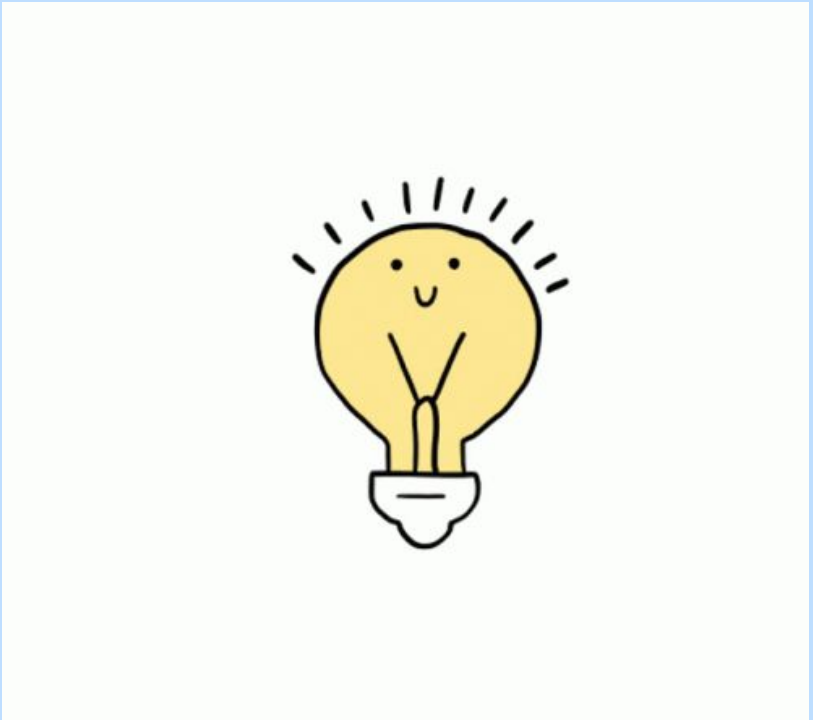


When we look at spectra of stars, galaxies, and empty space, we notice puzzling patterns that cannot yet be explained by our model.



We have so many questions about phenomena that we would like to explore in the future.

Thank you!



BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 f.

AGENDA REPORTING FORM

Agenda Topic: SHS Earth Science - Unit 2, Climate Change and Human Impact ACC - NEW - First Reading.

Summary of Issue: SHS Earth Science - Unit 2, Climate Change and Human Impact ACC - NEW - First Reading.

Background:

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

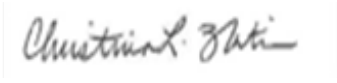
Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS Earth Science - Unit 2, Climate Change and Human Impact ACC - NEW – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal



Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Unit Overview	
Unit Title:	Climate Change and Human Impact ACC
Teacher:	Kelsey Duffy and Jaime Hatch
Grade Level/Course:	9th Grade Earth Science
Length/Dates:	8 weeks
Unit Summary:	Why is the sea level rising, causing some people to have to move? Initial student models in this unit propose a variety of ideas, but it seems like melting polar ice is a likely cause for this global phenomenon. Uncertainty and student concern for the people impacted motivate unit investigations that help students better understand the matter and energy flows that underlie a global phenomenon like polar ice melt and sea level rise. Historical data, hands-on investigations, and typical early-year math (like unit conversions) help students establish the mechanisms that cause sea level rise and estimate its potential impact. Through investigations, simulations, and system models, students figure out how decreasing carbon dioxide emissions and two geoengineering solutions (applying glass microbeads to polar ice and protecting glaciers from warm water with berms) could help slow polar ice melt, protecting coastal communities. As they do so, they 1. begin developing the science practices needed in a chemistry classroom, 2. build a particle-level, quantifiable understanding of thermodynamics, and 3. consider how human activity results in particle-level changes with global implications. C.1: Thermodynamics in Earth's Systems

Performance Expectations
• HS-PS3-1† Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flow in and out of the system are known. • HS-PS3-4 Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperatures are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). • HS-ESS2-2 Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth systems. • HS-ESS2-4† Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. • HS-ESS2-7† Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.

- **HS-ESS3-1*** Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.
- **HS-ESS3-5** Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts on Earth systems.
- **HS-ESS3-6†** Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

*This performance expectation is developed across multiple units.
†This performance expectation is developed across multiple courses.

Essential Questions:

- Learning Sequence 1: Why is Sea Level Rising?
  - 1: How are sea levels rising and forcing people to move?
  - 2: What can the past help us figure out about what is causing sea level rise in the present?
  - 3: How does carbon dioxide contribute to climate change?
  - 4: What would happen if the Earth's ice melted?
- Learning Sequence 2: How can we Slow Polar Ice Melt?
  - 5: How can we best slow or stop the land ice melt?
  - 6: Why would some engineers want to sprinkle glass microbeads on the Arctic?
  - 7.a: How do feedback loops affect Earth's systems?
  - 7.b: How do feedback loops affect Earth's systems?
- Learning Sequence 3: How well would the berm solution work?
  - 7.c: How can changes in Earth's systems create conditions for major changes in life on Earth?
  - 8: What is going on where the ice meets the water?
  - 9: Why does warm salty water sink to melt a glacier?
  - ~~10: How can we measure the energy transfer a berm prevents?~~
  - ~~11: How does heat affect the amount of ice melt?~~
  - ~~12: How can we slow the flow of energy on Earth to protect vulnerable coastal communities?~~
  - 13.a: How can we model what will happen to Earth's climate if humans make changes?
  - 13.b: How can we model what will happen to Earth's climate if humans make changes?

Science and Engineering Practices (Skills)	Disciplinary Core Ideas (Knowledge)	Crosscutting Concepts (Enduring Understandings)
Planning and Carrying Out Investigations: This unit **intentionally develops** students' engagement in these practice elements: • Plan an investigation ~~or test a design individually and~~ collaboratively to produce data to serve as the basis for evidence as part of ~~building and~~ revising models, ~~supporting explanations for phenomena, or testing solutions to problems~~. Consider possible confounding variables or effects and evaluate the investigation's design to ensure variables are controlled. • **Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, ~~risk~~, time), ~~and refine the design accordingly~~.** • Plan and conduct an investigation or test a design solution in a safe ~~and ethical~~ manner including considerations of ~~environmental, social, and~~ personal impacts. • Select appropriate tools to collect, ~~record, analyze, and evaluate~~ data. • Make directional hypotheses that specify what happens to a dependent variable when an independent variable is manipulated.	**PS3.D: Energy in Chemical Processes** • Although energy cannot be destroyed, it can be converted to less useful forms—for example, to thermal energy in the surrounding environment. (HS-PS3-3, HS-PS3-4) **ESS1.B: Earth and the Solar System** • **Cyclical changes in the shape of Earth's orbit around the sun, together with changes in the tilt of the planet's axis of rotation, both occurring over hundreds of thousands of years, have altered the intensity and distribution of sunlight falling on the earth. These phenomena cause a cycle of ice ages and other gradual climate changes. (secondary to HS-ESS2-4)** **ESS2.A: Earth Materials and System** • **Earth's systems, being dynamic and interacting, cause feedback effects that can increase or decrease the original changes. (HS-ESS2-1, HS-ESS2-2)** • **The geological record shows that changes to global and regional climate can be caused by interactions among changes in the sun's energy output or Earth's**	**Energy and Matter:** This unit **intentionally develops** students' engagement in these crosscutting concept elements: • The total amount of energy and matter in closed systems is conserved. • Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. • Energy cannot be created or destroyed—only moves between one place and another place, between objects ~~and/or fields~~, or between systems. • Energy drives the cycling of matter within and between systems. The following crosscutting concepts are also **key to the sensemaking** in this unit: • Stability and Change • Scale, Proportion, and Quantity

Using Mathematics and Computational Thinking: This unit **intentionally develops** students' engagement in these practice elements: ● **Create ~~and/or revise~~ a computational model or simulation of a ~~phenomenon, designed device, process, or~~ system.** ● **Use mathematical, computational, ~~and/or algorithmic~~ representations of phenomena or design solutions to ~~describe and/or~~ support claims ~~and/or explanations~~.** ● Apply techniques of algebra and functions to represent ~~and solve~~ scientific ~~and engineering~~ problems. ● Use simple limit cases to test ~~mathematical expressions, computer programs, algorithms, or~~ simulations of a process or system to see if a model "makes sense" by comparing the outcomes with what is known about the real world. ● Apply ratios, ~~rates, percentages~~, and unit conversions in the context of complicated measurement problems involving quantities with derived or compound units (such as mg/mL, kg/m^3, acre-feet, etc.).	**orbit, tectonic events, ocean circulation, volcanic activity, glaciers, vegetation, and human activities. These changes can occur on a variety of time scales from sudden (e.g., volcanic ash clouds) to intermediate (ice ages) to very long-term tectonic cycles. (HS-ESS2-4)** **ESS2.D: Weather and Climate** ● **The foundation for Earth's global climate systems is the ~~electromagnetic~~ radiation from the Sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. (HS-ESS2-4)** ● **Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. (HS-ESS2-6, HS-ESS2-7)** ● Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. (HS-ESS2-4, HS-ESS2-6) ● **Current models predict that, although future regional climate changes will be complex and varied, average global temperatures will continue to rise.**	

	The outcomes predicted by global climate models strongly depend on the amounts of human-generated greenhouse gases added to the atmosphere each year and by the ways in which these gases are absorbed by the ocean and biosphere. (secondary to HS-ESS3-6)	

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

C District Rubrics

Performance Assessment(s) and Evaluative Criteria:

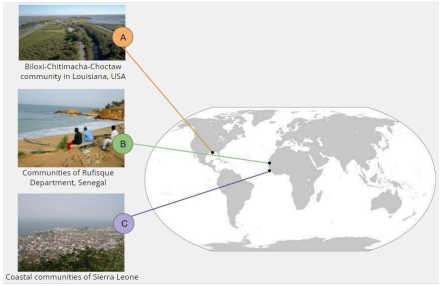
1. LS1 Common Assessment: Human Impact Assessment - Rio de Janeiro Transfer Task: Students design, build, and improve a device that converts energy from one form into another within given constraints.use ratios and unit conversions to predict how human-caused ice melt affects sea level and people.(SEP: 5.5; DCI: ESS3.B.1, ESS3.D.1; CCC: 3.1) **HS-ESS3-1**, **HS-ESS3-5**, **HS-ESS3-6†**
   Success Criteria:
   - identify the quantities involved (ice melt, sea level change, population).
   - use ratios to compare changes at different scales.
   - convert units correctly (for example, ice volume to sea level rise).
   - make predictions about sea level rise using calculations.
   - explain how sea level rise impacts human populations.
2. LS2 Common Assessment: Thawing Permafrost Transfer Task: Students ask questions to understand how positive and negative feedback loops involving plants and other organisms affect Earth's systems. (SEP: 1.4; DCI: ESS2.A.1; CCC: 7.3) **HS-ESS2-2**, **HS-ESS2-4†**, **HS-ESS2-7**
   Success Criteria:

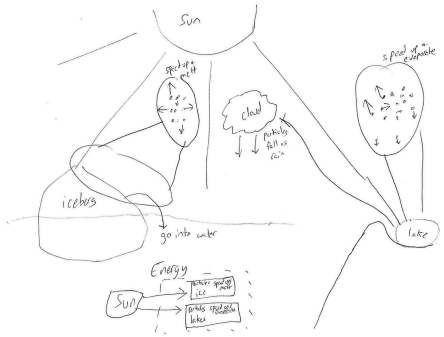
- identify examples of positive and negative feedback loops in Earth systems.
- connect how plants and organisms interact with these feedback loops.
- ask questions that clarify how feedback loops work.
- use evidence from models or data to support my questions.

3. LS3 Common Assessment: Heat Pumps Transfer Task: Students plan an investigation to find a problem with energy transfer in a geothermal heating system. (SEP: 3.5, 3.2; DCI: PS3.B.2, PS3.B.5, PS3.D.1; CCC: 4.2) **HS-PS3-1†, HS-PS3-4**

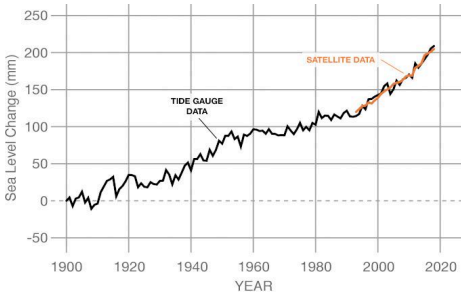
Success Criteria:

- identify the components of the geothermal system.
- define the energy transfer processes in the system.
- plan steps to investigate potential problems.
- control variables and define system boundaries for the investigation.
- record observations and data to identify energy transfer issues.

Target Question	Activity	Standard Objectives/Learning Target	Student will know and wonder
Learning Sequence 1: Why is Sea Level Rising? **Class Notes: LS1 - Why is Sea Level Rising? Thermodynamics in Earth's Systems**			
Lesson 1: How are sea levels rising and forcing people to move? **Lesson 1 - C.1 Thermodyna…**  C.1 Lesson 1 Teacher Refer…	**C.1 Lesson 1 Teacher Edition** **Duffy combined handout(s) version of Lesson 1:** **Lesson 1 Reference Sheet - …** **-INTRODUCE A PHENOMENON AFFECTING DIFFERENT COMMUNITIES AROUND THE WORLD** **-ANALYZE SEA LEVEL GRAPH**	**Learning Target:** I can ask questions and develop a model to explain how changes in sea level affect human migration by tracking energy and matter through Earth systems. **Success Criteria:** I will… • examine models or data related to sea-level change and identify patterns in change over time or rate of change.	**What students will wonder:** We explore three coastal communities that are affected by rising sea levels. We identify that this is a global problem, with communities responding in different ways. People in some places have to move. We recognize that sea levels have been rising for over a hundred years and model ideas about the matter and energy changes that are causing sea levels to rise. We



C.1 Lesson 1 Teacher Refer…



-EXAMINE SEA LEVEL RISE AROUND THE WORLD

Sea Level Projection Tool

-DEFINE THE PROBLEM (climate refugee, climate migrant, internally displaced person)

Community	Population	Elevation Above Sea Level, m	Sea Level Rise (2020), m	Projected Sea Level Rise (2100), m	Response
Carti Sugdub island, Panama	32,000	3	0.07	0.78	Leaders are considering moving people to the mainland. A community for 600 people is estimated to cost $5 million.
Kiribati (Pacific nation composed of 33 islands)	119,000	1.8	0.04	0.68	Spent $8.77 million to purchase land in another country (Fiji) as a new home for its people.
Miami, Florida, USA	454,000	1.8	0.08	0.83	Spending at least $3.8 billion by 2060 for stormwater pumps, sea walls, and other solutions to protect some neighborhoods.
New York City, USA	8.42 million	10	0.1	0.93	Spending $1.45 billion by 2025 on floodwalls, floodgates, and raising some land up to 9 feet higher.
Rotterdam, Netherlands	624,000	0	0.07	0.69	Investing over $4 billion to improve storm surge barriers, build "floating communities," and construct drainage systems.
Shanghai, China	26.32 million	4	0.09	0.95	Has constructed over 300 miles of protective seawalls.
Sundarbans settlements, India	3.9 million	2	0.06	0.76	Community members were building mud seawalls by hand, until the Indian government committed $660 million to build concrete seawalls.
Global total - low-lying coastal communities	680 million	-	-	-	*17 to 72 million people are estimated to eventually have to move due to rising sea levels by 2050. Flooding from sea level rise is estimated to cost $14.2 trillion globally by 2100.*

-RELATED PHENOMENA

-DEVELOP AN INITIAL MODEL

-SHARE INITIAL MODELS WITH PARTNERS

-CO-CONSTRUCT COMMUNITY AGREEMENTS

-CONSTRUCT DRIVING QUESTION BOARD

- ask questions that help clarify how and why sea levels are changing.
- develop an initial model that shows how energy and matter flows contribute to sea-level rise.

1.A Ask questions that arise from examining models to clarify and seek additional information about changes and rates of change in sea levels and the resulting impact on human migration. (SEP: 1.2; DCI: ESS3.B.1; CCC: 7.2)

1.B Develop a model based on evidence to illustrate energy and matter flows in the Earth system that result in changes in human migration. (SEP: 2.3; DCI: ESS3.B.1; CCC: 5.2, 4.2)

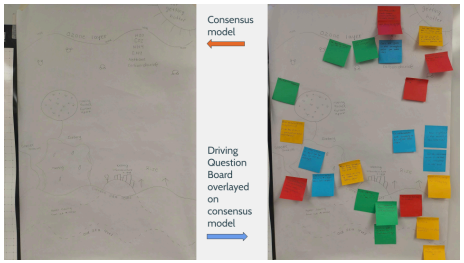
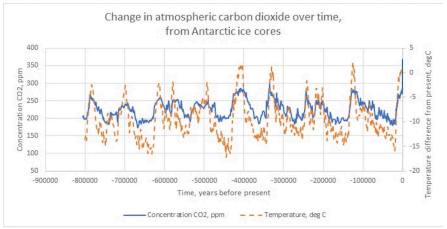
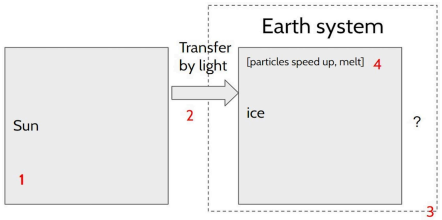
develop community agreements and a class consensus model. We build a Driving Question Board and gather ideas for investigation.

What students will figure out:

- Sea levels are rising--some causes we find are local like storms and erosion, but something is affecting sea levels globally. Scientists predict that this will continue.
- Some communities are able to build infrastructure to protect themselves, but in other places people who live near the coast need to move.
- In chemistry we use ideas about energy and matter to explain confusing things that we see in the world.
- Polar ice melt due to climate change is one explanation for why the sea level is rising.

What's next?

We will look at historical data on sea level rise, temperature, ice volume, and potential causes of climate change. We will analyze this data to determine that carbon dioxide is the most likely cause of

			*current ice melt and will model how all the potential causes could affect climate.*
Lesson 2: What can the past help us figure out about what is causing sea level rise in the present? **Lesson 2 - C.1 Thermodyna…**  	**C.1 Lesson 2 Teacher Edition** **-(JIGSAW 1) ANALYZE HISTORICAL DATA** **C.1 Lesson 2 Teacher Refer…** **C.1 Lesson 2 Reading Ice C…** **C.1 Lesson 2 Reading Geolo…** **C.1 Lesson 2 Reading Clues…** **-CONSIDER HOW SCIENTISTS COLLECT DATA** **-(JIGSAW 2) CONSIDER DATA COLLECTION METHODS** **C.1 Lesson 2 Reference Ear…** **C.1 Lesson 2 Reference Ear…** **C.1 Lesson 2 Reference Yea…** **-ANALYZE AND INTERPRET DATA** **Data Analysis - Chalk Talk G…** **C.1 Lesson 2 Answer Key D…** **-GALLERY WALK**	**Learning Target:** I can evaluate new evidence and make an oral argument explaining how different energy sources and Earth system changes affect climate and sea level over time. **Success Criteria:** I will… • analyze and evaluate data showing how different energy sources and Earth system changes influence climate and sea level. • use evidence to revise or justify a model of sea-level rise. • construct an oral argument that explains and compares how these factors affect climate over short- and long-term timescales. **2.A** Evaluate the impact of new data showing indirect evidence of energy flows of changes in Earth's	**What students will wonder:** We look at historical data to see if sea level rise is new and whether people have experienced sea level rise like this before. We see that the sea level has been this high in the last million years, but maybe not recently. We also see that temperature and ice volume change somewhat with sea level. We read about how this and similar data were collected, then analyze data about potential causes using a Chalk Talk protocol, discuss the likely cause of current ice melt and sea level rise, and model how these different potential causes could affect climate. **What students will figure out:** • Over the last million years, global temperatures seem to increase around the same time that ice volumes decrease and sea levels increase.

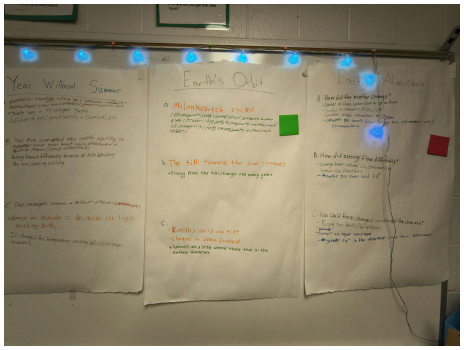
Slide K

Gallery Walk

In your notebook

Use one of the following sentence starters to make notes about each poster during the gallery walk.

- This poster made me think differently about **energy** because...
- This poster made me think differently about **matter** because...
- This poster made me think differently about **climate** because...



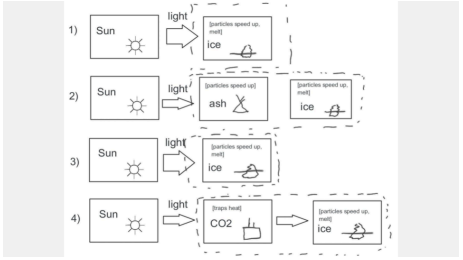
-EXIT TICKET

Exit Ticket-Data Analysis - D...

-CONSTRUCT AN ARGUMENT ABOUT THE CAUSE OF ICE MELT

-BUILDING UNDERSTANDINGS DISCUSSION

-MODEL ENERGY FLOWS



orbit, the Sun's energy output, volcanic activity, vegetation, and carbon dioxide on a working model of sea level rise. (SEP: 4.5; DCI: ESS1.B.2, ESS2.A.3, ESS2.D.2; CCC: 3.2, 5.2)

Learning Target: I can construct and present an oral argument explaining how different Earth and space factors cause climate to change over different timescales.

Success Criteria: I will…

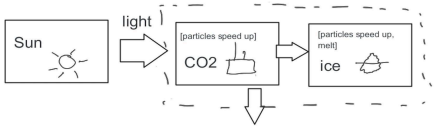
- identify factors that influence Earth's climate (Earth's orbit, the Sun's energy output, volcanic activity, vegetation, and carbon dioxide).
- describe how each factor affects climate (warming, cooling, or both).
- distinguish between short-term and long-term timescales of climate change.
- use evidence (data, graphs, models, or examples) to support my claims.
- construct a clear oral argument that includes a

- Scientists have to use indirect sources of evidence to figure out what Earth's climate was like in the past.
- Changes in sunlight due to Earth's orbit and tilt can affect climate.
- Changes in sunlight due to solar activity can affect climate.
- Volcanic activity can affect climate.
- Changes in carbon dioxide due to plant growth or human activity can affect climate and can help explain current temperature increases.
- Climate is impacted when something changes energy flows into or out of Earth systems, but it is unclear how carbon dioxide does that.

What's next?

We explored three coastal communities that are affected by rising sea levels and their responses to this global problem. We recognized that sea levels have been rising for over a hundred years and modeled ideas about the matter and energy changes that are causing sea

		claim, evidence, and reasoning. • explain cause-and-effect relationships between climate drivers and climate changes. • respond to questions or counterclaims using scientific evidence. **2.B** Construct an oral argument of how changes in Earth's orbit, the Sun's energy output, volcanic activity, vegetation, and carbon dioxide affect changes in climate over different timescales. (SEP: 7.4; DCI: ESS1.B.2, ESS2.A.3, ESS2.D.2; CCC: 7.2)	*levels to rise. We built a Driving Questions Board and gathered ideas for investigations.*
Lesson 3: How does carbon dioxide contribute to climate change? **Lesson 3 - C.1 Thermodyna…** 	**C.1 Lesson 3 Teacher Edition** **-BRAINSTORM IDEAS ABOUT CO2 AND TEMPERATURE** **-GENERATE IDEAS FOR INVESTIGATION** **-PLAN AN INVESTIGATION** **-MAKE A PREDICTION** **-PLAN DATA COLLECTION** **C.1 Lesson 3 Reference CO…** **-CONDUCT THE INVESTIGATION**	**Learning Target:** I can work with others to plan and test an investigation that shows how changes in carbon dioxide affect temperature in a model atmosphere. **Success Criteria:** I will… • work with my group to plan an investigation. • identify the variables in the investigation. • change the amount of carbon dioxide in the model.	**What students will wonder:** We investigate how increased CO2 in the atmosphere causes warmer temperatures using water bottles, digital thermometers, and CO2 from fizzing tablets. We outline variables we change, measure, and keep the same throughout the investigation. We collaboratively write directional hypotheses detailing what we think happens and design data tables to organize our collected evidence. Using our data, we model how energy stays in the atmosphere with more CO2 in the



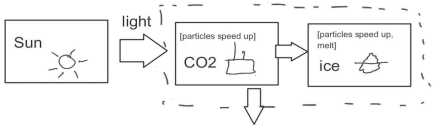
C.1 Lesson 3 Teacher Refer…

C.1 Lesson 3 Answer Key C…

Carbon Dioxide Investigation…

-SUMMARIZE INVESTIGATION FINDINGS

-BUILD CONSENSUS MODEL



-IDENTIFY IMPACTS OF CO2 ON EARTH SYSTEMS

-OBTAIN INFORMATION ABOUT ATMOSPHERIC GASSES

Atmospheric CO2 Reading - …

How is the Troposphere Hea…

-INTERPRET INFORMATION ABOUT ATMOSPHERIC GASSES

- observe and record temperature changes.
- describe the relationship between carbon dioxide and temperature.

3.A Collaboratively outline the variables and test an investigation to identify the directional relationship between the amount of carbon dioxide and temperature change in a defined model atmospheric system. (SEP: 3.1, 3.5; DCI: ESS2.D.3; CCC: 4.2)

Learning Target: I can develop a model to show how energy from the Sun moves through the atmosphere and cryosphere and how this affects Earth's climate.

Success Criteria: I will…

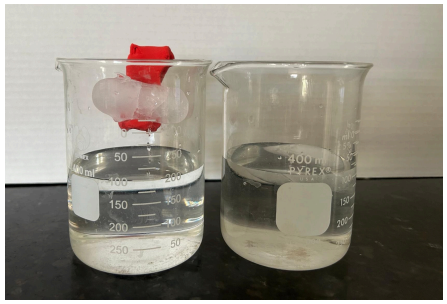
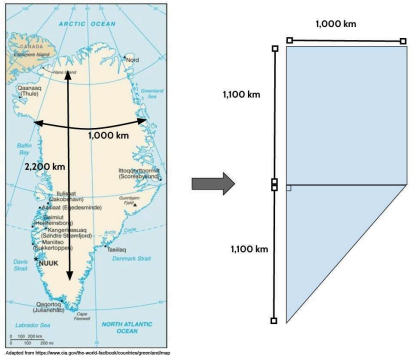
- identify where energy comes from (the Sun).
- show how energy moves through the atmosphere and cryosphere.
- explain what happens when energy is absorbed or reflected.
- use evidence to support my model.

system, causing warmer temperatures and sea level rise. We learn that CO2 concentrations in Earth's atmosphere are increasing rapidly. Because CO2 stays in the atmosphere for centuries, we want to find solutions to address impending sea level rise.

What students will figure out:

- The presence of carbon dioxide somehow enhances the rate of warming in a closed water bottle system, which we can use to model Earth's atmosphere.
- Energy that enters a system with more carbon dioxide is less likely to exit that system compared to a system with less carbon dioxide.
- Earth's atmosphere is a mixture of many different types of gases, including carbon dioxide.
- The concentration of carbon dioxide in Earth's atmosphere has increased rapidly over time. Because it can last in the atmosphere for a very long time, we need to find

		• explain how energy flow affects climate. **3.B** Develop a model based on evidence to predict how energy flows between the Sun, the atmosphere, and the cryosphere and how its absorption impacts climate. (SEP: 2.3; DCI: ESS2.D.1, PS3.B.2; CCC: 4.3) --- **Learning Target:** I can ask questions to better understand why models predict that global temperatures will keep rising even if carbon dioxide emissions stop. **Success Criteria:** I will… • identify the unexpected result in a climate model. • ask scientific questions about energy and matter conservation. • connect past carbon dioxide emissions to future temperature changes. • use models or data to help explain my questions. • revise my thinking based on new evidence. **3.C** Ask questions about the unexpected result that	another way to address sea level rise besides reducing CO_2 emissions. ***What's next?*** *We will develop and evaluate a mathematical model of the impact on sea level if Greenland and Antarctica's ice melted. We will plan and carry out an investigation to test the idea that sea ice may not affect sea levels. We will calculate the impacts of sea level rise.*

		conservation of energy and matter lead to models that predict that global temperatures will continue to rise on average even if carbon dioxide emissions stop. (SEP: 1.1; DCI: ESS2.D.4; CCC: 5.1)	
Lesson 4: What would happen if the Earth's ice melted? **Lesson 4 - C.1 Thermodyna…**   **C.1 Lesson 4 Teacher Refer…** **C.1 Lesson 4 Answer Key S…**	**C.1 Lesson 4 Teacher Edition** **-CREATE INITIAL MODEL ABOUT MELTING ICE** **-BEGIN TO DEVELOP A MATHEMATICAL MODEL** **Sea Level Calculations - Duffy** **Unit Conversion Word Problems** **-USE MATHEMATICAL MODEL TO CALCULATE VOLUME OF GREENLAND ICE** **-USE MATHEMATICAL MODEL TO CALCULATE VOLUME OF ANTARCTIC ICE** **Coastline Retreat From Sea-Level Rise Simulation | Sea Level | VESL | JPL | NASA** **-REFLECT ON OUR MATHEMATICAL MODEL** **-CALCULATE SEA LEVEL RISE FROM GREENLAND ICE MELT** **-CALCULATE SEA LEVEL RISE FROM ANTARCTICA ICE MELT**	**Learning Target:** I can use ratios and unit conversions to predict how human-caused ice melt affects sea level and people. **Success Criteria:** I will… • identify the quantities involved (ice melt, sea level change, population). • use ratios to compare changes at different scales. • convert units correctly (for example, ice volume to sea level rise). • make predictions about sea level rise using calculations. • explain how sea level rise impacts human populations. **4.A** Apply ratios and unit conversions at different scales to make predictions about the impact of human-caused ice melt on sea levels and human populations.	**What students will wonder:** We examine where ice is found on Earth's surface and make predictions and model what would happen if Earth's cryosphere melted. We develop a mathematical model to figure out the impact on sea level if Greenland and Antarctica's ice melted. We evaluate our answer using a simulation of sea levels and notice that the ice in the Arctic Ocean is not represented. We wonder if this ice affects sea levels, so we plan and carry out an investigation to see if ice in water affects the water level when it melts. We determine it does not, update our model, and calculate the human impacts of sea level rise. **What students will figure out:** • We estimate that if all of Greenland's land ice melted, Earth's sea levels would rise by almost 7 meters. If all of Antarctica's

	-PLAN AN INVESTIGATION FOR HOW MELTING ICE AFFECTS SEA LEVEL --- **-TAKE FINAL MEASUREMENTS** **C.1 Lesson 4 Teacher Refer…** **-SHARE AND MAKE SENSE OF THE RESULTS** **-REVISE OUR MODEL** **-CONSIDER THE HUMAN IMPACTS OF SEA LEVEL RISE** **-BRAINSTORM SOLUTIONS AND NAVIGATE**	(SEP: 5.5; DCI: ESS3.B.1, ESS3.D.1; CCC: 3.1) --- **Learning Target:** I can plan and conduct an investigation to improve a model that explains why melting sea ice does not raise sea level but can still cause other problems. **Success Criteria:** I will… • use a model to represent sea ice in the ocean system. • test what happens when sea ice melts. • revise the model based on what I observe. • explain why sea ice melt does not change sea level. • describe other negative effects of losing sea ice. **4.B** Plan and carry out an investigation to revise a model to reflect that sea ice is in the ocean system (hydrosphere) and therefore does not change sea level, though losing it might have other negative effects. (SEP: 3.1; DCI: ESS3.D.2; CCC: 4.2)	land ice melted, Earth's sea levels would rise by about 55 meters. • A sea level rise of 7 or 55 meters, or even 0.5 meter, would cause many major cities and other places to be covered by water for at least part of the year. • Earth's sea levels would not rise if Earth's sea ice melted, because this ice is already in the ocean. • We have initial ideas about ways that ice sheets could be prevented from melting. ***What's next?*** *We will analyze changes occurring over time at Ilulissat Glacier, a site of fast ice melt. We will read about two design solutions for slowing or preventing further melt. We will model the energy transfers and ask questions about the energy flows and overall suitability of the designs.*
INTERIM ASSESSMENT **(HS ESS3-5)**			

INTERIM ASSESSMENT

Interim Slides for students

LS1 Common Assessment:
Human Impact Assessment - Rio de Janeiro Transfer Task
Built in Canvas based on this google form

Study Guide built on Canvas using this:
C.1 Lesson 4 Handout Conversions Home Learning



Human Impact Assessment - Transfer Task MC KEY.pdf
C.1 Lesson 4 Answer Key Exit Ticket Key

Climate and Human Impact Assessment - LS1 Transfer Task ACC

Learning Target: I can use ratios and unit conversions to predict how human-caused ice melt affects sea level and people.

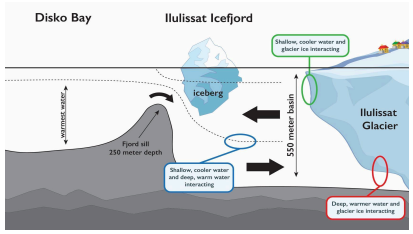
Success Criteria: I will…

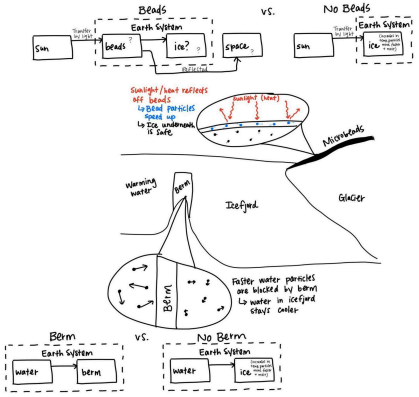
- identify the quantities involved (ice melt, sea level change, population).
- use ratios to compare changes at different scales.
- convert units correctly (for example, ice volume to sea level rise).
- make predictions about sea level rise using calculations.
- explain how sea level rise impacts human populations.

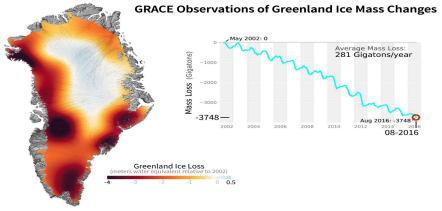
4.A Apply ratios and unit conversions at different scales to make predictions about the impact of human-caused ice melt on sea levels and human populations. (SEP: 5.5; DCI: ESS3.B.1, ESS3.D.1; CCC: 3.1)

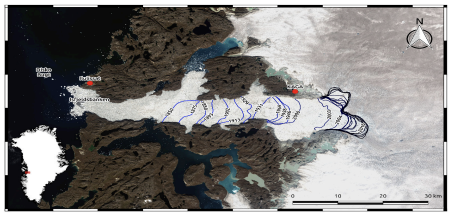
Learning Sequence 2: How can we Slow Polar Ice Melt? **Class Notes: LS2 - How can we slow Polar Ice Melt? Thermodynamics in Earth**

Lesson 5: How can we best slow or stop the land ice melt? **Lesson 5 - C.1 Thermodyna…**	**C.1 Lesson 5 Teacher Edition** **Duffy combined handout version of Lesson 5:** **-INTRODUCE THE ILULISSAT GLACIER CASE SITE AND ANALYZE CHANGES OCCURRING THERE**	**Learning Target:** I can ask questions to improve a model that shows how energy moves into, out of, and within a system when solutions are used to reduce glacier ice melt in Disko Bay. **Success Criteria:** I will…	**What students will wonder:** We analyze the changes occurring over time at a site of fast ice melt in Greenland (Ilulissat Glacier) using satellite images on video recordings of the glacier front. We read about two design solutions for slowing or preventing further









-LEARN ABOUT TWO PROPOSED SOLUTIONS

Ilulissat Design Solution Pro…

-MODEL THE PROPOSED SOLUTIONS

-SHARE IDEAS IN SMALL GROUPS

-INTRODUCE THE DISCUSSION MAPPING TOOL

-GO PUBLIC WITH IDEAS ABOUT PROPOSED SOLUTIONS

-REFINE THE MODEL TO INCLUDE ENERGY

-REFLECT ON OUR DISCUSSION MAPPING PROCESS

-ADD TO THE DRIVING

- use a model that shows energy transfer in the system.
- identify where energy enters, leaves, and moves within the system.
- ask questions about how proposed solutions change energy flow.
- focus my questions on glacier ice melt.
- use my questions to help refine the model.

5.A Ask questions to refine a model of the energy transfer into, out of, and within the system if proposed solutions prevent glacier ice melt in Disko Bay. (SEP: 1.4; DCI: PS3.B.2; CCC: 4.1)

Learning Target: I can use energy transfer models to ask questions about whether proposed design solutions are effective now and in the future.

Success Criteria: I will…

- use a consensus model of energy transfer.
- identify how the solution changes energy flow.

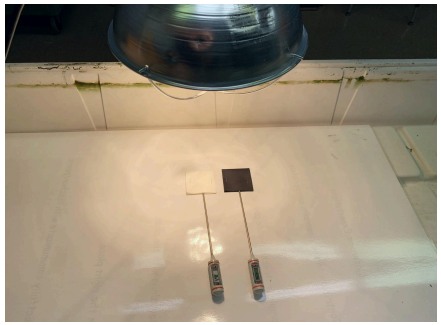
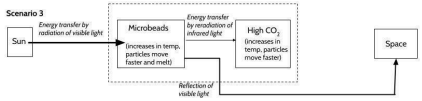
melt. We hear concerns from local rights holders and attempt to model the energy transfers that occur to make these solutions work. We ask questions about these energy flows and overall suitability of the designs.

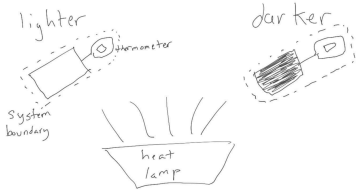
What students will figure out:

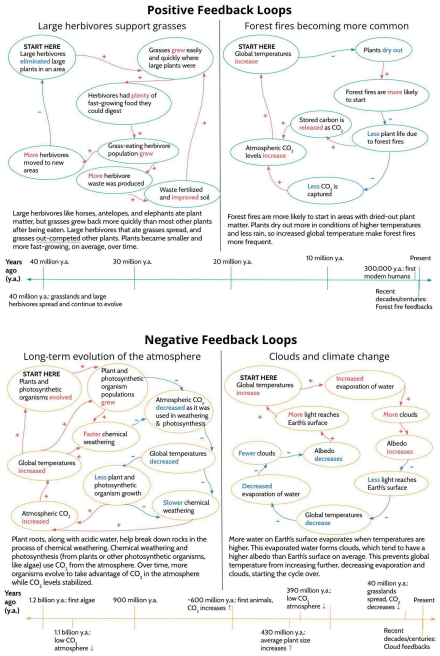
- The Ilulissat Glacier is the single largest flow of melt in Greenland. The front edge of the glacier has been receding over many decades.
- There are two proposed solutions. One is to build a huge underwater barrier between Disko Bay and Ilulissat Icefjord to prevent warm salty ocean water from coming into contact with the Ilulissat Glacier. The other is to spread thin layers of microbeads on Arctic ice in the summer months.
- Rights holders have concerns about the suitability of these designs and their potential impacts.

What's next?

We will plan and carry out an investigation to test our ideas

	QUESTION BOARD	• ask questions that challenge the solution's effectiveness. • consider both short-term and long-term impacts. • use evidence from the model to support my questions. **5.B** Use energy transfer consensus models to ask questions that challenge the suitability of the design solutions based on their current and future impacts. (SEP: 1.7; DCI: ESS3.D.1; CCC: 4.3)	*about how microbeads prevent ice melt. We will see that darker colors heat up more, and we will use a reading to help explain how carbon dioxide causes temperature increases and how microbeads work.*
Lesson 6: Why would some engineers want to sprinkle glass microbeads on the Arctic? **Lesson 6 - C.1 Thermodyna…**  	**C.1 Lesson 6 Teacher Edition** **Duffy combined handout version of Lesson 6:** **Light and Materials - Duffy** **-PLAN AN INVESTIGATION** **C.1 Lesson 6 Handout Light …** **-CARRY OUT AN INVESTIGATION** **-DISCUSS RESULTS FROM THE INVESTIGATION** **-READ ABOUT LIGHT AND MATERIALS** **C.1 Lesson 6 Reading Light …**	**Learning Target:** I can plan and carry out a safe investigation to show how the Sun's energy is reflected, absorbed, stored, and reradiated, and how this affects climate. **Success Criteria:** I will… • define the system boundaries for my investigation. • identify and control variables in the experiment. • observe how energy is reflected, absorbed, stored, and reradiated. • collect and record data safely.	**What students will wonder:** We plan an investigation to test our ideas about how microbeads prevent ice melt. Our teacher proposes a setup with a heat lamp shining on different colors of construction paper, and we discuss how to control variables and conduct the investigation safely. We see that darker colors heat up more. We read about light energy and discuss how what we read can explain both how carbon dioxide causes temperature increases and how the beads can help prevent melt. We use our model to make predictions, update our personal glossaries and

	**-DISCUSS THE LIGHT AND MATERIALS READING** **-MODEL THE EFFECTS OF CO2 AND MICROBEADS** **C.1 Lesson 6 Handout Revis…** **C.1 Lesson 6 Answer Key R…** **-MODEL HOW MICROBEADS WORK** **-USE OUR MODEL TO MAKE A PREDICTION** **-UPDATE PERSONAL GLOSSARIES AND PROGRESS TRACKERS** **-MAKE A CLAIM ABOUT MICROBEADS** **C.1 Lesson 6 Handout Micro…** **-REFLECT ON THE DECISION TO USE MICROBEADS**	• explain how these energy processes affect climate. **6.A** Plan and conduct a safe investigation with controlled variables and well-defined system boundaries to figure out how the reflection, absorption, storage, and reradiation of energy from the Sun affect climate. (SEP: 3.1, 3.3; DCI: ESS2.D.1, PS3.D.1; CCC: 4.2) --- **Learning Target:** I can use math to support a claim about whether microbeads are a good solution for preventing polar ice melt based on changes in energy flows and feedback loops. **Success Criteria:** I will… • identify how microbeads affect energy flows and feedback loops. • use data and calculations to support my claim. • make a clear argument about whether microbeads are an effective solution. • explain my reasoning using evidence from my calculations.	progress trackers, and reflect on who should get to decide to use microbeads. **What students will figure out:** • Light energy (radiation) causes dark materials to increase in temperature more than light materials. • Different materials absorb and reflect light energy differently. More reflective materials, like fresh ice or snow, have a high albedo. • There are different kinds of light, including infrared light. • When dark materials absorb visible light, their particles speed up and re-emit infrared light over time. • Carbon dioxide and other greenhouse gases transmit visible light, but absorb infrared light, trapping it in the Earth system. • A feedback loop could occur as additional carbon dioxide causes increased temperatures, which would melt ice, which would decrease the albedo of Earth's surface, which would cause more energy

		• consider both positive and negative impacts of the solution. **6.B** Use mathematical representations to support a claim about whether the changes in energy flows and disrupted feedback loops caused by microbeads make them a viable solution to help prevent polar ice melt. (SEP: 5.2; DCI: ESS2.A.1; CCC: 5.3)	to be absorbed. ***What's next?*** *We will discuss who should decide whether microbeads should be used to slow polar ice melt. We will read about feedback loops' impacts on the development of Earth systems. We will engage with a short mid-unit assessment and check in on our Driving Question Board.*
Lesson 7.a: How do feedback loops affect Earth's systems? **Lesson 7 - C.1 Thermodyna…** 	**C.1 Lesson 7 Teacher Edition** **-EXAMINE AN INFOGRAPHIC AND DISCUSS FEEDBACK LOOPS IN HISTORY** **C.1 Lesson 7 Reference Ear…** **Feedback loops go here?** **Feedback Cards** **Feedback Loops - Energy V…** **Climate Emergency Feedba…**	**Learning Target:** I can ask questions to understand how positive and negative feedback loops involving plants and other organisms affect Earth's systems. **Success Criteria:** I will… • identify examples of positive and negative feedback loops in Earth systems. • connect how plants and organisms interact with these feedback loops. • ask questions that clarify how feedback loops work. • use evidence from models or data to support my questions. **7.A** Ask questions to clarify the role of positive and negative	**What students will wonder:** We discuss who should decide whether microbeads should be used to slow polar ice melt. We have questions and concerns, many of them related to unpredictable feedback loops. We read about feedback loops and recognize that some have had profound impacts on the development of Earth systems and living things. We engage with a short mid-unit assessment and check in on our Driving Question Board. **What students will figure out:** • Earth's atmosphere and surface have changed significantly over time due to changes in living things,

		feedback loops involving the co-evolution of plants and other organisms with other Earth systems. (SEP: 1.4; DCI: ESS2.E.1, ESS2.D.2, ESS2.A.1; CCC: 7.3)	and changes in these systems impact living things in a feedback loop. ● A positive feedback loop is one where effects end up reinforcing the original cause, driving more change. A negative feedback loop is one where effects end up counteracting the original cause and limiting its impact. ● A positive feedback loop is not necessarily good and a negative one is not necessarily bad. ● One feedback loop is thawing permafrost releasing carbon dioxide, which can cause additional warming and permafrost thaw. ***What's next?*** *We will pose questions about where glacial ice meets ocean water, then learn from Inuit and NASA experts to formulate hypotheses about how proposed solutions would affect energy flows in the area. We will be puzzled to learn that the warmest water is at the bottom of the bay.*

LS2 Common Assessment:
Thawing Permafrost Transfer Task

Lesson 7.b: How do feedback loops affect Earth's systems?
Lesson 7 - C.1 Thermodynamics in Earth's Systems
C.1 Lesson 7 Teacher Edition



Built in Canvas using this:
C.1 Lesson 7 Assessment Thawing Permafrost Transfer
C.1 Lesson 7 Answer Key Thawing Permafrost Key

***NOTE: if given on canvas, students should be given a hardcopy of the feedback loop so that they can annotate.**

Permafrost Assessment - LS2 Transfer Task

Learning Target: I can ask questions to understand how positive and negative feedback loops involving plants and other organisms affect Earth's systems.

Success Criteria: I will…

- identify examples of positive and negative feedback loops in Earth systems.
- connect how plants and organisms interact with these feedback loops.
- ask questions that clarify how feedback loops work.
- use evidence from models or data to support my questions.

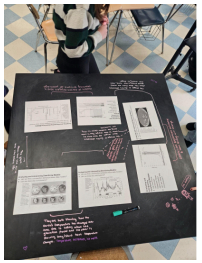
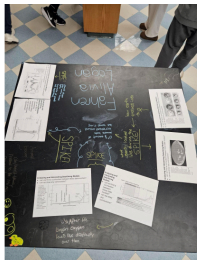
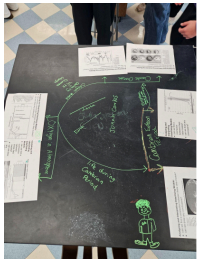
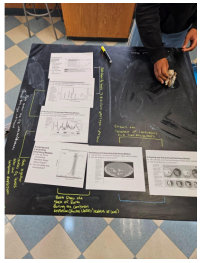
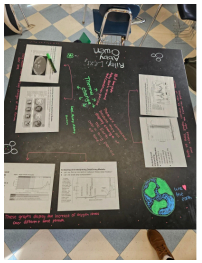
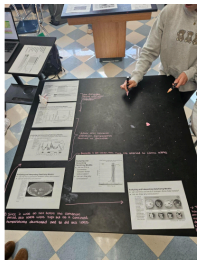
7.A Ask questions to clarify the role of positive and negative feedback loops involving the co-evolution of plants and other organisms with other Earth systems. (SEP: 1.4; DCI: ESS2.E.1, ESS2.D.2, ESS2.A.1; CCC: 7.3)

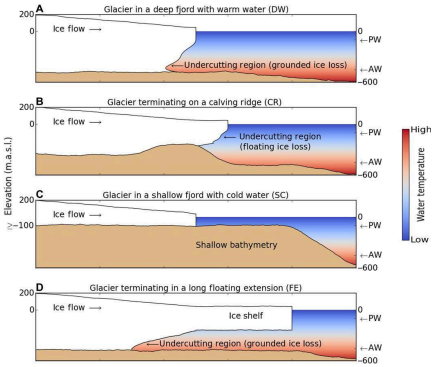
What students will wonder:
We discuss who should decide whether microbeads should be used to slow polar ice melt. We have questions and concerns, many of them related to unpredictable feedback loops. We read about feedback loops and recognize that some have had profound impacts on the development of Earth systems and living things. We engage with a short mid-unit assessment and check in on our Driving Question Board.

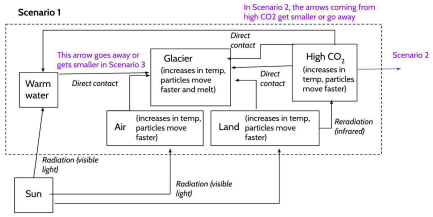
What students will figure out:

- Earth's atmosphere and surface have changed significantly over time due to changes in living things, and changes in these systems impact living things in a feedback loop.
- A positive feedback loop is one where effects end up reinforcing the original cause, driving more change. A negative feedback loop is one where effects end up counteracting the original cause and limiting its impact.
- A positive feedback loop is

			not necessarily good and a negative one is not necessarily bad. ● One feedback loop is thawing permafrost releasing carbon dioxide, which can cause additional warming and permafrost thaw. ***What's next?*** *We will pose questions about where glacial ice meets ocean water, then learn from Inuit and NASA experts to formulate hypotheses about how proposed solutions would affect energy flows in the area. We will be puzzled to learn that the warmest water is at the bottom of the bay.*
Learning Sequence 3: How well would the berm solution work? Class Notes: LS3 - How well would the berm soultion work?Melt? Ther			
Lesson 7.c: How can changes in Earth's systems create conditions for major changes in life on Earth?	**ENGAGE:** Narrative Introduction (Teach… Earth's Entire History (Visual… **EXPLORE:** Cambrian Explosion BTC Ac… Student examples:	**PE: HS-ESS2-7** **DCI: ESS2.D, ESS2.E** **Learning Target:** I can construct an evidenced based argument that explains how life and Earth's systems have changed together over time, influencing each other's evolution. **Success Criteria: I will…**	

	 2A   2A   1A  **Explain:** HS-ESS2-7 Assessment - W… **What Caused the Cambrian …** Extra Reading: CK12 Early Atmosphere and Oceans	• identify examples of how life has changed Earth's systems, and how Earth's systems have influenced the evolution of life. • explain the cause-and-effect relationships and feedbacks between living organisms and Earth systems. • analyze evidence (from data, models, or texts) to support an argument about the coevolution of life and Earth.	
Lesson 8: What is going on where the ice meets the water? **Lesson 8 - C.1 Thermodyna…**	**C.1 Lesson 8 Teacher Edition** **-ETHICALLY ENGAGE WITH INDIGENOUS KNOWLEDGE** **Inuit belief / AO** **Inuit Belief Highlights - Duffy** **C.1 Lesson 8 Handout Inuit …**	**Learning Target:** I can ask questions about changing ice, water, and land in the circumpolar region to help frame a hypothesis about energy and matter where	**What students will wonder:** We already know a lot about surface glacial melt and decide to explore the melt happening underneath. We pose questions about what might be going on





-REVIEW DATA FROM THE NASA OMG PROJECT

NASA's OMG: Where the W…

NASA OMG Project - Duffy

C.1 Lesson 8 Reference NA…

-REVISIT QUESTIONS AND FRAME HYPOTHESES

Revisiting Questions and Re…

C.1 Lesson 8 Handout Revis…

C.1 Lesson 8 Answer Key R…

glacial ice meets the ocean at Ilulissat.

Success Criteria: I will…

- observe and describe changes in ice, water, and land in the region.
- use Indigenous Inuit and/or NASA methods to guide my questions.
- ask questions that could be investigated in the field.
- connect my questions to energy and matter changes.
- use questions to help frame a testable hypothesis.

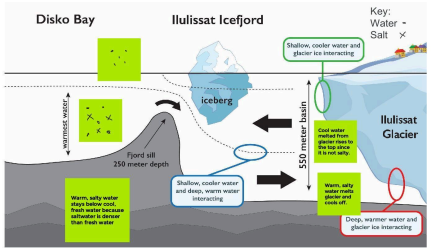
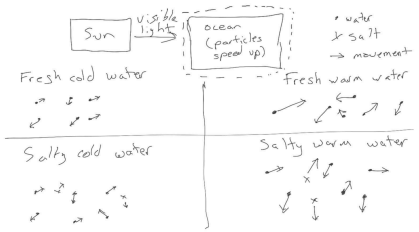
8.A Ask questions about the changing ice, waters, and lands of the circumpolar region that could be investigated in the field (using Indigenous Inuit and/or NASA methodologies) to frame a hypothesis about changes in energy and matter where glacial ice meets the ocean water at Ilulissat. (SEP: 1.6; DCI: ESS2.A.3; CCC: 5.2)

Learning Target: I can read and listen to scientific and technical information from Inuit Knowledge where glacial ice meets ocean water, then consider the information needed to answer our questions and how to gather it. We cannot go to Greenland ourselves but think we can learn from people there who already have systematically built this knowledge. We learn from Inuit and NASA experts, revisit our questions, and formulate hypotheses about how proposed solutions would affect energy flows. We are puzzled by data that suggest the warmest water is at the bottom of the bay.

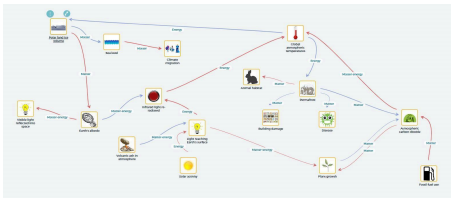
What students will figure out:

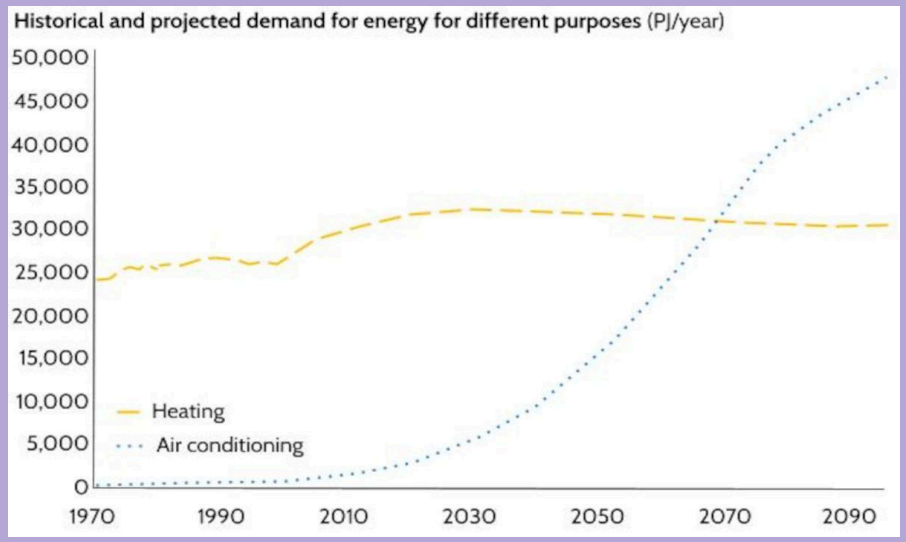
- In addition to surface melt and albedo effects, there are concerns about warming oceans driving glacial melt from below.
- Some questions are best answered through field-based investigations and experience.
- Indigenous Knowledge is a systematic way of thinking with its own purposes and methodologies, just as science is a systematic way of thinking with its own purposes and methodologies.

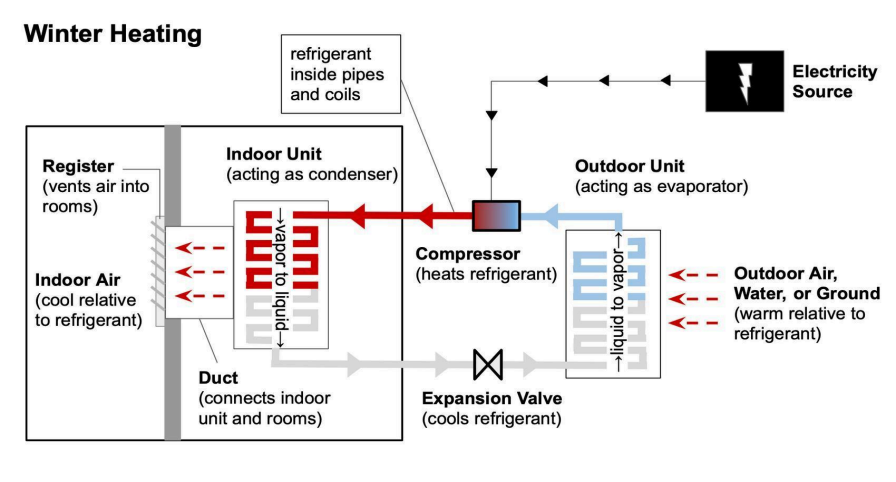
		and NASA research to analyze the Arctic system and compare different perspectives. **Success Criteria:** I will… ● identify boundaries, initial conditions, inputs, and outputs of the Arctic system. ● use information from Inuit Knowledge to describe the system. ● use information from NASA research to describe the system. ● compare how the two perspectives analyze the Arctic system. ● explain the usefulness of each perspective in understanding energy and matter flows. **8.B** Read and listen to scientific and technical information from two authoritative sources--Inuit Indigenous Knowledge and research from the NASA OMG Project--and consider the usefulness of describing and analyzing the boundaries, initial conditions, inputs, and outputs of the Arctic system from these different perspectives. (SEP: 8.3; DCI: ESS2.A.3; CCC: 4.2)	● Field-based investigations and experience can help people answer their questions, formulate hypotheses, and generate new questions. ● Both the berm solution and cutting carbon emissions could slow the transfer of energy at the interface between warm ocean water and glacial ice, through different mechanisms and on different timescales. ● Puzzlingly, the warmest ocean water is at the bottom of the bay. ***What's next?*** *We will develop particle-level and energy models of water at different temperatures and salinities. We will collect data on the mass and volume of water under these different conditions and calculate its density. We will revise our models and explain how berms decrease energy transfer to the glacier.*

Lesson 9: Why does warm salty water sink to melt a glacier? **Lesson 9 - C.1 Thermodyna…**  	**C.1 Lesson 9 Teacher Edition** **Duffy combined handout version of Lesson 9:** **-NAVIGATE** **Brainstorm ideas about why liquids float or sink.** **-MODEL PARTICLES IN DIFFERENT LIQUIDS**  **-PLAN AN INVESTIGATION** **-INVESTIGATE MASS AND VOLUME** **C.1 Lesson 9 Class Data Ta…** **-PRODUCE LINES OF BEST FIT AND INTERPRET OUR RESULTS** **C.1 Lesson 9 Class Data Ta…** **-CALCULATE DENSITY** **Discuss best-fit lines, consider limitations of the mathematical models, and calculate slope using Google Sheets.** **C.1 Calculating Density in G…** **C.1 Graphing in Google She…**	**Learning Target:** I can evaluate a question about ocean energy circulation to see if it can be tested and choose the right tools to collect and record data. **Success Criteria:** I will… • determine if a question is testable. • identify predicted energy flows in the ocean system. • select appropriate tools to collect and record data. • explain why the tools and methods are suitable for the investigation. • plan steps to investigate ocean energy circulation safely and effectively. **9.A** Evaluate a question about the energy circulation in the ocean to see if it is testable and select appropriate tools to collect and record data in an investigation, considering predicted energy flows within the ocean system. (SEP: 1.5, 3.4; DCI: ESS2.D.1; CCC: 5.4)	**What students will wonder:** We wonder why cool water is on top of warm salty water. We develop initial particle-level and energy models of water at different conditions (warm fresh, cold fresh, warm salty, and cold salty) and collect data on its mass and volume . We graph our individual and class data, determine lines of best fit, and calculate the density of water under these different conditions. We revise our initial models, explain how berms decrease energy transfer to the glacier, and complete an exit ticket. **What students will figure out:** • Though density is a property for a substance at room temperature, increased energy tends to increase the distance between particles and thus decrease the density of the particles that make up that substance. • Density of a substance (or a sample) is its mass per unit volume. • When denser fluids are

	-INTRODUCE SIGNIFICANT FIGURES **Reading Significant Figures -…** **C.1 Lesson 9 Reading Signif…** **-CARRY OUT A SECOND INVESTIGATION** **-UPDATE INITIAL PARTICLE MODELS FROM DAY 1** **-UPDATE PROGRESS TRACKERS** **-MODEL ENERGY TRANSFER** **-EXIT TICKET** **https://docs.google.com/forms/d/1kAZBHTqV9ml57xxp-GgkoGeYvt-aYWD1TpzGgdsRDDU/copy**	**Learning Target:** I can use data and models to identify how density changes affect energy circulation in the ocean. **Success Criteria:** I will… ● apply function fits to data to see patterns. ● consider the limitations of the data and analysis. ● evaluate how reliable a model is. ● connect changes in density to changes in energy circulation. ● use evidence from data and models to support my conclusions. **9.B** Apply function fits to data, consider limitations of data analysis, and consider model reliability to identify density as altering expected patterns of energy circulation in the ocean. (SEP: 4.2, 4.3; DCI: ESS2.D.1; CCC: 4.4)	added above less dense fluids, the denser fluids sink. ● When denser fluids are moved beneath less dense fluids, they tend to remain separated and flow independently of each other. ● Changes in energy and matter happen together, including in convection, when energy transfers as substances move. ***What's next?*** *We will plan and carry out an investigation to figure out if we can measure energy transfer between warm and cool water. From graphs, we will gain some additional evidence that energy is conserved. We will use a simulation to develop a mathematical model of energy transfer through conduction.*
Lessons 10-12 copied at the end- not appropriate for freshmen?			
Lesson 13.a: How can we model what will happen to Earth's climate if humans make changes?	**C.1 Lesson 13 Teacher Edition** **-READ ABOUT AND DISCUSS CLIMATE MODELING**	**Learning Target:** I can ask questions to figure out relationships in a predictive climate model, knowing that new	

	**Modeling the Climate - Duffy** **-GET TO KNOW THE COMPUTATIONAL MODEL** **Earth System Model Simulation** **-ASK QUESTIONS THAT CAN BE ANSWERED USING THE MODEL** **Give students time to develop questions that can be tested using the model.** **-TEST QUESTIONS THAT CAN BE ANSWERED USING THE MODEL** **Give students time to develop questions that can be tested using the model, then test them.** **-SHARE RESULTS FROM THE COMPUTATIONAL MODEL** **Discuss what students saw in their tests.** **-REFLECT ON WHAT WE HAVE ACCOMPLISHED** **Revisit the DQB as a class and take stock of all of the questions we have now answered.**	discoveries may change our understanding and that average global temperatures are expected to rise. **Success Criteria:** I will… • identify relationships between variables in the model. • ask questions about the model's limitations. • use a computational model to support claims about how energy and matter move in complex systems. • consider how new discoveries might change predictions. • connect the model to expected trends in global temperatures. **13.A** Ask questions to determine relationships in a predictive but limited model considering that new discoveries are always being made and that climate models suggest average global temperatures will continue to rise. (SEP: 1.3; DCI: ESS3.D.2, ESS2.D.4; CCC: 4.4) **13.B** Use a computational model to support claims about the impacts of energy and matter	

		flows amid complexity. (SEP: 5.2; DCI: ESS2.D.4; CCC: 4.3)	
Common Assessment: **-LS3 Summative Assessment: Heat Pumps Transfer Task** Lesson 13.b: How can we model what will happen to Earth's climate if humans make changes? **Lesson 13 - C.1 Thermodynamics in Earth's Systems** **C.1 Lesson 13 Teacher Edition** C.1 Lesson 13 Answer Key Heat Pumps Key HVAC Assessment - LS3 Transfer Task  	**Learning Target:** I can plan an investigation to find a problem with energy transfer in a geothermal heating system. **Success Criteria:** I will… • identify the components of the geothermal system. • define the energy transfer processes in the system. • plan steps to investigate potential problems. • control variables and define system boundaries for the investigation. • record observations and data to identify energy transfer issues. **13.C** Plan an investigation to identify a problem with energy transfer in the geothermal heating system. (SEP: 3.5, 3.2; DCI: PS3.B.2, PS3.B.5, PS3.D.1; CCC: 4.2)	**What students will wonder:** We return to our Gotta-Have-It Checklist for the unit computational model and realize that the model is fairly complicated, so we need to think more about how climate modeling works. We read about how scientists carry out and use climate modeling. We use this understanding to develop questions we can ask of our computational model, then test them. We discuss our results and reflect on how they make us feel. We close out our Driving Question Board and complete a transfer task focused on indoor heating in a changing climate. **What students will figure out:** • Climate models work using equations for energy and matter transfer like those we developed. • They are based on assumptions and are therefore not perfectly predictive. • Models are improved as

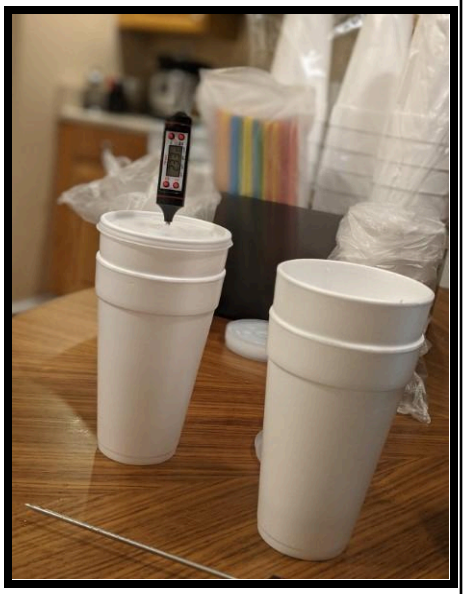


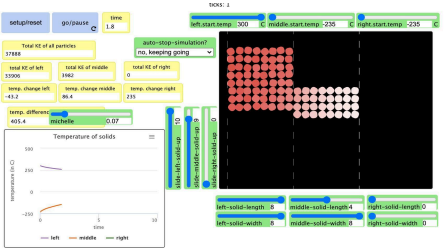
scientists get new information.

- Climate models agree that Earth will continue to warm significantly if no changes are made.
- Our computational model shows that solutions that decrease carbon dioxide in the atmosphere or energy reaching Earth's surface could prevent some sea level rise and its negative impacts on people.
- Heat pumps provide a possible solution to help limit carbon dioxide emissions while keeping homes safe and comfortable.

What's next?
END OF UNIT.

~~**Not Appropriate at the freshmen level**~~

Lesson 10: How can we measure the energy transfer a berm prevents? **Lesson 10 - C.1 Thermodyn…** 	**C.1 Lesson 10 Teacher Edition** **-PLAN AN INVESTIGATION FOR LIQUID-LIQUID ENERGY TRANSFER INTERACTIONS** **-SET UP THE EXPERIMENTAL CONDITIONS** **-COLLECT AND SHARE DATA** **C.1 Lesson 10 Liquid-Liquid …** **-HAVE A BUILDING UNDERSTANDINGS DISCUSSION** **-PREDICT TEMPERATURE CHANGES** **Build a mathematical model that can be used to predict temperature changes.** **Summarizing Our Investigati…** **-MAKE SENSE OF THE AREAS**	**Learning Target:** I can plan and carry out investigations to measure energy transfer between objects and show how energy is conserved. **Success Criteria:** I will… • plan an investigation with clear steps. • identify objects and variables involved in energy transfer. • measure energy transfer between objects. • record and analyze data accurately. • explain how my results show energy conservation. **10.A** Plan and conduct investigations of energy transfer between objects in order to quantify conserved energy. (SEP: 3.2; DCI: PS3.A.1; CCC: 5.3)	**What students will wonder:** We plan and carry out an investigation to figure out if we can measure energy transfer between warm and cool water. We try to mathematically model our results using graphs and gain some additional evidence that energy is conserved. We need more information about what this looks like at a particle level, so we conduct an initial investigation with a simulation. We then use the simulation to develop a mathematical model of energy transfer through conduction. This model includes the new idea of specific heat. **What students will figure out:** • This is what happens when two objects/samples at different temperatures are in contact with one another: • Energy transfer between



$$Q = c_p \cdot m \cdot \Delta T$$

Energy transferred = c_p · mass · temperature change
(calories) (grams) (°C)

Substance or Mixture	Specific heat, c_p calories / (g · °C)
Dry air	0.24
Limestone	0.22
Sand	0.20
Copper	0.09
Water	1.00

-INTRODUCE A SIMULATION

C.1 NetLogo Simulation Orie…

-CARRY OUT AN INITIAL INVESTIGATION

-Simulation #1: Energy Transfer Between Solids

-SHARE OBSERVATIONS FROM THE INITIAL INVESTIGATION

-HOME LEARNING

-INTRODUCE UPDATED SIMULATION

-Simulation #2: Energy Transfer Between Different Substances

-PLAN AN INVESTIGATION

-CARRY OUT AN INVESTIGATION WITH THE SIMULATION

C.1 Lesson 10 Class Simulat…

C.1 Lesson 10 Sample Clas…

-HAVE A BUILDING UNDERSTANDINGS DISCUSSION

As a class, have students share their findings and build a quantitative model to represent the relationship between mass, temperature change, and energy transfer in the system.

Learning Target: I can test a simulation of a closed system to see how energy and matter are conserved and how objects of different temperatures reach the same energy distribution.

Success Criteria: I will…

- set up a simulation of a closed system.
- apply simple limit cases to test the simulation.
- observe how energy moves between objects.
- explain how the system reaches uniform energy distribution.
- connect my observations to energy and matter conservation.

10.B Use simple limit cases to test a simulation of a closed system in which energy and matter are conserved that shows how an uncontrolled system with two different-temperature objects eventually reaches uniform energy distribution. (SEP: 5.4; DCI: PS3.B.5; CCC: 5.1)

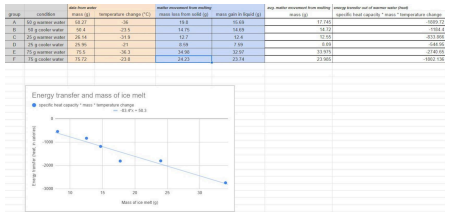
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two objects/samples initially at different temperatures will cause both to eventually reach the same final temperature, which will be between the initial temperatures.

- The mass and temperature of each sample affects where the final temperature stabilizes (ΔT depends on m).
- Energy is conserved. It flows between the objects but is not created or destroyed.
- Conduction is the transfer of energy through direct contact as particles collide.
- The specific heat (c) of a substance or mixture tells us how much energy in calories is needed to change 1 gram of it by 1 °C.
- Heat transfer Q into or out of a substance can be found by multiplying the specific heat, mass, and temperature change.

		Learning Target: I can use algebra and functions to quantify and model energy flows that cause temperature changes and show energy is conserved. **Success Criteria:** I will… • calculate energy transferred that causes temperature changes. • model energy flow mathematically. • show how energy is conserved in my calculations. • use data to support my mathematical models. **10.C** Apply techniques of algebra and functions to quantify, describe, and mathematically model the energy flows that result in measurable temperature changes in order to quantify conserved energy. (SEP: 5.3; DCI: PS3.B.3; CCC: 4.3)	***What's next?*** *We will realize that we do not know all the factors that affect the amount of ice melt, so we will plan and conduct an investigation to measure how heat and mass are related. We will consider how our results might help us address glacier melt and sea level rise.*
Lesson 11: How does heat affect the amount of ice melt? **Lesson 11 - C.1 Thermodyn…**	**C.1 Lesson 11 Teacher Edition** **Duffy combined handout version of Lesson 11:** **-NAVIGATE** **Reorient students to calculating the energy transfer the berm prevents.**	**Learning Target:** I can **Success Criteria:** I will… **11.A** Ask questions based on an existing model around how energy causes matter cycling in a system	**What students will wonder:** We reflect on where our new heat equation fits into our energy transfer model. We realize that we do not know what affects the amount of ice melt other than incoming heat, so we plan and conduct an investigation in which





-DEVELOP AN INVESTIGATION QUESTION

Investigation Question Devel…

C.1 Lesson 11 Answer Key I…

Give students time to brainstorm and decide on an investigation question.

-PLAN AN INVESTIGATION TO COMPLETE OUR MATHEMATICAL MODEL

C.1 Lesson 11 Water-Ice Cla…

Review the investigation procedure and co-construct a modified spreadsheet to collect class data.

-COLLECT AND SHARE DATA

Carry out the investigation and share results in the class data table.

Water-Ice Investigation Proc…

-MAKE SENSE OF THE RESULTS

Construct a line of best fit and discuss what its slope means.

-NAVIGATE

Have students update their Progress Tracker to support navigation to the next lesson.

with conserved and transferred energy. (SEP: 1.2; DCI: PS3.B.1; CCC: 5.4)

Learning Target: I can ask questions about how energy moves and causes matter to cycle in a system where energy is conserved and transferred.

Success Criteria: I will…

- look at an existing model of energy and matter cycling.
- identify where energy is conserved and transferred.
- ask questions about how energy affects matter movement.
- use my questions to clarify or improve the model.

11.B Make a directional hypothesis about how much energy transfer must be prevented as part of a system design. (SEP: 3.5; DCI: PS3.B.1; CCC: 4.1)

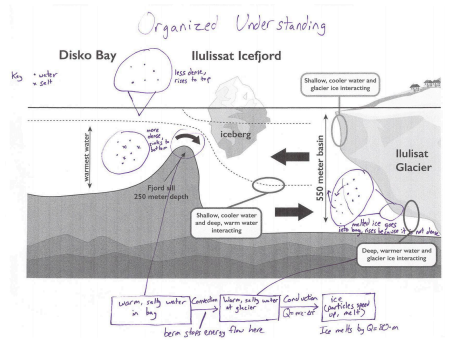
we measure both the temperature change of the water and the mass change of the melting ice. We figure out from the slope of the best-fit line of the data that 80 calories of energy are required to melt 1 gram of ice. We consider how this understanding might help us in addressing glacier melt and sea level rise.

What students will figure out:

- Because energy is conserved, the heat that transfers out of the water in our investigation flows to the ice.
- 80 calories of energy are required to melt 1 gram of ice ($Q = 80 \cdot m$).
- We can use our mathematical model to predict the amount of ice melt when we know the mass and temperature of the water it is in contact with.

What's next?

We will develop a Gotta-Have-It Checklist and mathematical model that can help us further evaluate the berm solution. We will use the model to calculate the berm's impact on ice melt. We will

			brainstorm ideas for an expanded computational model that includes the Earth system beyond the glacier.
Lesson 12: How can we slow the flow of energy on Earth to protect vulnerable coastal communities? **Lesson 12 - C.1 Thermodyn…**   	**C.1 Lesson 12 Teacher Edition** **-BUILD A GOTTA-HAVE-IT CHECKLIST** **Handout Berm Model - Duffy** **-DEVELOP A MATHEMATICAL MODEL** **-BUILD A CONSENSUS MODEL** **-USE THE MATHEMATICAL MODEL** **Calculating Berm Impact - D…** **-DISCUSS AND PROBLEMATIZE THE RESULTS** **-BUILD A UNIT GOTTA-HAVE-IT CHECKLIST** **Unit Gotta-Have-It Checklist …** **-COMPLETE AN EXIT TICKET**	**Learning Target:** I can use different types of models to predict how a berm will affect energy and matter flows. **Success Criteria:** I will… • create a checklist for a computational model that predicts how human use of resources affects a defined system. • show how energy and matter move in the system. • predict changes caused by adding a berm. • use mathematical models and unit conversions to support a claim about changes in sea level, using energy conservation to help explain it. **12.A** Use multiple types of models of changes in energy and matter flows in order to predict the impact of a berm. (SEP: 2.4; DCI: ESS3.D.1; CCC: 5.2) --- **12.B** Support a claim with mathematical models, including	**What students will wonder:** We develop a Gotta-Have-It Checklist of ideas to include in a mathematical model that can help us further evaluate the berm solution. We develop this mathematical model, then use it to calculate the berm's impact on ice melt. We recognize that this model does not reflect all the ideas we figured out or the solutions we examined in the unit, so we brainstorm ideas for an expanded computational model that includes the Earth system beyond the glacier. **What students will figure out:** • We can build a mathematical model that will allow us to figure out how much ice melt the berm can prevent. • About 3.35 x 10^{18} calories of energy are being transferred into the Ilulissat Glacier system to cause the amount of ice melt that produces the yearly amount of meltwater

		unit conversions involving quantified changes in sea level, using energy conservation as a tool. (SEP: 5.2, 5.5; DCI: PS3.A.1; CCC: 7.2) --- **12.C** Create a checklist for a computational model that can predict how a defined system is influenced by resource availability and use by humans. (SEP: 5.1; DCI: ESS3.A.1; CCC: 4.2)	coming off the Ilulissat Glacier. ● About 5 x 10^{18} calories of annual energy flow into the Ilulissat Glacier system could be prevented by the proposed berm solution, so the berm could theoretically stop glacier melt at that location. ● We can expand our model to include a larger system (i.e., on the global scale, rather than the scale of a particular glacier). ***What's next?*** *We will read about how scientists model climate. We will use this understanding to develop and test questions with our unit computational model. We will discuss and reflect on our results. We will close out our Driving Question Board and complete a transfer task focused on indoor heating in a changing climate.*

Climate Change and Human Impact



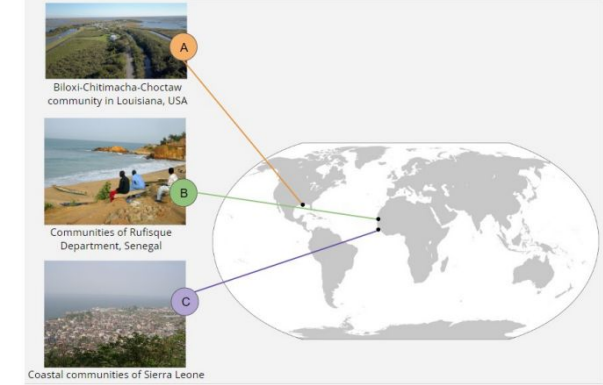
Accelerated Earth Science Course-Unit 2

Written by Jaime Hatch & Kelsey Duffy
Presentation Created by Nicole Raccio
October 21, 2026

Unit 2:
Climate Change and Human Impact

Students will explore why sea level is changing, causing people to relocate. They will conduct investigations that help students better understand the matter and energy flows that underlie a global phenomenon like polar ice melt and sea level rise.

Students figure out how decreasing carbon dioxide emissions and two geoengineering solutions (applying glass microbeads to polar ice and protecting glaciers from warm water with berms) could help slow polar ice melt, protecting coastal communities.

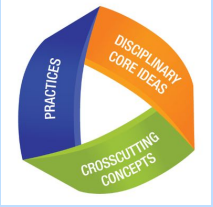


Coastal locations are noticing sea level rise due to local and global causes, which are forcing some communities to move.

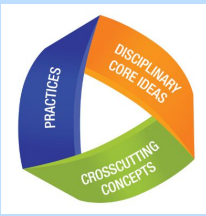
Main Standards Assessed



- **HS-PS3-1**† Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flow in and out of the system are known.
- **HS-PS3-4** Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperatures are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).
- **HS-ESS2-2** Analyze geoscience data to make the claim that one change to Earth's surface can create feedback that causes changes to other Earth systems.
- **HS-ESS3-5** Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts on Earth systems.



SEPs, DCIs, & CCCs



Science & Engineering Practices (SEP)

- Using Mathematics and Computational Thinking
- Planning and Carrying Out Investigations
- Analyzing and Interpreting Data

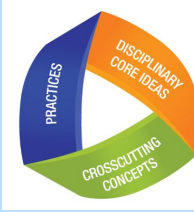
Disciplinary Core Ideas (DCI)

- PS3.A: Definitions of Energy
- PS3.B: Conservation of Energy and Energy Transfer
- PS3.D: Energy in Chemical Processes
- ESS2.A: Earth Materials and Systems
- ESS2.D: Weather and Climate
- ESS3.D: Global Climate Change

Crosscutting Concepts (CCC)

- System and System Models
- Stability and Change

Learning Sequence 1: Why is Sea Level Rising?



Lesson Level Question:

- How are sea levels rising and forcing people to move?
- What can the past help us figure out about what is causing sea level rise in the present?
- How does carbon dioxide contribute to climate change?
- What would happen if the Earth's ice melted?

Learning Objectives

- I can ask questions and develop a model to explain how changes in sea level affect human migration by tracking energy and matter through Earth systems.
- I can evaluate new evidence and make an argument explaining how different energy sources and Earth system changes affect climate and sea level over time.
- I can construct and present an argument explaining how different Earth and space factors cause climate to change over different timescales.
- I can plan and conduct an investigation that shows how changes in carbon dioxide affect temperature in a model atmosphere.
- I can develop a model to show how energy from the Sun moves through the atmosphere and cryosphere and how this affects Earth's climate.
- I can ask questions to better understand why models predict that global temperatures will keep rising even if carbon dioxide emissions stop.
- I can use ratios and unit conversions to predict how human-caused ice melt affects sea level and people.
- I can plan and conduct an investigation to improve a model that explains why melting sea ice does not raise sea level but can still cause other problems.



Assessment:

Human Impact Assessment - Rio de Janeiro Transfer Task

Learning Target: I can use ratios and unit conversions to predict how human-caused ice melt affects sea level and people.

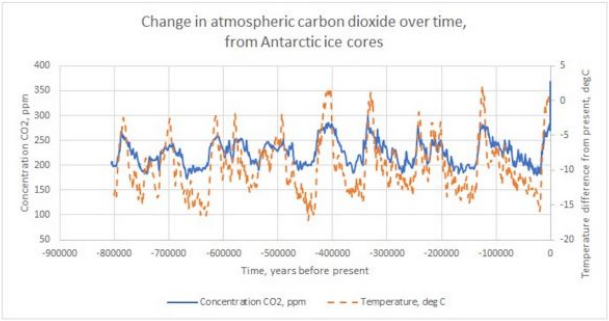
Success Criteria: I will…

- identify the quantities involved (ice melt, sea level change, population).
- use ratios to compare changes at different scales.
- convert units correctly (for example, ice volume to sea level rise).
- make predictions about sea level rise using calculations.
- explain how sea level rise impacts human populations.

- ❖ Scale, Proportion, and Quantity
- ❖ Mathematical Thinking

What students figure out

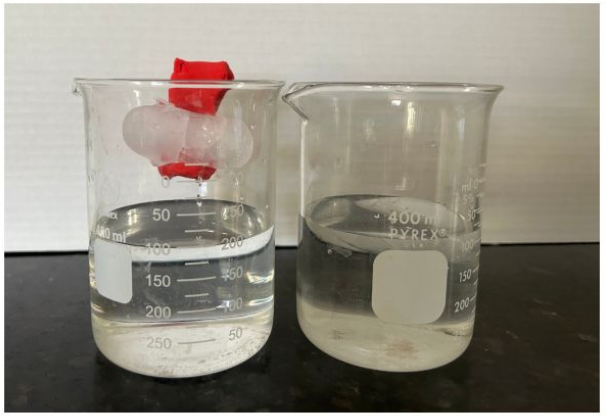
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Sea level tends to increase as temperature increases and polar ice melts. Various factors can affect Earth's climate, but only carbon dioxide can impact it at the timescales we observe.

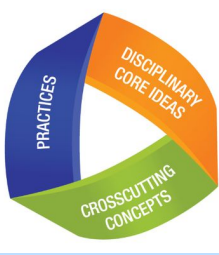


In the closed water bottle system, bottles containing more CO2 see a greater increase in temperature under a heat lamp.



Data about Greenland's and Antarctica's size allow us to calculate how much water the melting ice would add to the world's oceans and we investigate whether both land ice and sea ice raise sea levels.

Learning Sequence 2: How can we Slow Polar Ice Melt?



Lesson Level Questions

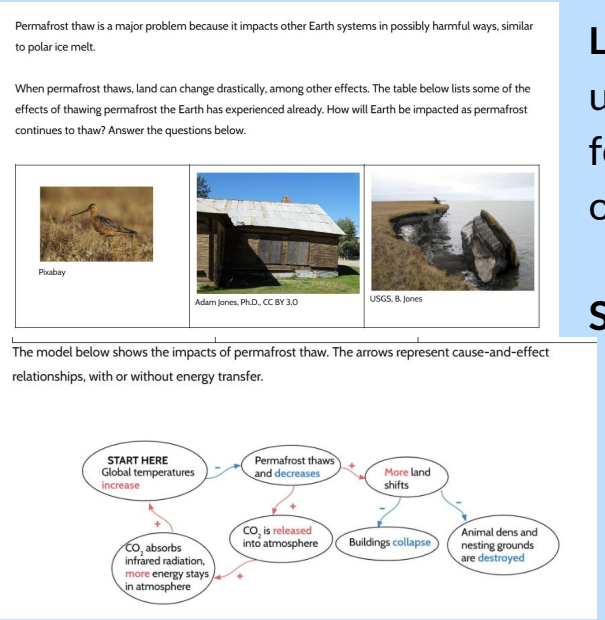
- How can we best slow or stop the land ice melt?
- Why would some engineers want to sprinkle glass microbeads on the Arctic?
- How do feedback loops affect Earth's systems?
- How do feedback loops affect Earth's systems?

Learning Targets

- I can ask questions to improve a model that shows how energy moves into, out of, and within a system when solutions are used to reduce glacier ice melt in Disko Bay.
- I can use energy transfer models to ask questions about whether proposed design solutions are effective now and in the future.
- I can plan and carry out an investigation to show how the Sun's energy is reflected, absorbed, stored, and reradiated, and how this affects climate.
- I can use math to support a claim about whether microbeads are a good solution for preventing polar ice melt based on changes in energy flows and feedback loops.
- I can ask questions to understand how positive and negative feedback loops involving plants and other organisms affect Earth's systems.

Assessment:

Thawing Permafrost Transfer Task



Permafrost thaw is a major problem because it impacts other Earth systems in possibly harmful ways, similar to polar ice melt.

When permafrost thaws, land can change drastically, among other effects. The table below lists some of the effects of thawing permafrost the Earth has experienced already. How will Earth be impacted as permafrost continues to thaw? Answer the questions below.

Pixabay

Adam Jones, Ph.D., CC BY 3.0

USGS, B. Jones

The model below shows the impacts of permafrost thaw. The arrows represent cause-and-effect relationships, with or without energy transfer.

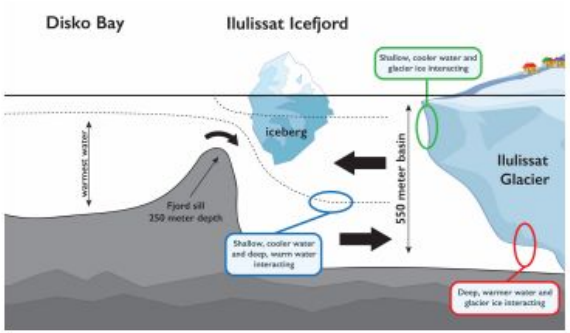
Learning Target: I can ask questions to understand how positive and negative feedback loops involving plants and other organisms affect Earth's systems.

Success Criteria: I will…

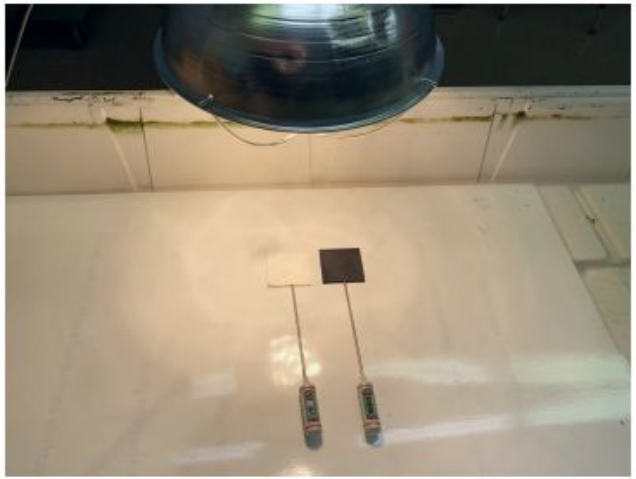
- identify examples of positive and negative feedback loops in Earth systems.
- connect how plants and organisms interact with these feedback loops.
- ask questions that clarify how feedback loops work.
- use evidence from models or data to support my questions.

- ❖ Stability and Change
- ❖ Asking Questions and Defining Problems

What students figure out



The Ilulissat Glacier has lost a lot of ice mass and has visibly retreated over the past few decades. Scientists have proposed two potential geoengineering solutions to slow the rate of melting at this location — building an underwater berm, or spreading thin layers of microbeads on ice during the summer.

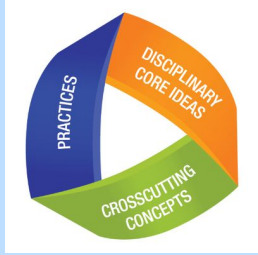


Different colors of construction paper increase in temperature differently under a heat lamp.



Many changes in Earth systems, like increased warming due to melting ice and permafrost releasing CO2 that speeds warming, are due to feedback loops.

Learning Sequence 3: How well would the berm solution work?



Lesson Level Questions

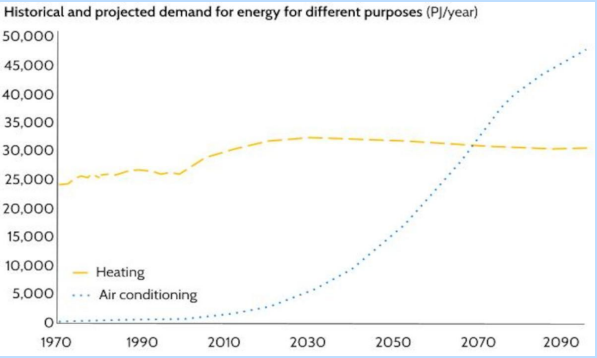
- How can changes in Earth's systems create conditions for major changes in life on Earth?
- What is going on where the ice meets the water?
- Why does warm salty water sink to melt a glacier?
- How can we model what will happen to Earth's climate if humans make changes?
- How can we model what will happen to Earth's climate if humans make changes?

Learning Targets

- I can construct an evidenced based argument that explains how life and Earth's systems have changed together over time, influencing each other's evolution.
- I can ask questions about changing ice, water, and land in the circumpolar region to help frame a hypothesis about energy and matter where glacial ice meets the ocean at Ilulissat.
- I can read and listen to scientific and technical information from Inuit Knowledge and NASA research to analyze the Arctic system and compare different perspectives.
- I can use data and models to identify how density changes affect energy circulation in the ocean.

Assessment:

Heat Pumps Transfer Task



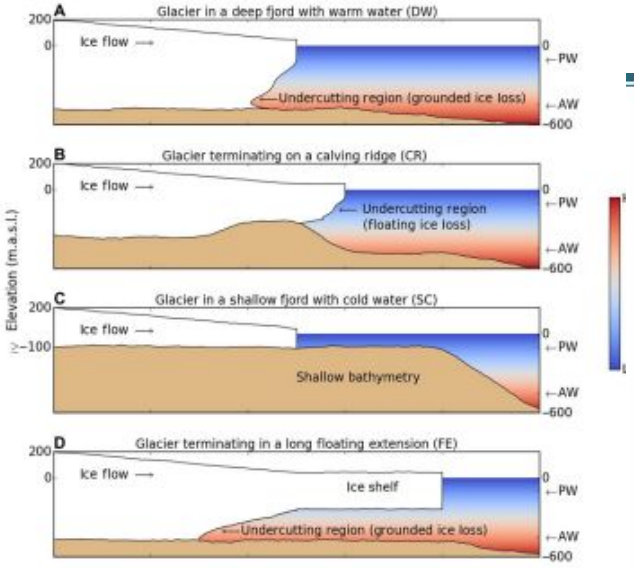
Learning Target: I can plan an investigation to find a problem with energy transfer in a geothermal heating system.

Success Criteria: I will…

- identify the components of the geothermal system.
- define the energy transfer processes in the system.
- plan steps to investigate potential problems.
- control variables and define system boundaries for the investigation.
- record observations and data to identify energy transfer issues.

- ❖ System and Systems Models
- ❖ Planning and Carrying out Investigations

What students figure out



Data from Inuit hunters and fishers and NAS scientists suggest that warming oceans contribute to glacial melt

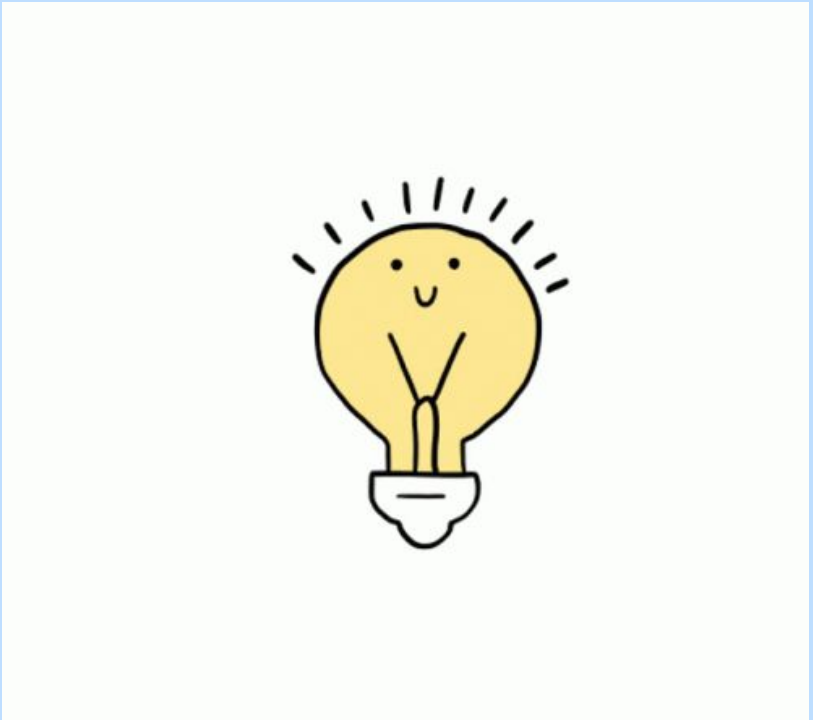


Samples of water of different temperatures and amounts of salt form layers when they first come into contact with one another.



We can build models that help us predict how different human actions will affect climate.

Thank you!



BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 g.

AGENDA REPORTING FORM

Agenda Topic: SHS History - Current Issues - Revised - First Reading.

Summary of Issue: SHS History - Current Issues - Revised - First Reading.

Background: _____

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS History - Current Issues - Revised – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Southington Public Schools Curriculum
Current Issues

Unit 1 Overview	
Unit Title:	Your World, Your Voice: An Introduction to Current Issues, Global Citizenship, & Civic Responsibility
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	3 classes
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	This is the mandatory opening unit. It will ask students to consider what it means to be a global citizen and the importance of staying informed. Essentially, why study current issues? The semester's final three units are then chosen using arguments that students build in this unit's summative task.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Civ.1.9-12 Distinguish the powers and responsibilities of citizens, political parties, interest groups, and the media in a variety of governance systems.
- D2.Civ.5.9-12 Evaluate citizens' and institutions' effectiveness in addressing social and political problems at local, state, national, and/or global levels.
- D2.Civ.10.9-12 Analyze the impact and appropriate roles of citizens and institutions in effecting change in societal systems.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.1 Initiate and participate effectively in collaborative discussions.

Southington Public Schools Curriculum
Current Issues

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums while using the origin, authority, structure, context, and corroborative value to guide the selection of credible sources.
- Inq.3.b Organize and prioritize evidence directly and substantively from multiple sources in order to develop or strengthen claims (e.g., detect inconsistencies).
- Inq.4.a Construct arguments using precise and knowledgeable claims, with evidence from multiple sources, while acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, relevant examples, and pertinent details to contextualize evidence and arguments (e.g., chronology, causation, procedure).
- Inq.4.d Present arguments and explanations that feature evocative ideas and multiple perspectives about political issues and topics to reach a range of audiences and venues outside the classroom using print, oral, and digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems/issues using a multidisciplinary lens.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

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Current Issues

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	1. Studying current issues builds the knowledge and skills people need to participate effectively in a democratic society. 2. As global citizens, our choices and circumstances are connected to people and events beyond our local community. 3. Citizens share a responsibility to stay informed and to engage — in ways that fit their own voice and capacity — with issues affecting the common good. 4. Convincing arguments require evidence, clear claims, and honest engagement with other opinions.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	1. Why does studying current issues matter to us as individuals and as a society? 2. What does it mean to be a global citizen? 3. How are local and global issues connected? 4. What is our responsibility to society when it comes to being informed and engaged citizens?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Current Issue • Global Citizenship • Civic Responsibility • Civic Engagement • Interdependence • Informed Citizenry • Common Good • Stakeholder • Advocacy • Perspective	• Identify and articulate why an issue matters at a personal, community, and global level. • Connect a local issue to its broader, global counterpart. • Evaluate different forms of civic engagement and when each might be appropriate. • Construct a claim-evidence-based argument and deliver it persuasively to an audience. • Acknowledge and respond to alternative viewpoints respectfully.

Stage 2: Evidence of Student Learning

Performance Tasks

Southington Public Schools Curriculum
Current Issues

Assessment Evidence
What will the student produce? Use the GRASPS model below to design your performance task.

Goal
- Convince your classmates and teacher that a specific topic from the Current Issues Topic Bank deserves to be one of the three student-selected units this semester.

Role
- You are a Citizen Advocate / Class Delegate.

Audience
- Your classmates and teacher, who will use student arguments to help decide the semester's three student-choice units.

Situation
- The course only has room for three student-selected units. Build an evidence-based case for why your chosen topic matters right now, connecting it to global citizenship and civic responsibility, while acknowledging that other topics in the bank are also worthy contenders.

Product/Performance/Purpose
- A one-page argument brief, plus an educational flyer to persuade classmates and teachers to agree with your choice.

Standards and Criteria for Success, including VoG Alignment
- (Critical Thinking) States a clear claim about why the topic deserves to be studied this semester.
- (Critical Thinking) Uses at least 2 credible pieces of evidence (a fact, statistic, or current event tied to the topic).
- (Content Mastery) Explicitly connects the topic to global citizenship and/or civic responsibility concepts from Lessons 1–2.
- (Critical Thinking) Acknowledges at least one competing topic from the bank and explains why theirs is still compelling.
- (Creativity) Creates a visually appealing and interesting flyer that draws attention to the importance of the topic.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Canva Template: students should use Canva to design their flyers, specifically the “Educational Flyer” template
- Link to Document with Directions, Organizer, and Rubric

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to Document with Directions, Organizer, and Rubric

Southington Public Schools Curriculum
Current Issues

Comments Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.
• All freshmen in this course will also be taking Modern U.S. History. In that course, their first project/performance task is to write an “elevator pitch,” which is a CAST paragraph. This assignment can use the same template (for the one-page argument) and can build on what students will have been learning in the other course. You may want to check in with your students’ other teachers to see where they are and what students already know/do not know. • Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit is a single IDM inquiry arc that builds toward the semester ahead. Lesson 1 establishes why studying current issues matters; Lesson 2 widens the lens to global citizenship and interdependence; Lesson 3 turns to civic responsibility and culminates in the summative argument task. Distribute the Current Issues Topic Bank at the start of Lesson 1 so students can informally research candidate topics across the unit in preparation for their Lesson 3 argument and flyer. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis — pacing suggestions are noted in the Key Activities column of the lesson table.

Inquiry Arc: Why Current Issues, Why Us (Lessons 1–3)

Compelling Question	*Which current issue deserves to shape our learning this semester, and why?*		
Standards & Practices	D2.Civ.1.9-12; D2.Civ.5.9-12: Evaluate citizens' and institutions' effectiveness in addressing social and political problems at local, state, national, and/or global levels.		
Staging the Question	“Headline Gallery Walk” (~20 min): students circulate past 8–10 anonymized current-event headlines spanning a range of topics (drawn from the Topic Bank), jotting initial reactions and questions on sticky notes, then share out in a whole-class discussion before the inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	Why does studying current issues matter to us as individuals and as a society?	What does it mean to be a global citizen, and how are local and global	What is our responsibility to society when it comes to being informed and engaged

Southington Public Schools Curriculum
Current Issues

		issues connected?	citizens?
Formative Performance Task	(~45 min) Examine brief data on youth civic knowledge/engagement and a short reading on the value of an informed citizenry; write a “So What?” reflection paragraph on why current issues study matters personally and civically. Distribute the Topic Bank and preview the semester ahead.	(~50 min) Explore a global citizenship framework; complete a local-to-global connections graphic organizer linking a local issue to its global counterpart (e.g., a local food bank and global food security); reflection discussion.	(~35 min) Examine a spectrum of civic engagement options (voting, volunteering, advocacy, dialogue, service) Argument workshop: students finalize their one-page arguments using independent topic research gathered across the unit, then create visually appealing flyers.
Featured Sources	*Brief survey data on youth civic knowledge/engagement; short reading on the value of an informed citizenry; the Headline Gallery Walk set*	*Short global citizenship framework reading (e.g., adapted from UNESCO's Global Citizenship Education framework); brief case study connecting a local and global issue*	*Brief composite profiles of youth civic engagement across different forms of participation; the Current Issues Topic Bank*
Taking Informed Action (Optional)	**Understand:** Follow a credible news source covering your proposed topic for one week. **Assess:** Identify why the issue is — or isn't — getting the attention you think it deserves in the news you're following. **Act:** Share one current-event update related to your topic with the class to help kick off the semester's work, regardless of which topics are ultimately chosen.		

Lesson-by-Lesson Sequence

Note: Lesson 3 doubles as both the final content lesson and the summative task lesson; the argument workshop and flyers draw on independent research students conduct as homework across Lessons 1–2 using the Topic Bank distributed in Lesson 1. Be sure to hand out vocabulary list (without definitions) on day 1.

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Current Issues

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Why Current Issues?	I will understand why studying current issues matters to both myself and society. I will understand that I have a responsibility to my community at all levels.	I can read and analyze headlines I can work with my classmates to come up with ideas I can combine multiple opinions into one idea I can write an argument	A. Headline Gallery Walk staging (~20 min) B. Analyze civic-knowledge data and an informed-citizenry reading in small groups (~35 min) C. Write a "So What?" reflection paragraph (~15 min) D. Topic Bank distributed and previewed (~15 min)	"So What?" reflection paragraph explaining why current issues study matters personally and civically.	Current issue, informed citizenry
2	Global Citizenship	I will describe global citizenship and identify how local and global issues are interconnected. I will identify ways to responsibly engage with societal issues.	I can explain what a global citizen is I can compare local topics with global ones I can participate in a mini-discussion I can acknowledge other opinions respectfully	A. Warm-up review (~10 min); explore a global citizenship framework and a local–global case study in small groups (~40 min) B. Complete a local-to-global connections graphic organizer (~25 min) C. Reflection discussion about how people can get involved/have a say. (~13 min).	Completed local-to-global connections graphic organizer plus a short reflection on one connection students found surprising.	Global citizenship, interdependence, common good, stakeholder, civic responsibility, civic engagement, advocacy
3	Responsibility to Society + Summative	I will construct an argument for why an issue	I can write an argument using evidence	A. Quick Vocabulary Quiz (~10 min) B. Argument workshop using independent topic	GRASPS argument brief and flyer scored with	Perspective

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Current Issues

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		deserves our attention.	I can create a visually appealing flyer I can convince my teacher to choose my topic	research gathered across the unit (~50 min) C. Paper or digital gallery walk (~15 min) D. Taking Informed Action task assigned	unit rubric; Taking Informed Action follow-through.	

Southington Public Schools Curriculum
Current Issues

Unit 2 Overview	
Unit Title:	Decoding the Headlines: Media Literacy, Misinformation, & Bias
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	7 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	This unit examines the fundamentals of today's news and the dangers of fake news and media bias. Over the course of this unit, students will learn about what makes an event truly "newsworthy", the differences and dangers of misinformation and disinformation and how media bias can influence our views on the world and current events. Students will practice identifying the criteria of a news story, the tactics used to spread disinformation and how to spot media bias in the news. This unit is meant to support media literacy skills used across all disciplines and emphasize real life applications to students.

Stage 1: Desired Results

Grade Level/Subject Standard(s) List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address
College, Career, and Civic Life (C3) Framework for Social Studies State Standards: • D2.Civ.14.9-12 Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights. • D2.His.4.9-12 Analyze complex and interacting factors that influenced the perspectives of people during different eras and contexts. **Common Core State Standards:** • RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin. • RH.9-10.2 Determine the central ideas of a source and provide an accurate summary. • RH.9-10.4 Determine the meaning of domain-specific words and phrases. • RH.9-10.6 Analyze how an author's point of view or purpose shapes the content and style of a text. • RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims. • RH.9-10.9 Compare treatments of the same topic across multiple sources.

- WHST.9-10.1 Write arguments focused on discipline-specific content.
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.1 Initiate and participate effectively in collaborative discussions.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.b Explain how supporting questions contribute to an inquiry and how new questions emerge when engaging varied-perspective sources.
- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:

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Current Issues

Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:

Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal

Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	1. News is selected and shaped by human and algorithmic decisions about what counts as "newsworthy," and those decisions affect what the public knows and cares about. 2. Misinformation and disinformation both involve false or misleading content, but they differ in intent — and recognizing intent, where possible, changes how we should respond. 3. False and misleading content spreads through recognizable tactics (e.g., manipulated images, out-of-context claims, fabricated stories) that can be learned and detected. 4. All media contains some degree of bias, whether unintentional (word choice, story selection) or intentional (partisan framing); recognizing bias is different from dismissing a source entirely. 5. Becoming a savvy news consumer requires active habits — checking multiple sources, examining evidence, and questioning first reactions — not just good intentions.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: What Makes News, News?** 1. What criteria make an event "newsworthy"? 2. How has the definition of "news" changed in the digital and social media age? **Inquiry Arc 2: Misinformation & Disinformation Tactics** 1. Why does intent matter? 2. What are the common tactics used to create and spread false or misleading content? 3. Why do people believe and share false information, even when it's inaccurate? **Inquiry Arc 3: Media Bias** 1. What is bias, and how does it show up in media coverage? 2. How does partisan/political bias differ from other forms of bias, and how can we identify it? 3. How can we build habits to spot bias and seek out reliable, balanced information?

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What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Fake News • Misinformation • Disinformation • Satire/Parody • Misleading Content • Hoax/Fabricated Content • False Connections • Manipulated Material • Bias • Media Bias • Partisan (Political) Bias • Word Choice/Loaded Language • Omission • Selection of Sources	• Apply criteria to evaluate whether an event or claim is genuinely newsworthy. • Distinguish misinformation from disinformation and identify common tactics used to spread false content. • Identify specific indicators of media and partisan bias in a text. • Evaluate the credibility of a news source using multiple criteria. • Construct a practical, evidence-based media literacy resource for a real audience.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Create a practical resource that helps a specific audience tell the difference between reliable news, misinformation/disinformation, and biased coverage. **Role** • You are a team of News Literacy Coaches (3 people) working with a local news-literacy initiative. **Audience** • A middle-school social studies class. **Situation** • The initiative has noticed that people increasingly struggle to tell real news from fake, misleading, or heavily biased content, and has asked you to build a practical, evidence-based tool your audience can actually use. **Product/Performance/Purpose** • Choose one: a short tutorial video or a podcast episode. **Standards and Criteria for Success, including VoG Alignment** • (Content Mastery) Clearly explain at least 3 criteria of newsworthiness • (Critical Thinking) Accurately distinguish misinformation from disinformation, and explain at least 2 specific tactics used to spread false content • (Content Mastery) Identify at least 2 indicators of media/partisan bias

- (Content Mastery) Correctly apply at least 6 vocab terms from this unit
- (Critical Thinking) Use 2 credible examples or sources
- (Creativity & Collaboration) Work together to create a set of tips/guidelines for middle schoolers that they can actually use

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- If students choose to create a video, they can use CapCut or Canva. They can also use the media recording function directly on Canvas.
- If they choose to create a podcast, they can use the media recording function directly on Canvas, or do a screen recording with just audio on their computers.
- Link to Directions, Rubric, and Graphic Organizers

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to Directions, Rubric, and Graphic Organizers

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across three IDM inquiry arcs. Arc 1 establishes what makes something “news” in the first place and how that definition has shifted in the digital age. Arc 2 turns to misinformation and disinformation — the difference intent makes, the common tactics used to spread false content, and why people believe and share it anyway. Arc 3 turns the lens on media bias itself, teaching students to spot specific bias indicators and distinguish media bias from partisan bias, before culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table. Use illustrative, composite examples for misinformation/bias case studies rather than amplifying real viral hoaxes, and draw comparison examples from across the political spectrum so no single outlet or viewpoint is singled out.

Inquiry Arc 1: What Makes News, News?

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Compelling Question	What criteria determine whether something counts as real news?	
Standards & Practices	D2.Civ.14.9-12 — Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.	
Staging the Question	“Front Page or Not?”: students sort a mix of headlines and story blurbs into “definitely news,” “maybe news,” and “not news,” then discuss what criteria they used. The goal is not to reach a final answer yet.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What criteria make an event “newsworthy”?	How has the definition of “news” changed in the digital and social media age?
Formative Performance Task	Introduce classic newsworthiness criteria (timeliness, proximity, prominence, impact, human interest, conflict, novelty); apply them to a new set of headlines and complete a Newsworthiness Checklist.	Compare how people got news in the past (newspapers, network TV) vs. today (social media, algorithmic feeds, influencers); complete a “Then and Now” comparison chart.
Featured Sources	*Brief reading introducing standard news values/criteria; a mixed set of real and illustrative headlines for sorting*	*Brief reading introducing standard news values/criteria; a mixed set of real and illustrative headlines for sorting* *Brief reading on how social media algorithms curate and prioritize news content; a short history-of-news-media overview*

Inquiry Arc 2: Misinformation & Disinformation Tactics

Compelling Question	How do false and misleading information spread, and how can we recognize it?		
Standards & Practices	CCSS.ELA-LITERACY.RH.9-10.8 — Assess the extent to which the reasoning and evidence in a text support the author's claims.		
Staging the Question	“Can You Spot the Fake?”: students respond true/false to a few sample claims, then the answers are revealed and discussed to motivate the arc.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**

Supporting Questions	What is the difference between misinformation and disinformation, and why does intent matter?	What are the common tactics used to create and spread false or misleading content?	Why do people believe and share false information, even when it's inaccurate?
Formative Performance Task	Define misinformation vs. disinformation with intent as the key differentiator; classify short case scenarios and justify each classification with evidence of intent.	Station rotation / jigsaw covering five common tactics — satire/parody, misleading content, hoax/fabricated content, false connections, and manipulated material — using brief illustrative examples; complete a "Spot the Tactic" identification chart.	Explore why false content spreads (confirmation bias, emotional reactions, social proof, algorithmic amplification); analyze a short case study of content going viral; complete a personal media-habits reflection.
Featured Sources	*Brief reading distinguishing misinformation from disinformation, with illustrative examples*	*Brief, composite illustrative examples of each of the five tactics (not real viral hoaxes, to avoid amplifying them)*	*Brief reading on the psychology and mechanics of why misinformation spreads and goes viral*

Inquiry Arc 3: Media Bias - Shaping Our View of the World

Compelling Question	How does media bias shape the way we see the world, and what can we do about it?		
Standards & Practices	D2.His.4.9-12 — Analyze complex and interacting factors that influenced the perspectives of people during different eras and contexts. CCSS.ELA-LITERACY.WHST.9-10.1 — Write arguments focused on discipline-specific content.		
Staging the Question	Students compare two or three illustrative outlets' framing of the same event side by side and spot differences in headline, word choice, and emphasis before the inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**

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Supporting Questions	What is bias, and how does it show up in media coverage?	How does partisan/political bias differ from other forms of bias, and how can we identify it?	How can we build habits to spot bias and seek out reliable, balanced information?
Formative Performance Task	Introduce bias indicators — word choice/loaded language, omission, selection of sources — and distinguish general media bias from partisan/political bias; analyze sample excerpts using a "Bias Detective" checklist.	(Continued from Lesson 6, same supporting question): compare how the same story is covered by sources representing different points on the political spectrum, identifying specific bias indicators in each.	Build a personal "media diet" checklist (lateral reading, checking multiple sources, checking author/date/citations); apply it to the GRASPS resource.
Featured Sources	*Composite/illustrative excerpts demonstrating different bias indicators; a brief reading distinguishing media bias from partisan bias*	*Illustrative excerpts from sources representing different points on the political spectrum, covering the same event*	*Student-compiled notes and evidence from Lessons 1–6 for the GRASPS resource*
Taking Informed Action (Optional)	**Understand:** Track your own news consumption for 3–5 days — where you get news, which sources, and how often you check the origin or author. **Assess:** Evaluate your own media diet: Are your sources balanced? Do you fact-check before sharing? Identify one gap or habit you could improve. **Act:** Commit to and practice one specific new media-literacy habit (e.g., lateral reading, checking two sources before sharing, following a reputable fact-checking account) for the following week, and share your experience with the class.		

Lesson-by-Lesson Sequence

Note: Hand out vocabulary sheet (w/out definitions) to students on day 1

Common Sense Education's K–12 Digital Citizenship Curriculum lessons under "Information & Media Literacy"

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging + SQ1	I will apply criteria to determine whether an event is genuinely newsworthy.	I can sort headlines into different categories I can explain new vocabulary words I can complete a Newsworthiness checklist	A. “Front Page or Not?” staging: sort a mix of headlines/story blurbs into definitely news / maybe news / not news, and discuss criteria used (~25 min) B. introduce classic newsworthiness criteria (timeliness, proximity, prominence, impact, human interest, conflict, novelty) (~20 min) C. apply criteria to a new headline set and complete a Newsworthiness Checklist (~30 min) D. exit ticket (~13 min) Lesson	Completed Newsworthiness Checklist applying at least 3 criteria to a new set of headlines.	Fake News
2	Arc 1 · SQ2	I will understand how the digital and social media age has changed how news is selected and delivered.	I can participate in a class discussion I can compare old media with new media	A. Warm-up review (~10 min) B. compare how people got news in the past vs. today, including how social media algorithms curate feeds (~40 min) C. complete a “Then and Now” comparison chart (~25 min) D. discussion debrief (~13 min). Lesson	Completed “Then and Now” comparison chart identifying at least two ways algorithmic curation changes what news people see.	Selection of Sources

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
3	Arc 2 · Staging + SQ1	I will distinguish misinformation from disinformation based on intent.	I can explain new vocabulary words I can decode the text I can apply my new learning to real-life scenarios	A. “Can You Spot the Fake?” staging quiz on a few sample claims, revealed and discussed (~15 min) B. introduce misinformation vs. disinformation, focused on the role of intent (~20 min) C. classify short case scenarios and justify each classification with evidence of intent (~40 min) D. exit ticket (~13 min). Lesson Optional: Newsfeed Defenders Game on iCivics	Completed classification chart distinguishing misinformation from disinformation with justifications.	Misinform-ation, Disinform-ation
4	Arc 2 · SQ2	I will identify common tactics used to create and spread false or misleading content.	I can collaborate with my classmates I can define 5 media tactics I can apply my knowledge in “Spot the Tactic”	A. Station rotation / jigsaw covering five tactics — satire/parody, misleading content, hoax/fabricated content, false connections, and manipulated material — using brief illustrative examples (~55 min) B. complete a “Spot the Tactic” identification chart matching new examples to the correct category	Completed “Spot the Tactic” identification chart correctly matching examples to categories.	Satire/ Parody, Misleading Content, Hoax/ Fabricated Content, False Connections, Manipulat-ed Material

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				(~20 min) C. whole-class debrief (~13 min). Lesson		
5	Arc 2 · SQ3 + Arc 2 Checkpoint	I will understand why people believe and share false information, even when it's inaccurate.	I can track the spread of viral content I can reflect on my own media use	A. Explore psychological/social reasons false content spreads (confirmation bias, emotional reactions, social proof, algorithmic amplification) (~35 min) B. analyze a short case study of content going viral (~25 min) C. personal media-habits reflection (~15 min) D. Arc 2 Checkpoint: written response to the Arc 2 compelling question (~13 min). Lesson	Virality case-study notes plus Arc 2 Checkpoint response.	Bias
6	Arc 3 · Staging + SQ1 & SQ2	I will identify specific indicators of media bias and distinguish it from partisan/political bias.	I can compare different articles on the same topic I can identify when an article is biased	A. Hook: compare 2–3 illustrative outlets' framing of the same event and spot differences (~15 min) B. Introduce bias indicators (word choice/loaded language, omission, selection of sources) and distinguish general	Completed Bias Detective checklist identifying specific bias indicators in sample excerpts.	Media Bias, Partisan (Political) Bias, Word Choice/ Loaded Language, Omission

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can explain the difference between partisan bias and generic bias	media bias from partisan bias (~30 min) C. Analyze sample excerpts using a "Bias Detective" checklist (~30 min) D. Debrief (~13 min). Lesson		
7	Arc 3 · SQ3 + Summative	I will build personal habits for evaluating news and construct a practical media-literacy resource for a real audience.	I can set goals for myself based on what I've learned in this unit I can create an informative video/podcast for middle schoolers I can explain vocab terms from this unit.	A. Build a personal "media diet" checklist (lateral reading, checking multiple sources, checking author/date/citations) (~20 min) B. GRASPS workshop time (~45 min) C. share/present resources (~23 min) D. remaining work may extend to a following period. E. Taking Informed Action task assigned. Performance Task Docs	GRASPS media-literacy resource scored with the unit rubric; Taking Informed Action follow-through.	Applied use of full vocabulary list

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Unit Overview	
Unit Title:	AI and Creativity: What Counts as Art?
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	5 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	This unit will ask students to consider how AI systems work and how they affect artists. Specifically, students will study copyright law regarding AI generated works and come to conclusions about what rules should guide AI in the future. This unit is designed to encourage students to explore topics also covered in Computer Science, Art, and Business Law classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Civ.14.9-12 (adapted) Analyze emerging issues surrounding intellectual property and creative rights in a digital society.
- D2.Eco.1.9-12 Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups (e.g., creative industries).

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

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Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s):	• Definitions of “art” have always been contested and have shifted over time as new tools, techniques, and social movements challenged prior definitions.

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What are the big picture understandings that are transferable across contexts, places, and times?	• Generative AI tools produce creative output by learning patterns from vast datasets of existing human-made work, which raises new questions about originality, authorship, and consent. • Copyright and intellectual property law is still catching up to AI-generated content, creating real uncertainty for creators, companies, and courts. • The rise of AI creativity tools has economic and cultural consequences for working artists, and reasonable people disagree about how institutions and society should respond. • Deciding "what counts as art" is not only an aesthetic question — it is a values question with real stakes for creators, audiences, and institutions.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: Defining Art & Creativity in the Age of AI:** • What has historically counted as "art," and who decides? • How do AI systems actually generate creative works, and how does that compare to human creative processes? **Inquiry Arc 2: The Stakes of AI-Generated Creativity:** • Who owns AI-generated creative work, and what does current copyright law say? • How is AI creativity affecting working artists, authenticity, and the value we place on creative work? • What rules, norms, or policies should guide AI and creativity going forward?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Generative AI • Training Data • Prompt • Authorship • Intellectual property • Copyright • Originality • Authenticity • Creative economy • Artistic merit	• Analyze how criteria for judging art and creativity have shifted historically. • Explain, at a conceptual level, how generative AI tools produce creative output. • Interpret legal case summaries and apply them to new, unresolved questions. • Evaluate multiple stakeholder perspectives on a contested cultural and economic issue. • Construct an evidence-based written and oral argument that acknowledges counterclaims.

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Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence
What will the student produce? Use the GRASPS model below to design your performance task.

Goal
- Research and propose a clear, defensible policy for how a creative institution should treat AI-generated or AI-assisted work.

Role
- You are a Policy Advisor serving on a committee for a creative institution of your choice: an art museum/gallery, a school creative-writing or art contest, a music streaming platform, or a stock-image/art licensing marketplace.

Audience
- The institution's leadership board (teacher and/or guest evaluators role-playing board members).

Situation
- Your institution must decide whether, and how, to accept, label, exhibit, license, or award AI-generated or AI-assisted creative work. The board has asked you to research the debate and propose clear guidelines.

Product/Performance/Purpose
- A written policy recommendation (1–2 pages) and a visual (e.g., a one-page guidelines handout).

Standards and Criteria for Success, including VoG Alignment
- Clearly defines key terms (e.g., generative AI, authorship, originality) as used in the policy.
- Uses at least 4 pieces of credible, cited evidence representing more than one stakeholder perspective.
- Addresses ownership/copyright, authenticity, and economic considerations for artists.
- Evaluates trade-offs and directly addresses at least one counterargument.
- Guidelines are specific and feasible for the chosen institution to actually implement.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, rubric, and graphic organizers

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and graphic organizers

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Comments Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.
• Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across two IDM inquiry arcs. Arc 1 establishes what has historically counted as art and how generative AI actually works. Arc 2 turns to the stakes — ownership, authenticity, economic impact on artists, and the policies institutions should adopt — culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson below comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table.

Inquiry Arc 1: Defining Art & Creativity in the Age of AI (Lessons 1–2)

Compelling Question	When AI creates something, is it art?	
Standards & Practices	NCAS: Responding (adapted); D2.Civ.14.9-12 (adapted): Analyze emerging issues surrounding creative and intellectual property rights.	
Staging the Question	“Is This Art?” gallery walk (~20 min): students view brief descriptions/images of historically debated works — Duchamp's Fountain, an early photograph, a Rothko color-field painting, a Pollock drip painting, and an AI-generated image — and rate each on an “Is it art?” scale, then discuss what criteria they used.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What has historically counted as “art,” and who decides?	How do AI systems actually generate creative works, and how does that compare to human creative processes?
Formative Performance Task	(~50 min) Read a short overview of how definitions of art have shifted historically (e.g., photography's early rejection, Duchamp's readymades, Abstract Expressionism's reception); complete a “criteria for art” concept-formation chart; write a short paragraph defining art in their	(~55 min) View/read a short, accessible explainer on how generative AI models are trained on large datasets and produce new output from a prompt; complete a compare/contrast chart of the human vs. AI creative process; small-group discussion.

	own words.	
Featured Sources	*Brief readings/overviews on historical art controversies (early photography, Duchamp's readymades, Abstract Expressionism); the gallery-walk image set*	*Short, accessible explainer on generative AI models (e.g., how diffusion models and large language models are trained and generate output)*

Inquiry Arc 2: The Stakes of AI-Generated Creativity (Lessons 3–5)

Compelling Question	When AI creates something, who gets to decide how to use it?		
Standards & Practices	D2.Eco.1.9-12: Analyze how incentives influence choices among firms and individuals in creative industries; D2.Civ.14.9-12 (adapted).		
Staging the Question	Quick-write (~10 min): “If you type a prompt into an AI tool and get an image back, who made it — you, the AI, the company that built it, or no one?” Share out to preview Arc 2.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	Who owns AI-generated creative work, and what does current copyright law say?	How is AI creativity affecting working artists, authenticity, and the value we place on creative work?	What rules, norms, or policies should guide AI and creativity going forward?
Formative Performance Task	(~55 min) Analyze brief, paraphrased case summaries of real copyright disputes and rulings involving AI-generated work (e.g., U.S. Copyright Office guidance, Getty Images v. Stability AI, Authors Guild v. OpenAI); complete a case-brief organizer.	(~55 min) Jigsaw of stakeholder perspectives — working artists/writers concerned about displacement and consent, AI companies emphasizing accessibility and new tools, and audiences/consumers on authenticity preferences; each group summarizes a perspective;	(~30 min) Compare existing institutional approaches (contests banning AI art, galleries embracing it, platforms' AI-labeling policies) using a brief comparison chart. (~45–50 min) GRASPS workshop: students choose an institution track and draft their policy recommendation, then deliver pitches to the “board.”

		whole-class synthesis discussion of trade-offs.	
Featured Sources	*Paraphrased summaries of U.S. Copyright Office guidance on AI-generated works; paraphrased case summaries of at least one image-related and one text-related lawsuit*	*Brief, paraphrased perspective summaries from artist advocacy groups, AI companies, and consumer/audience survey data on attitudes toward AI-generated art*	*Brief comparison of real institutional AI-art policies (contests, galleries, streaming/licensing platforms)*
Taking Informed Action (Optional)	**Understand:** Look up your own school's, or a local arts organization's, current stance (if any) on AI-generated creative work. **Assess:** Evaluate whether that stance matches what you learned in this unit, and identify one gap or open question it doesn't address. **Act:** Write a short letter or email sharing your recommendation with that school or organization, or create a one-page "guide" for classmates on how to think about AI and creativity responsibly.		

Lesson-by-Lesson Sequence

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · SQ1	I will analyze how the criteria for "what counts as art" have shifted historically.	I can visually analyze pictures I can work with a group to create a list I can define what art is.	A. "Is This Art?" gallery-walk staging (~20 min) B. read historical art-controversy overview and complete a criteria-for-art concept chart in small groups (~50 min) C. closing synthesis and short definition	"Criteria for art" concept chart plus a short paragraph defining art in the student's own words.	Artistic merit

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				paragraph (~18 min) Lesson		
2	Arc 1 · SQ2	I will explain how generative AI systems produce creative work and compare that process to human creativity.	I can explain what generative AI is I can compare and contrast human creations with AI creations	A. Warm-up review (~10 min) B. view/read a generative-AI explainer and complete a human-vs-AI compare/contrast chart in pairs (~55 min) C. small-group discussion and debrief (~23 min) Lesson	Completed compare/contrast chart identifying at least two similarities and two differences between human and AI creative processes.	Gener-ative AI, training data, prompt
3	Arc 2 · SQ3	I will explain current legal uncertainty around ownership of AI-generated creative work.	I can closely read a copyright dispute I can make decisions about copyright law	A. Quick-write staging (~10 min) B. analyze paraphrased case summaries of AI copyright disputes/rulings in small groups (~55 min) C. case-brief organizer and whole-class debrief (~23 min) Lesson	Completed case-brief organizer summarizing at least two disputes/rulings and their implications for ownership.	Authorship, intellect-ual property, copy-right, origin-ality
4	Arc 2 · SQ4	I will evaluate how AI creativity affects working artists, authenticity, and the value	I can define key class vocabulary I can work with my peers to	A. Review of key terms (~10 min) B. jigsaw of artist, AI-company, and audience perspectives, each group summarizing	Jigsaw perspective notes plus a short written reflection on which trade-off the student	Authenti-city, creative econo-my

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		of creative work.	become an expert on a topic I can listen to my peers and take notes on what they share	one viewpoint (~50 min) C. whole-class synthesis discussion of trade-offs (~28 min) Lesson	finds most significant.	
5	Arc 2 · SQ5 + Summative	I will evaluate existing institutional AI-art policies and construct a defensible policy recommendation addressing the compelling question.	I can compare different AI policies I can develop my own AI policy recommendation I can make a visual guideline I can follow through on what I've learned in this unit.	A. Compare real institutional AI-art policies using a brief chart (~30 min) B. GRASPS workshop time to draft policy recommendations by chosen institution track (~30 min) C. pitches to the "board" (~25–28 min) D. Taking Informed Action task assigned.	Institutional-policy comparison chart; GRASPS policy recommendation and pitch scored with unit rubric; Taking Informed Action follow-through.	Applied use of full vocabulary list

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Unit Overview	
Unit Title:	Bridging the Gap: Income Inequality & Poverty in the United States
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	6 Lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	This unit asks students to consider if the American Dream is still within reach for everyone. First, students will study poverty and income inequality in the United States. Then, students will examine the policies and plans that work to bridge the gap. This unit is designed to encourage students to explore topics also covered in Introduction to Sociology and AP Human Geography.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Eco.1.9-12 Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups.
- D2.Eco.2.9-12 Use marginal benefit and marginal cost to construct an argument for or against a government policy.
- D2.Civ.10.9-12 Analyze the impact and appropriate roles of citizens and institutions in addressing local, state, and national problems.
- D2.His.16.9-12 (adapted) Integrate evidence from multiple relevant sources and interpretations into a reasoned argument.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.

- SL.9-10.1 Initiate and participate effectively in collaborative discussions.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:

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Students effectively communicate and use interpersonal skills in a range of formal and informal contexts. **Citizenship Transdisciplinary Goal** Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Income inequality and poverty result from a complex mix of economic systems, policy choices, and historical/structural forces — not individual effort alone. • Statistics and data visualizations can be used, selectively framed, or misread to tell different stories about the same social issue. • Public policy involves trade-offs; no single anti-poverty solution satisfies every value, stakeholder, or budget. • Individuals and communities can influence public policy through informed, evidence-based civic action.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: Diagnosing the Gap** • What is income inequality, and how do we measure it? • What does poverty look like in the United States, and how is it measured? • What structural and individual factors shape poverty and social mobility? **Inquiry Arc 2: Responding to the Gap** • What policies has the U.S. used to address poverty and inequality, and how effective have they been? • What are the competing perspectives on how to reduce income inequality and poverty?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material

• Income inequality • Poverty threshold • Gini coefficient • Wealth gap • Social mobility • Living/minimum wage • Social safety net • Redistribution • Structural poverty • Food desert	• Interpret and analyze quantitative economic data (tables, charts, maps). • Evaluate the credibility and perspective of a source. • Distinguish correlation from causation in economic claims. • Construct an evidence-based written and oral argument that acknowledges counterclaims. • Engage in civil, evidence-based discourse about a contested policy issue.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence
What will the student produce? Use the GRASPS model below to design your performance task.

Goal
- Design and pitch a realistic, evidence-based policy proposal that reduces income inequality or poverty in a specific U.S. community.

Role
- You are a Junior Policy Analyst for a bipartisan Congressional Task Force on Economic Opportunity.

Audience
- The Task Force panel (teacher and/or guest evaluators role-playing legislators).

Situation
- The Task Force must recommend policies to narrow the income gap. You will select a community/population, diagnose root causes, evaluate at least two existing policies, and design a feasible proposal that acknowledges opposing views.

Product/Performance/Purpose
- A 5-minute panel presentation (slideshow) with a data visual, addressing the compelling question directly.

Standards and Criteria for Success, including VoG Alignment
- Uses at least 4 pieces of credible, cited evidence/data.
- Correctly applies at least 4 unit vocabulary terms.
- Diagnoses at least two root causes — one structural, one circumstantial.
- Evaluates trade-offs and directly addresses at least one counterargument.
- Proposal is specific and feasible (cost, implementation, stakeholders).
- Presentation is organized, cites sources, and uses a data visual accurately.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

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- Link to directions, rubric, and graphic organizers
- Link to slideshow template

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and graphic organizers

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: The unit unfolds across two IDM inquiry arcs. Arc 1 helps students diagnose the causes and scope of income inequality and poverty; Arc 2 shifts to evaluating policy responses and competing perspectives, culminating in the GRASPS summative task and a Taking Informed Action extension.

Inquiry Arc 1: Diagnosing the Gap (Lessons 1–3)

Compelling Question	Is the American Dream still within reach for all?		
Standards & Practices	D2.Eco.1.9-12; D2.His.16.9-12 (adapted): Integrate evidence from multiple sources into a reasoned argument about a current issue.		
Staging the Question	“Where Do You Stand?” continuum activity: students physically position themselves along an agree–disagree line in response to statements such as “Anyone can become wealthy if they work hard enough,” then discuss in pairs before the inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What is income inequality, and how do we measure it?	What does poverty look like in the U.S., and how is it measured?	What structural and individual factors shape poverty and social mobility?
Formative Performance Task	Analyze income-quintile and Gini-coefficient data; write a paragraph	Jigsaw the official poverty threshold vs. the	Compare a social-mobility data map with a short structural-barriers reading;

	explaining the trend and one claim it supports.	Supplemental Poverty Measure; complete a guided household-budget simulation and comparison paragraph.	complete a T-chart and a mini constructed response.
Featured Sources	*U.S. Census Bureau income-distribution tables; short explainer on the Gini coefficient*	*Census poverty-threshold data; excerpt from a household-budget simulation tool*	*Social-mobility data visualization; brief reading on structural barriers (e.g., school-funding disparities)*

Inquiry Arc 2: Responding to the Gap (Lessons 4–6)

Compelling Question	How can we make the American Dream possible for all?		
Standards & Practices	D2.Eco.2.9-12; D2.Civ.10.9-12: Analyze the impact and appropriate roles of citizens and institutions in addressing local, state, and national problems.		
Staging the Question	Quick-write: “If you had $1 to spend on one anti-poverty policy, where would you put it and why?” Share out to preview the range of policy options students will investigate.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What policies has the U.S. used to address poverty and inequality, and how effective have they been?	What are the competing perspectives on how to reduce income inequality and poverty?	How can students construct and communicate an evidence-based response to the compelling question?
Formative Performance Task	Station rotation on minimum wage, EITC, SNAP, and progressive taxation; complete a goals/mechanism/evidence comparison chart.	Structured academic controversy using two brief opposing-viewpoint summaries; write a claim-evidence-reasoning paragraph.	Summative GRASPS policy brief and panel presentation (workshop, peer feedback, and delivery).
Featured Sources	*Nonpartisan policy-summary snapshots on minimum*	*Two brief, paraphrased opposing-viewpoint*	*Student-compiled evidence log from Lessons 1–5*

	wage, EITC, and SNAP effectiveness	*summaries (market-based vs. government-intervention approaches)*	
Taking Informed Action (Optional)	**Understand:** Research an actual anti-poverty policy proposal currently being debated in your state legislature or Congress. **Assess:** Evaluate who benefits and who bears the costs or trade-offs of that specific proposal. **Act:** Write a letter or email to a real or simulated elected official stating an evidence-based position, or design a public-awareness infographic for the school community.		

Lesson-by-Lesson Sequence

Note:

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · SQ1	I will explain what income inequality is and interpret data (e.g., the Gini coefficient) that measures it.	I can share my opinion with my classmates I can explain what a chart says	A. Staging: agree/disagree continuum on "anyone can get rich with hard work" B. analyze U.S. income-quintile charts and Gini trend line in small groups. Lesson	Written paragraph explaining what the data shows and one claim about the trend.	Income inequality, Gini coefficient, wealth gap
2	Arc 1 · SQ2	I will compare how poverty is defined and measured, and describe its lived reality.	I can work with a small group to understand topics I can share my ideas with the class I can balance a	A. Jigsaw: official poverty threshold vs. Supplemental Poverty Measure B. guided household-budget simulation. Lesson	Comparison paragraph on the two poverty measures plus budget-simulation reflection.	Poverty threshold, living wage, food desert

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			household budget			
3	Arc 1 · SQ3 (Arc 1 synthesis)	I will weigh structural and individual factors that shape poverty and social mobility.	I can explain some causes of poverty I can create a T-chart to represent my learning	A. Analyze a social-mobility data map alongside a short reading on structural barriers (e.g., school-funding disparities) B. complete a structural vs. individual T-chart C. revisit Lesson 1 continuum. Lesson	Mini constructed response: “To what extent is poverty a matter of individual choice vs. systemic factors?”	Social mobility, structural poverty
4	Arc 2 · SQ4	I will evaluate the goals and effectiveness of major U.S. anti-poverty policies.	I can explain major policies I can complete a graphic organizer I can compare and contrast different policies	A. Station rotation: minimum wage, EITC, SNAP, progressive taxation B. complete a goals/mechanism/evidence comparison chart. Lesson	Chart plus short written ranking of which policy seems most effective, with reasoning.	Social safety net, redistribu-tion
5	Arc 2 · SQ5	I will identify and evaluate competing perspectives on reducing inequality and poverty.	I can understand and explain different opinions I can share my opinion	A. Structured academic controversy / Socratic seminar using two brief opposing-viewpoint summaries (market-based vs.	Claim-evidence-reasoning paragraph identifying the more persuasive argument while	Review of all 10 terms

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			while being respectful to others	government-intervention approaches). Lesson	acknowledging the other side.	
6	Arcs 1+2 · Summative	I will construct and present an evidence-based policy proposal that addresses the compelling question.	I can demonstrate my learning on the vocab quiz I can develop a plan for a policy I can use feedback to make my work better	A. Vocabulary Quiz B. Workshop day: build GRASPS policy brief and presentation using evidence gathered in Lessons 1–5 C. structured peer feedback D. panel presentations E. Taking Informed Action task. Lesson	GRASPS policy brief + presentation scored with unit rubric; Taking Informed Action letter/infographic.	Applied use of full vocabulary list

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Unit Overview	
Unit Title:	Climate in Crisis: Understanding the Global Challenge of Climate Change
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	7 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will study the effects of climate change on our world. They will consider who is responsible, and how we can work together to respond to it. This unit is designed to encourage students to explore topics also covered in AP Human Geography and Environmental Science classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Civ.3.9-12 Analyze the impact of constitutions, laws, treaties, and international agreements on the maintenance of national and international order.
- D2.Civ.5.9-12 Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national, and/or international level.
- D2.Civ.13.9-12 Evaluate public policies in terms of intended and unintended outcomes, and related consequences.
- D2.Geo.5.9-12 Evaluate how political and economic decisions throughout time have influenced cultural and environmental characteristics of various places and regions.
- D2.Geo.9.9-12 Evaluate the influence of long-term climate variability on human migration and settlement patterns, resource use, and land uses at local-to-global scales.
- D2.His.14.9-12 Analyze multiple and complex causes and effects of events in the past.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.

- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a* Gather relevant information from multiple sources representing a wide range of views.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b* Construct explanations using sound reasoning, correct sequence, examples, and pertinent details, while acknowledging strengths and weaknesses given its purpose.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f* Apply a range of deliberative and democratic strategies and procedures to make decisions and take action in classroom, school, and out-of-school civic contexts.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

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Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Climate change is a global issue that crosses national borders and requires international cooperation, innovative solutions, and sustainable practices to mitigate its effects and adapt to its impacts. • Scientists use multiple lines of evidence, including proxy data, to understand both past and present climate change. • Climate change affects ecosystems and living things in ways that also affect the humans and communities who depend on them. • Responsibility for climate change and vulnerability to its effects are not evenly distributed across countries and communities. • International agreements and national policies have evolved over time, reflecting ongoing negotiation, disagreement, and incremental progress.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: Understanding Climate Change** • What is climate change, and how do scientists know it's happening? • How does climate change affect plants, animals, and the people who depend on them? **Inquiry Arc 2: Causes, Data, and Responsibility** • What does the data show about who is producing greenhouse gas emissions? • How does climate change affect different countries and communities differently, and who is best equipped to respond? **Inquiry Arc 3: Responding to Climate Change**

	• How have the U.S. and the international community responded to climate change over time? • What can individuals, communities, and nations do moving forward?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Climate change • Climate change deniers • Consensus • Continuity • Global warming • Proxy data • Greenhouse gases • Deforestation • Carbon dioxide • Industrialization • Fossil fuels • Net Zero • Adaptation • Mitigation • Renewable energy • Carbon Tax • Global North • Global South • Climate Justice • Kyoto Protocol • UN Framework Convention of Climate Change	• Analyze data, graphs, and proxy evidence to draw conclusions about climate change. • Use close reading strategies to interpret informational texts about climate science and policy. • Compare how climate change affects different places, communities, and living things. • Evaluate public policies and international agreements in terms of their intended and unintended consequences. • Construct evidence-based explanations and realistic recommendations, acknowledging strengths and weaknesses.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Create a scenario or plan that could realistically help limit global warming to well below 2°C — and ideally 1.5°C — by 2100. **Role** • You are a Climate Specialist, working alone or with a partner (offer this choice).

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Audience
- Policymakers and scientists.

Situation
- Climate change is one of the defining international issues of the era — it crosses national borders and has reshaped the priorities of the global community for decades. Protecting the planet and its inhabitants is urgent, but international progress can be slow and difficult.

Product/Performance/Purpose - choose Option A or B
- Option A (if the En-ROADS Climate Solutions Simulator is available): use En-ROADS to build a scenario, then complete either the short-form report (plan, political feasibility, winners/losers, surprises, hope, and personal action) or the long-form memo (detailed plan, a summary of how well it meets the 2°C/1.5°C goals, and a reflection).
- Option B (if En-ROADS is unavailable, or as a non-simulator alternative): using data and evidence gathered across the unit, design a climate action portfolio proposing specific mitigation and/or adaptation policies for a chosen country or region, addressing the same six questions — plan, feasibility, winners/losers, surprises/trade-offs, hope, and personal action.

Standards and Criteria for Success, including VoG Alignment
- Proposes specific mitigation and/or adaptation strategies with a rationale grounded in evidence from the unit.
- Considers political feasibility and identifies likely winners and losers of the plan.
- Addresses at least one surprising trade-off or unintended consequence.
- Reflects honestly on why this issue is difficult, while expressing realistic hope grounded in evidence.
- Identifies a specific, realistic personal action.
- (Option A only) Accurately reports the simulator's projected temperature outcome for the chosen scenario.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.
- Link to directions, rubric, and organizers for both options

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?
- Link to directions, rubric, and organizers for both options

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.
- This unit is supported by and was designed using the CHOICES handbook - seek it out to make your teaching stronger!

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across three IDM inquiry arcs. Arc 1 builds foundational understanding of what climate change is and how it affects living things. Arc 2 turns to data, emissions, and the question of responsibility across countries and communities. Arc 3 examines how the U.S. and the international community have responded over time, and what individuals and nations can still do — culminating in "The Climate Future" GRASPS task. Because classes meet in 88-minute blocks, each lesson comfortably holds an opening, a core task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table. Content and pacing are kept intentionally accessible for a 9th–10th grade Current Issues course — this is an introduction to the topic, not an in-depth science or policy deep-dive.

Materials note: this unit is built around the Choices Program's "Climate Change and Questions of Justice" student book and teacher resource book (hard copy). The GRASPS offers a choice between the En-ROADS Climate Solutions Simulator, confirmed still active as of mid-2026 at climateinteractive.org, and a non-simulator, data-based alternative — use whichever fits your classroom's tech access on a given day.

Inquiry Arc 1: Understanding Climate Change (Lessons 1–2)

Compelling Question	What is climate change, and how does it affect the living things — including us — who depend on a stable climate?	
Standards & Practices	D2.Geo.9.9-12 — Evaluate the influence of long-term climate variability on human migration and settlement patterns, resource use, and land uses at local-to-global scales. | D2.His.14.9-12 — Analyze multiple and complex causes and effects of events in the past.	
Staging the Question	Play the "What Is Climate Change?" video with structured pause points: students write and revise their own definitions of climate change and global warming, check understanding of proxy data with concrete examples, briefly note how the information makes them feel, and predict what it might mean for their community, country, and the world.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What is climate change, and how do scientists know it's happening?	How does climate change affect plants, animals, and the people who depend on them?

Formative Performance Task	Complete the staging video sequence; then analyze the "Freedom to Pollute" visual discovery image from the 2017 UN Climate Change Conference and discuss: is America doing enough?	Read Choices Student Book pp. 3–11 (Causes & Effects of Global Climate Change) with a graphic organizer; in small groups, read one of 7 Organism Profiles (pp. 10–23), complete the Effects of Climate Change graphic organizer (p. 24), and extend thinking to the impact on humans; discuss emerging themes.
Featured Sources	*"What Is Climate Change?" video lesson; "Is America Doing Enough?" visual discovery lesson*	*Choices Student Book pp. 3–24 and Teacher Resource Book graphic organizer/questions; "Postcards from Climate Change" video series*

Inquiry Arc 2: Causes, Data & Responsibility (Lessons 3–4)

Compelling Question	How do we determine who is most responsible for mitigating and adapting to the effects of climate change?	
Standards & Practices	D2.Geo.5.9-12 — Evaluate how political and economic decisions throughout time have influenced cultural and environmental characteristics of various places and regions. | D2.Civ.13.9-12 — Evaluate public policies in terms of intended and unintended outcomes, and related consequences.	
Staging the Question	Show a short CO_2 explainer video or explore the Carbon Map tool as an entry point into thinking about where emissions come from and who produces them.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What does the data show about who is producing greenhouse gas emissions?	How does climate change affect different countries and communities differently, and who is best equipped to respond?
Formative Performance Task	Complete Choices Teacher Resource Book data-analysis handouts (pp. 43–46); discuss which graphs are most helpful for determining responsibility and why, their merits and drawbacks, and what additional data would help; use the EPA Household Carbon	Read Choices Student Book pp. 12–27 (Responses to Climate Change) with a graphic organizer; jigsaw case studies of California, China, Colombia, Freiburg (Germany), New Orleans, Haiti, Nigeria, and Bangladesh (pp. 29–55), considering local

	Footprint Calculator and compare results to class data.	priorities, responsibility for emissions, effects of greatest concern, and capacity to respond; build a short Google Slides teach-back for classmates.
Featured Sources	*CO_2 explainer video or the Carbon Map tool; Choices Teacher Resource Book handouts pp. 43–46; EPA Household Carbon Footprint Calculator*	*Choices Student Book pp. 12–55 and Teacher Resource Book graphic organizer p. 51*
Arc Summative Check	Homework discussion/paragraph: Based on the case studies, which countries seem most responsible for climate change, and which seem least responsible while having the fewest resources to respond? What evidence supports your answer?	

Inquiry Arc 3: Responding to Climate Change (Lessons 5–7)

Compelling Question	How can the world come together to address the issue of climate change?	
Standards & Practices	D2.Civ.3.9-12 — Analyze the impact of constitutions, laws, treaties, and international agreements on the maintenance of national and international order. | D2.Civ.5.9-12 — Evaluate citizens' and institutions' effectiveness in addressing social and political problems at the local, state, tribal, national, and/or international level.	
Staging the Question	Briefly revisit the Arc 2 homework responses on responsibility before turning to how the U.S. and the world have actually tried to respond over time.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	How have the U.S. and the international community responded to climate change over time?	What can individuals, communities, and nations do moving forward?
Formative Performance Task	Examine “U.S. Response: Continuity & Change” and “How Do Americans View Climate Change?”; compare the Kyoto Protocol (1997) to the Paris Agreement (2021);	Review a brief “State of the World” overview (UNEP Annual Report, UNFCCC analysis of national climate plans); watch and discuss a segment of Greta Thunberg's UN address; choose

	complete a Mythbusters matching activity using UN Mythbusters content and create a bumper-sticker task contrasting myth and fact.	and prepare for Option A or B of the GRASPS task.
Featured Sources	*"U.S. Response: Continuity & Change" and "How Do Americans View Climate Change?" lessons; Kyoto Protocol and Paris Agreement overviews; UN Mythbusters*	*UNEP Annual Report summary; UNFCCC analysis of national climate plans; Greta Thunberg's UN Climate Action Summit address*
Taking Informed Action (Optional)	**Understand:** Use the EPA Household Carbon Footprint Calculator or a similar tool to identify a specific local or personal contributor to greenhouse gas emissions (e.g., transportation, energy use, food, waste). **Assess:** Evaluate which changes would have the greatest realistic impact for your own household or community, and what trade-offs or barriers exist. **Act:** Choose one: commit to and track a specific personal change for two weeks, create an awareness resource for family or friends, or write to a local representative about a specific climate policy.	

Lesson-by-Lesson Sequence

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging + SQ1	I will define climate change and explain how proxy data helps scientists understand it.	I can actively watch the video and write down central ideas while it plays I can define climate change and proxy data	A. Play "What Is Climate Change?" video with structured pause points: write and revise a definition of climate change/global warming; check understanding of paleoclimatologist and proxy data	Definitions of climate change/global warming plus visual discovery notes.	Climate Change, Global Warming, Proxy Data, Consen-sus

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can come up with predictions for our planet based on the video I can explain the steps America has taken to fight climate change	with examples (tree rings, ice cores); brief check-in on feelings after the data; write predictions for community/country/world (~55 min) B. “Is America Doing Enough?” visual discovery with a protest image from the 2017 UN Climate Change Conference (~33 min). Lesson 1: C…		
2	Arc 1 · SQ2	I will consider how climate change affects a variety of plants and animals in the US and the services they provide to people	I can explain the effects of climate change on living things I can work with a group to complete a graphic organizer and explain an organism profile I can write a well-written response on my own time	A. Close reading of Choices Student Book pp. 3–11 (Causes & Effects of Global Climate Change) with graphic organizer, assigned as homework or jigsaw (~30 min) B. small groups read one of 7 Organism Profiles (pp. 10–23), complete the Effects of Climate Change graphic organizer (p. 24), and extend thinking to human	Effects of Climate Change graphic organizer plus postcard-video written responses.	Green-house Gases, Deforest-ation, Carbon Dioxide (CO_2), Industrial-ization, Fossil Fuels

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				impact; share out (~45 min) C. discuss emerging themes (~13 min). HW: watch "Postcard from the Oregon Coast" plus one more from Postcards from Climate Change; write responses. Lesson 2: C…		
3	Arc 2 · Staging + SQ1	I will analyze data and graphs to consider who is responsible for greenhouse gas emissions. I will distinguish between mitigation and adaptation efforts to reduce harmful climate change effects.	I can actively watch a video to understand what Carbon Dioxide is I can use charts and graphs to come to conclusions I can find sources of emissions I can explain efforts used across the world to mitigate and adapt to the effects of climate change	A. Show a CO_2 explainer video or explore the Carbon Map tool (~15 min) B. complete Choices TRB handouts pp. 43–46 and discuss: which graphs are most helpful for determining responsibility, and why? What are the merits and drawbacks of each? What additional data would help? (~40 min) C. use the EPA Household Carbon Footprint Calculator, compare results to class data, and	Completed data-analysis handouts plus household carbon footprint comparison.	Net Zero, Adaptation, Mitigation, Renewable Energy, Carbon Tax

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				identify other emission sources (~33 min). Lesson 3: C…		
4	Arc 2 · SQ2	I will understand that areas of the world experience and respond to climate change differently	I can work with a group to study how countries respond to climate change I can create a resource that my classmates can use I can use case study evidence to reason about climate responsibility and capacity to respond.	A. Close reading of Choices Student Book pp. 12–27 (Responses to Climate Change) with graphic organizer p. 32 and study guide pp. 29–30, assigned as homework or jigsaw (~20 min) B. Case Studies Activity: jigsaw groups examine California, China, Colombia, Freiburg (Germany), New Orleans, Haiti, Nigeria, and Bangladesh (pp. 29–55), considering priorities, responsibility for emissions, effects of greatest concern, capacity to respond, and who is driving response efforts; complete graphic organizer p. 51 and build a short Google Slides	Case-study graphic organizer plus Google Slides teach-back; HW paragraph comparing responsibility vs. capacity to respond.	Global North, Global South, Climate Justice

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				teach-back for classmates (~68 min). Lesson 4: Cli…		
5	Arc 3 · Staging + SQ1	I will explain how the U.S. and the international community have responded to climate change over time.	I can explain how the US is responding to climate change I can differentiate between myth and fact when it comes to climate change I can compare and contrast different policies I can create a visual that reflects different perspectives	A. "U.S. Response: Continuity & Change" lesson and "How Do Americans View Climate Change?" (~30 min) B. compare the Kyoto Protocol (1997) and the Paris Agreement (2021) (~25 min) C. Mythbusters matching activity (UN Mythbusters titles/summaries) with a bumper-sticker task (~33 min). Lesson 5: C…	Kyoto vs. Paris comparison notes; Mythbusters bumper-sticker task.	Climate Change Deniers, Kyoto Protocol, UNFCCC
6	Arc 3 · SQ2	I will evaluate the current state of global climate action and identify realistic personal and collective responses.	I can explain real policies and climate plans I can explain how activism plays a role in climate response	A. "State of the World" overview: brief direct instruction on the UNEP Annual Report and UNFCCC's analysis of national climate plans ahead of COP28/COP-era	Speech-reflection notes; GRASPS option selected.	Review of full vocab-ulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can decide what project I will complete for my performance task	negotiations (~30 min) B. watch and discuss Greta Thunberg's UN speech (most important point, puzzling parts, a question to discuss, something interesting) (~25 min) C. preview the GRASPS task and choose Option A (En-ROADS) or Option B (~33 min). Lesson 6: C…		
7	Arc 3 · Summative (The Climate Future)	I will understand that addressing climate change is a multifaceted task.	I can demonstrate my knowledge of unit vocab I can break down charts, graphs, and maps to make them useful for my project	Vocabulary Quiz Day 1: review the task, pair students (or confirm solo), and build familiarity with En-ROADS or the Option B data set; homework: work on the plan. Day 2: up to ~30 min for questions; remaining time for Current Events of the Week or the next unit; product due.	"The Climate Future" report or memo scored with the unit rubric; Taking Informed Action follow-through.	Applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				Taking Informed Action assigned. Lesson 7: C…		

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Unit Overview	
Unit Title:	Displaced Dreams: Immigrants and Refugees
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	6 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will study the push and pull factors that cause people to leave home. They will consider what people lose, and what they are owed, when they're forced to leave home. Students will also examine the role of government when it comes to displacement. This unit is designed to encourage students to explore topics also covered in AP Human Geography, Introduction to Sociology, Asian Studies, International Relations, and Introduction to Human Rights classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Geo.7.9-12 Explain how changes in the physical environment can increase or diminish its capacity to support human activity.
- D2.His.16.9-12 Integrate evidence from multiple relevant historical sources and interpretations into a reasoned argument about the past.
- D2.Civ.10.9-12 Analyze the impact and appropriate roles of citizens in monitoring and influencing state, local, and national governments.
- D2.Civ.14.9-12 Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).

- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.1 Initiate and participate effectively in collaborative discussions.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.b Explain how supporting questions contribute to an inquiry and how new questions emerge when engaging varied-perspective sources.
- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

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Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Human migration is driven by a complex mix of economic, political, environmental, and social push and pull factors, and it has shaped societies throughout history. • The legal and social distinctions among migrant, immigrant, refugee, and asylum seeker carry real consequences for the rights and protections a person receives. • Nations continually balance humanitarian obligation, national security, economic interest, and cultural concern when they craft immigration and refugee policy. • Informed, engaged citizens can influence how their communities and government respond to displacement and immigration.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: Why do people leave everything behind?** • What is the difference between a migrant, an immigrant, a refugee, and an asylum seeker? • What forces push people from their homes and pull them toward new ones? **Inquiry Arc 2: What does a nation owe the people who arrive at its door?** • How has U.S. immigration and refugee policy changed over time? • What are the different perspectives on immigration and refugee policy today?

What will students <u>know...</u>	**What will students <u>be able to do…</u>**

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Factual information, vocabulary and basic concepts related to each standard/goal	Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Migrant • Immigrant • Refugee • Asylum Seeker • Internally Displaced Person (IDP) • Push Factor • Pull Factor • Xenophobia • Naturalization • Nonrefoulement	• Analyze primary and secondary sources for point of view, purpose, and reliability. • Construct evidence-based arguments that acknowledge competing viewpoints. • Distinguish fact, opinion, and reasoned claim in media coverage of a contested issue. • Collaborate to design a civically responsible, feasible policy recommendation. • Communicate findings clearly in written and oral/multimedia form.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Help your community make an informed decision about how to respond to a current local, state, or national immigration or refugee issue by presenting a well-researched, evidence-based recommendation. **Role** • You are a policy research team working for the Bridges Coalition, a nonpartisan civic organization hired to brief local decision-makers on a pressing displacement or immigration issue. **Audience** • A panel of local decision-makers (simulated in class as a school board, town council, or state representative's staff) and the wider school community attending a mock public forum. **Situation** • Your town or district has been asked to consider a real proposal — for example, whether to expand ESL and newcomer services in local schools, whether to support a refugee resettlement agency, or how to respond to a current immigration policy change — and the council has requested recommendations grounded in evidence rather than opinion alone. **Product/Performance/Purpose**

- A one- to two-page policy brief and a five- to seven-minute multimedia presentation (slides, infographic, or short video) delivered at a mock public forum.

Standards and Criteria for Success, including VoG Alignment

- Directly addresses the unit's compelling question.
- Uses specific claims supported by evidence from at least 4 featured sources across both inquiry arcs.
- Accurately defines and applies at least 4 unit vocabulary terms.
- Acknowledges at least one competing perspective.
- Ends with a concrete, feasible recommendation and a specific civic action.
- Maintains a respectful, evidence-based civic tone throughout.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, organizers, and rubric

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to directions, organizers, and rubric

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across two IDM inquiry arcs, each with its own compelling question feeding the unit's overarching compelling question. Arc 1 asks why people leave everything behind, grounding students in the legal distinctions among migrant, immigrant, refugee, and asylum seeker and the push/pull factors behind displacement. Arc 2 asks what a nation owes the people who arrive at its door, tracing the history of U.S. immigration and refugee policy and the range of stakeholder perspectives in today's debates — culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table.

Inquiry Arc 1: Why Do People Leave Everything Behind?

Compelling	Why do people leave everything behind?

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Question		
Standards & Practices	D2.Geo.7.9-12 — Explain how changes in the physical environment can increase or diminish its capacity to support human activity. | D2.His.16.9-12 — Integrate evidence from multiple relevant historical sources and interpretations into a reasoned argument about the past.	
Staging the Question	Students view a set of unlabeled images and data points (a burned field, a packed suitcase, a UNHCR displacement statistic, a flooded coastline) and predict what connects them. Class discusses: what would have to be true for you to leave your home with only what you could carry?	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What is the difference between a migrant, an immigrant, a refugee, and an asylum seeker?	What forces push people from their homes and pull them toward new ones?
Formative Performance Task	Sort five real-world case snippets into the correct legal category using a definitions chart, then justify one classification in a written paragraph citing the source language.	Analyze three short case studies (armed conflict, gang and economic violence, climate-driven displacement) and complete a push/pull factor T-chart; write a paragraph comparing the causes.
Featured Sources	*UNHCR glossary of key population terms; USCIS definitions page; one brief refugee profile (e.g., UNHCR or International Rescue Committee storytelling archive)*	*UNHCR Global Trends report excerpt/infographic; news coverage of Central American migration; case study of a climate-displaced community (e.g., Kiribati or coastal Bangladesh)*
Arc Summative Check	Constructed-response paragraph addressing the Arc 1 compelling question with evidence from at least two featured sources, submitted as an entry ticket to Lesson 4. (Lesson 3 builds toward this: students view/read a first-person narrative, complete an annotation or diary-entry writing workshop, and discuss how the narrative connects back to push/pull factors before writing the summative response for homework.)	

Inquiry Arc 2: What Does a Nation Owe the People Who Arrive at Its Door?

Compelling Question	What does a nation owe the people who arrive at its door?
Standards &	D2.Civ.10.9-12 — Analyze the impact and appropriate roles of citizens

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Practices	in monitoring and influencing government. | D2.Civ.14.9-12 — Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.	
Staging the Question	Students read the closing lines of Emma Lazarus's 'The New Colossus' alongside a current headline about immigration or refugee policy and respond in writing: Does the promise on the Statue of Liberty still hold? Whole-class share-out surfaces initial positions to revisit at the unit's end.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	How has U.S. immigration and refugee policy changed over time?	What are the different perspectives on immigration and refugee policy today?
Formative Performance Task	Build an annotated timeline of key U.S. immigration laws and events (1882 Chinese Exclusion Act, 1924 National Origins Act, 1965 Immigration and Nationality Act, 1980 Refugee Act, 2012 DACA) and identify one turning point, explaining why it mattered.	Participate in a structured academic discussion in which each student represents a stakeholder (border-state official, resettlement caseworker, small-business owner, long-time resident, asylum seeker) built from real quotes; complete a perspectives matrix noting each stakeholder's interests and concerns.
Featured Sources	*Migration Policy Institute historical overview; brief excerpts/summaries of the listed legislation; a timeline infographic*	*Two to three op-eds representing differing viewpoints; Pew Research Center polling data on immigration attitudes; local news coverage of a resettlement debate*
Arc Summative Check	Perspectives matrix and civic-action options chart, checked for completeness and used as prewriting for the Unit Performance Task. (Lesson 6 builds toward this: students research realistic avenues for civic action using assigned sources, complete a civic-action options chart, and then launch the GRASPS performance task, forming teams and beginning work time that continues across subsequent class periods.)	
Taking Informed Action (Optional)	**Understand:** Research how displacement and immigration affect your own state or community — local resettlement numbers, the school's newcomer/ESL population, and recent local news coverage.	

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	Assess: Evaluate the effectiveness and gaps in current local and national responses: What resources exist? Where is there controversy or unmet need? **Act:** Choose an authentic action connected to the unit's findings: write a letter to a policymaker or newspaper editor, organize a school welcome or donation drive for newcomer families, create a public-awareness campaign, or present the team's recommendations at the mock public forum described in the GRASPS task.

Lesson-by-Lesson Sequence

Note: A supplemental lesson on Immigration & Customs Enforcement can be found here

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging + SQ1	I will understand how displacement impacts lives.	I can explain charts and graphs about immigration I can define and distinguish among migrant, immigrant, refugee, and asylum seeker using precise legal and social criteria I can work with my peers to sort different cases	A. Staging activity with unlabeled images/data (~10 min) B. mini-lecture and vocabulary introduction, Terms 1–5 (~10 min) C. small-group sorting task with case snippets (~20 min) D. written justification and exit ticket (~10 min). Lesson	Case-snippet sorting task with a written justification for one classification, citing source language.	Migrant, Immigrant, Refugee, Asylum Seeker, IDP
2	Arc 1 · SQ2	I will compare the push and pull factors behind three different displaceme	I can collaborate with my small group to master a topic I can identify the push and pull factors in	A. Warm-up review of Lesson 1 vocabulary (~5 min) B. jigsaw reading of three case studies in expert groups (~20 min)	Push/pull factor T-chart plus a comparison paragraph analyzing the three case studies' causes.	Push Factor, Pull Factor

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		nt scenarios.	displacement scenarios I can listen to others and take notes on main ideas they share I can articulate the similarities and differences between 3 scenarios	C. T-chart construction and group share-out (~15 min) D. comparison paragraph, begun in class and finished for homework (~10 min). Lesson		
3	Arc 1 · SQ3 + Arc 1 Summative Check	I will synthesize immigrant stories to understand the impact of displacement.	I can listen to and identify central ideas of a personal immigrant experience I can use evidence from a personal narrative to construct an initial claim.	A. View/read first-person narrative (~15 min) B. annotation or diary-entry writing workshop (~20 min) C. whole-class discussion connecting narratives back to push/pull factors (~10 min) D. Arc 1 summative constructed response, completed for homework. Lesson	Arc 1 constructed-response paragraph addressing the compelling question with evidence from at least two featured sources, submitted as an entry ticket to Lesson 4.	Reinforcement of Arc 1 terms
4	Arc 2 · Staging + SQ1	I will understand how the nation's approach to immigratio	I can collaborate with my partner to order events I can understand	A. Staging activity: 'The New Colossus' vs. current headline, quick-write and share-out (~10 min)	Annotated timeline of key U.S. immigration laws and events, with a written	Xenophobia, Naturalization, Nonrefoulement

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		n has shifted over time.	perspectives from different historical contexts I can analyze why a specific immigration law mattered	B. vocabulary check, Terms 6–10 (~10 min) C. timeline-building activity in pairs using source excerpts (~20 min) D. whole-class synthesis discussion on turning points (~10 min). Lesson	explanation of one turning point's significance.	
5	Arc 2 · SQ2	I will understand and evaluate 5 stakeholder perspectives on immigration.	I can support an opinion with evidence I can listen for information and respond respectfully	A. Assign and review stakeholder role cards (~10 min) B. structured academic discussion / fishbowl (~25 min) C. perspectives matrix completed individually (~15 min). Lesson	Perspectives matrix noting each stakeholder's interests and concerns, scored with the structured academic discussion rubric.	Review of full vocabulary list
6	Arc 2 · SQ3 + Summative Task Launch	I will analyze real avenues for civic action on immigration and refugee issues.	I can demonstrate my knowledge of unit vocab I can work with my group to draft a policy I can generate realistic options for civic action on immigration	A. Vocabulary Quiz B. Civic-action research using assigned sources (~15 min) C. civic-action options chart (~10 min) D. GRASPS performance task introduced, teams formed, and work time begins (~25 min); remaining	Civic-action options chart and perspectives matrix, used as prewriting for the GRASPS policy brief and presentation.	Applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
				performance-task work and the mock public forum are scheduled across subsequent class periods. Lesson		

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Unit Overview	
Unit Title:	Hot Spots: Navigating Political Issues of the 21st Century
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	7 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will study the major political conflicts going on at the time. They will examine areas where there have been ongoing issues, and consider why political conflicts elsewhere matter to those here in the United States. This unit is designed to encourage students to explore topics also covered in International Relations, AP Human Geography, World Religions, America at War, Asian Studies, and Human Rights classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Geo.7.9-12 (adapted) Explain how political, economic, cultural, and environmental factors contribute to conflict and cooperation among groups and countries.
- D2.Geo.4.9-12 Analyze relationships and interactions among human population, natural resources, and the physical environment.
- D2.Civ.12.9-12 (adapted) Analyze the role of international agreements, alliances, and organizations in maintaining or disrupting global order.
- D2.Eco.15.9-12 (adapted) Evaluate the local, national, and global economic impact of foreign events and policies.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).

- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:

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Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal

Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Geopolitical instability rarely has a single cause; it typically results from an interaction of political, economic, social, historical, and external factors. • Regions in conflict are connected to the rest of the world through trade, alliances, resources, and migration, so instability in one place can ripple outward. • Comparing multiple case studies side by side reveals recurring patterns as well as important differences in how and why instability develops. • Events in distant “hot spots” can affect everyday life in the United States — through prices, supply chains, security, and communities — even when the connection isn't obvious at first. • Understanding a conflict's causes and stakes is a necessary first step before forming a reasoned opinion about how the U.S. or international community should respond.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Unit Compelling Question:** • Why should we care about conflicts happening halfway around the world? **Inquiry Arc 1: Understanding Geopolitical (In)Stability:** • What causes geopolitical instability, and how can we recognize it? • How are today's hot spots connected to broader global systems? **Inquiry Arc 2: Case Studies in Global Hot Spots:** • What is driving instability in Russia/Ukraine and China's regional tensions, and what are the ripple effects? • What is driving instability in the Middle East and Venezuela, and what are the ripple effects? • What is driving instability in Africa's current hot spots, and what patterns recur across all the regions studied? **Inquiry Arc 3: Why it Matters to US:** • How do events in global hot spots affect communities here at home?

	• What should the U.S. or international community do in response to a specific hot spot, and how do we communicate that recommendation effectively?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Geopolitical instability • Sovereignty • Sanctions • Proxy Conflict • Authoritarianism • Displacement • Sphere of influence • Coup d'etat • Global supply chain • Diaspora	• Apply a consistent analytical framework to explain the causes of instability in a specific region. • Compare multiple case studies to identify recurring patterns and key differences. • Trace a concrete connection between a global event and a local or U.S. impact. • Evaluate the credibility and balance of sources covering a contested international issue. • Construct and deliver an evidence-based briefing that includes a specific, feasible recommendation.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Prepare a briefing that explains a specific global hot spot, analyzes why it's unstable, and recommends how the U.S. should respond — including why Americans should care. **Role** • You are a Regional Analyst / Briefing Officer for the U.S. National Security Council. **Audience** • A panel representing NSC policymakers (teacher and/or guest evaluators). **Situation** • The NSC needs an up-to-date briefing on one hot spot (chosen from Russia/Ukraine, China/Taiwan, the Middle East, Venezuela, or an African case) to inform a policy decision. Your briefing must explain root causes using the Instability Framework, connect the crisis to a concrete impact on American communities, and recommend a response while weighing its risks and benefits. **Product/Performance/Purpose**

- A written briefing memo (1–2 pages) with a map or visual.

Standards and Criteria for Success, including VoG Alignment

- Applies at least 3 factors from the Instability Framework to explain the hot spot's causes.
- Uses at least 4 credible, cited sources.
- Explicitly connects the hot spot to a concrete impact on American communities (economic, security, migration, or otherwise).
- Offers a specific, feasible recommendation and acknowledges at least one risk or counterargument to it.
- Briefing is organized, cites sources, and uses a visual (e.g., a map) accurately.

Resources

Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, rubric, and organizer.

Evaluative Criteria

How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and organizer.

Comments

Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across three IDM inquiry arcs. Arc 1 builds a shared analytical framework for understanding instability and global interconnection. Arc 2 applies that framework across five real-world case studies — Russia/Ukraine, China, the Middle East, Venezuela, and Africa — using a station-rotation/jigsaw approach so the class can cover meaningful breadth within three lessons. Arc 3 turns the lens back home, asking how these hot spots affect American communities, and culminates in the GRASPS summative briefing. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table. Given the sensitivity of these topics, present each case study through balanced, factual overviews from reputable, nonpartisan sources (e.g., established news explainers, nonpartisan foreign-policy backgrounders) and make space for students to encounter more than one perspective on contested questions.

Inquiry Arc 1: Understanding Geopolitical (In)Stability (Lessons 1–2)

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Unit Compelling Question	Why should we care about conflicts happening halfway around the world?	
Standards & Practices	D2.Geo.7.9-12 (adapted); D2.Geo.4.9-12: Analyze relationships and interactions among human population, natural resources, and the environment.	
Staging the Question	"Where in the World?" map activity (~20 min): students view an unlabeled world map with 5–6 current hot spots marked and discuss, in pairs, what they already know or have heard about each location before the inquiry begins.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	What causes geopolitical instability, and how can we recognize it?	How are today's hot spots connected to broader global systems?
Formative Performance Task	(~55 min) Introduce the Instability Framework (political, economic, social, historical, external factors); apply it to one worked example (e.g., a simplified historical case) in small groups; complete a framework graphic organizer.	(~55 min) Explore how trade, alliances, resources, and migration connect regions (e.g., Ukrainian grain exports and global food prices; Taiwan's role in semiconductor production); complete a "ripple effects" concept map.
Featured Sources	*Brief explainer introducing categories of geopolitical instability; a short worked case example*	*Brief reading/infographic on global economic interdependence (trade routes, resource dependencies, supply chains)*

Inquiry Arc 2: Case Studies in Global Hot Spots (Lessons 3–5)

Unit Compelling Question	Why should we care about conflicts happening halfway around the world?		
Standards & Practices	D2.Civ.12.9-12 (adapted): Analyze the role of international agreements, alliances, and organizations in maintaining or disrupting global order.		
Staging the Question	Quick review (~10 min) of the Instability Framework from Lesson 2 before rotating into the unit's first case-study stations.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**

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Supporting Questions	What is driving instability in Russia/Ukraine and China's regional tensions, and what are the ripple effects?	What is driving instability in the Middle East and Venezuela, and what are the ripple effects?	What is driving instability in Africa's current hot spots, and what patterns recur across all the regions studied?
Formative Performance Task	(~75 min) Station rotation: small groups apply the Instability Framework to brief case materials on the Russia-Ukraine war and on China-Taiwan/South China Sea tensions; complete a comparison chart for each.	(~75 min) Station rotation: small groups apply the framework to brief case materials on Middle East regional instability (covering multiple flashpoints) and on Venezuela's political/economic crisis and migration; complete a comparison chart for each.	(~50 min) Station rotation on African case studies (e.g., Sahel coups, Sudan's civil war, conflict minerals in the DRC). (~25 min) Whole-class synthesis: gallery walk comparing all five case studies' completed frameworks to identify recurring patterns and key differences.
Featured Sources	*Brief, paraphrased nonpartisan overviews of the Russia-Ukraine war's causes and course, and of China-Taiwan/South China Sea tensions*	*Brief, paraphrased nonpartisan regional overview of Middle East instability (multiple flashpoints); brief overview of Venezuela's economic collapse and migration crisis*	*Brief, paraphrased nonpartisan overviews of recent African instability (Sahel coups, Sudan's civil war, DRC conflict minerals)*
	The Council of Foreign Relations has resources that could benefit this inquiry arc. This includes their Global Conflict Tracker, Causes and Costs of Conflict Lesson Plan, and the Tracking Global Conflict Activity.		

Inquiry Arc 3: Why It Matters to Us (Lessons 6–7)

Unit Compelling Question	Why should we care about conflicts happening halfway around the world?
Standards &	D2.Eco.15.9-12 (adapted): Evaluate the local, national, and global

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Practices	economic impact of foreign events and policies.	
Staging the Question	Quick-write (~10 min): “Name one thing you own, eat, or use that might be connected to a country experiencing conflict right now.” Share out to preview Arc 3.	
	Supporting Q1	**Supporting Q2**
Supporting Questions	How do events in global hot spots affect communities here at home?	What should the U.S. or international community do in response to a specific hot spot, and how do we communicate that recommendation effectively?
Formative Performance Task	(~65 min) Examine concrete local/U.S. connections — energy and gas prices, semiconductor supply chains, refugee resettlement, defense spending, diaspora communities; complete a “So Far Away, So Close” concept map linking a chosen hot spot to a specific U.S. impact.	(~88 min) GRASPS workshop: students choose a hot spot and draft their briefing memo using evidence gathered across the unit; structured peer feedback; deliver oral briefings to the panel; Taking Informed Action task assigned.
Featured Sources	*Brief news summaries/data on economic and social impacts (energy markets, supply-chain data, refugee resettlement statistics, diaspora community profiles)*	*Student-compiled Instability Framework organizers and case-study notes from Lessons 1–6*
Taking Informed Action (Optional)	**Understand:** Follow reputable coverage of your chosen hot spot for one week. **Assess:** Identify one specific way that hot spot is already affecting the U.S. or your local community. **Act:** Write a letter to a member of Congress, create a public-awareness resource for the school community, or contribute to a class “World in Brief” bulletin board that continues throughout the semester.	

Lesson-by-Lesson Sequence

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · SQ1	I will understand the causes of	I can locate different countries	A. “Where in the World?” map staging (~20 min)	Completed framework graphic	Geopolitical instability, sovereignty

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		geopolitical instability.	and conflicts on a map I can explain some causes of geopolitical instability I can apply the instability framework to a real-life example I can collaborate with my peers and listen to their perspectives	B. introduce the Instability Framework and apply it to a worked example in small groups (~55 min) C. closing debrief (~13 min). Lesson 1: Hot…	organizer for the worked example.	
2	Arc 1 · SQ2	I will understand how instability in one place can ripple outward due global interdependence.	I can identify central ideas in the text about global interdependence I can explain how global trade, alliances, resources, and migration connect regions to one another	A. Warm-up review (~10 min) B. explore global interdependence readings/infographics in small groups (~55 min) C. complete a “ripple effects” concept map and debrief (~23 min). Lesson 2: Hot…	Completed “ripple effects” concept map showing at least two global interconnections.	Global supply chain, sphere of influence

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can create a concept map to show how the world is connected			
3	Arc 2 · SQ3	I will apply the Instability Framework to explain tensions in Russia/Ukraine and China's regional disputes.	I can collaborate to identify central ideas from the text at each station I can compare and contrast the instability framework on Russia/Ukraine and China/Taiwan conflicts I can use new vocabulary terms to support my conclusion	A. Framework review (~10 min) B. station rotation applying the framework to Russia-Ukraine and China-Taiwan case materials (~65 min) C. comparison chart and debrief (~13 min). Lesson 3: Hot…	Comparison chart applying the Instability Framework to both case studies.	Proxy conflict, authoritarian-ism
4	Arc 2 · SQ4	I will apply the Instability Framework to explain instability in the Middle East and Venezuela.	I can collaborate to identify central ideas from the text at each station I can compare	A. Quick review (~8 min) B. station rotation applying the framework to Middle East and Venezuela case materials (~65 min)	Comparison chart applying the Instability Framework to both case studies.	Sanctions, displacement

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			and contrast the instability framework on Middle Eastern and Venezuelan conflicts I can use new vocabulary terms to support my conclusion I can compare the role of the United States in each case	C. comparison chart and debrief (~15 min). Lesson 4: Hot…		
5	Arc 2 · SQ5 (Arc 2 synthesis)	I will apply the Instability Framework to Africa's current hot spots. I will synthesize patterns across all five case studies we've learned about over the past few classes.	I can collaborate to identify central ideas from the text at each station I can compare and contrast the instability framework on African conflicts. I can write a paragraph that identifies	A. Station rotation on African case studies (~50 min) B. whole-class gallery-walk synthesis comparing all five case studies' frameworks (~25 min) C. synthesis discussion (~13 min). Lesson 5: Hot…	Comparison chart for the African case studies plus a short synthesis paragraph on recurring patterns across regions.	Coup d'état, diaspora

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			one pattern that appears in multiple regions, as well as a major difference between regions, using specific evidence.			
6	Arc 3 · SQ6	I will trace a concrete connection between a global hot spot and an impact on American communities.	I can use real current locally relevant data to make connections I can create a concept map to visualize my ideas	A. Quick-write staging (~10 min) B. examine local/U.S. connections (energy, supply chains, refugee resettlement, diaspora) in small groups (~55 min) C. complete “So Far Away, So Close” concept map and debrief (~23 min). Lesson 6: Hot…	Completed “So Far Away, So Close” concept map linking a chosen hot spot to a specific U.S. impact.	Review of all 10 terms
7	Arc 3 · SQ7 + Summative	I will synthesize evidence into a formal briefing regarding a global hot spot.	I can demonstrate my knowledge of unit vocab I can use evidence (4+ sources) to support my ideas	A. Vocabulary Quiz B. GRASPS workshop time to draft briefing memos using evidence from Lessons 1–6 (~35 min) C. structured peer feedback (~13 min)	GRASPS briefing memo and oral briefing scored with unit rubric; Taking Informed Action follow-through.	Applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can present my ideas professionally and clearly	D. oral briefings to the panel (~35–40 min); E. Taking Informed Action task assigned. Lesson 7: Hot…		

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Unit Overview	
Unit Title:	Mind Matters: Mental Health & Social Media
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	8 Lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will study the impact of social media and digital life on youth mental health. They will consider how the online world affects them and their peers, and evaluate plans and policies that try to manage this effect. This unit is designed to encourage students to explore topics also covered in Introduction to Psychology, AP Psychology, Introduction to Sociology, and American Culture classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Psy.2.9-12 Investigate the potential effects of individual and cultural differences on social interactions.
- D2.Psy.4.9-12 Analyze the effects of a range of factors on individual and collective behavior.
- D2.Psy.5.9-12 Investigate how social and cultural factors influence the development of self and identity.
- D2.Psy.6.9-12 Examine the effects of social and cultural factors on mental health and well-being.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claims.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.

- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.
- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

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Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Mental health is a complex part of overall health and well-being; conditions like depression, anxiety, and ADHD are not simply the result of one behavior, technology, or personal choice. • Social media can have both positive and negative effects depending on how it's used, the individual, the content encountered, and the surrounding social environment. • Self-image, self-esteem, and self-efficacy are related but different concepts, and online environments can influence how people compare themselves with others. • Research evidence may reveal a relationship between variables without proving that one causes another. • Solutions to complex social problems require action at multiple levels — individual, interpersonal, institutional, and societal. • Young people can have agency in shaping healthier digital environments and supporting peers, without being expected to diagnose or treat mental health conditions.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: How Does Social Media Shape the Way Young People See Themselves?** • What is the difference between self-image, self-esteem, and self-efficacy? • How can social media influence social comparison and the way young people understand themselves? • Does social media cause poor mental health, or is the relationship more complicated? **Inquiry Arc 2: How Do Social Media Systems and Culture Affect Young People?** • How are social media platforms designed to capture and hold attention, and what are the effects? • What specific risks and pressures do young people navigate online? **Inquiry Arc 3: How Can We Support Mental Health in a Digitally Connected World?** • What are depression, anxiety, and ADHD, and how can they affect young people's experiences?

	• What factors beyond social media influence young people's mental health? • What actions can young people and their communities take to promote mental health and digital well-being?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Mental Health • Self-Image • Self-Esteem • Self-Efficacy • Social Media • Social Comparison • Depression • Anxiety • ADHD • Correlation • Algorithms • Echo Chambers • Rabbit Holes • Social Media Addiction • Cyberbullying • Body Image • Dangerous Viral Trends • Fear of Missing Out (FOMO) • Pressure to Conform • Sleep Disruption	• Define and distinguish related concepts (e.g., self-image, self-esteem, self-efficacy). • Analyze graphs, statistics, infographics, articles, and personal narratives; identify bias, limitations, and missing information. • Distinguish correlation from causation. • Construct evidence-based claims that acknowledge competing perspectives. • Develop realistic, evidence-based recommendations and communicate them to a specific audience.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Develop an evidence-based resource that helps young people understand the relationship between social media, self-perception, and mental health, and provides realistic recommendations for digital well-being. **Role** • You are a Youth Mental Health and Digital Well-Being Advisor working with a school, youth organization, or community organization.

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Audience

- Students in grades 9–12 who use social media and are navigating the pressures of being a young person today.

Situation

- A school or youth organization wants to help students understand how digital life and modern pressures can affect mental health, without oversimplified messages such as “social media is always harmful,” “social media causes depression,” “just stop using your phone,” or “mental health is only an individual problem.” They've asked for a resource grounded in research that recognizes the issue's complexity.

Product/Performance/Purpose

- Choose one: a digital or print Youth Mental Health and Digital Well-Being Guide, an evidence-based public service campaign, a school advisory presentation, or a resource for a school website or social media account.
- The product must include:
    - A clear explanation of how social media can affect young people's experiences.
    - An explanation of at least 3 of: self-image, self-esteem, self-efficacy, social comparison, depression, anxiety, ADHD.
    - At least 3 evidence-based claims supported by credible sources.
    - A discussion of at least one competing perspective or limitation.
    - At least 3 realistic recommendations for improving digital well-being or supporting mental health.
    - A clear statement that young people should not be expected to diagnose or treat themselves or others.
    - A section identifying when a young person should seek support from a trusted adult or qualified professional.

Standards and Criteria for Success, including VoG Alignment

- Accuracy — information is factually accurate and avoids stereotypes or stigmatizing language.
- Evidence — claims are supported by credible and relevant sources.
- Complexity — avoids simplistic claims about social media or mental health.
- Analysis — explains relationships among social media, self-perception, and mental health.
- Perspective — acknowledges competing views, limitations, or uncertainty.
- Audience Awareness — the resource is appropriate and useful for teenagers.
- Action — recommendations are realistic, specific, and evidence-based.

Resources

Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, rubric, and organizers

Evaluative Criteria

How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and organizers

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across three IDM inquiry arcs. Arc 1 asks how social media shapes the way young people see themselves, distinguishing self-image, self-esteem, and self-efficacy and examining correlation vs. causation. Arc 2 turns to how social media platforms and culture actually work — algorithms, echo chambers, and the specific risks and pressures young people navigate online. Arc 3 asks how young people and their communities can support mental health in a digitally connected world, examining depression, anxiety, and ADHD alongside the many factors beyond social media that shape well-being — culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table.

Facilitation note: throughout this unit, students are not being asked to diagnose themselves or their classmates. Everyday stress, sadness, or worry does not automatically mean someone has a mental health condition, and mental health conditions should never be used as labels for peers. If a student discloses genuine distress at any point, follow your school's standard protocol for connecting them with a counselor or other trusted adult — this unit is designed to build awareness and healthy habits, not to replace professional support.

Inquiry Arc 1: How Does Social Media Shape the Way Young People See Themselves? (Lessons 1–3)

Compelling Question	In a world where everyone is constantly connected, who gets to define who we are?
Standards & Practices	D2.Psy.5.9-12 — Investigate how social and cultural factors influence the development of self and identity. | D2.Psy.2.9-12 — Investigate the potential effects of individual and cultural differences on social interactions.
Staging the Question	Present statements such as “Social media makes teenagers feel worse about themselves,” “Social media helps teenagers feel less alone,” and “People only post the best parts of their lives.” Students respond Agree/Disagree/Unsure,

	then identify what they'd need to know before answering confidently.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What is the difference between self-image, self-esteem, and self-efficacy?	How can social media influence social comparison and the way young people understand themselves?	Does social media cause poor mental health, or is the relationship more complicated?
Formative Performanc e Task	Rotate through short scenarios (edited images, negative comments, watching a peer succeed) and identify whether each relates to self-image, self-esteem, or self-efficacy; complete a Concept Relationship Map.	Using the same scenarios, analyze how each involves social comparison and how digital environments can amplify it.	Examine several claims about social media and mental health; determine what the evidence actually shows, what's missing, and whether it demonstrates correlation, causation, or neither; write an evidence-based response with a claim, two pieces of evidence, and one limitation.
Featured Sources	*A youth social media use survey/infographic; a short personal narrative from a teenager; composite scenario set*	*A short expert explanation of social comparison; the same composite scenario set*	*A graph showing patterns in adolescent social media use and mental health; brief summaries of relevant research findings*
Arc Summative Check	Inquiry Arc 1 Checkpoint: students return to the Arc 1 compelling question and write a preliminary answer, to be revisited at the end of the unit.		

Inquiry Arc 2: How Do Social Media Systems and Culture Affect Young People? (Lessons 4–5)

Compelling Question	How are social media platforms designed, and what risks do young people navigate as a result?
Standards & Practices	D2.Psy.4.9-12 — Analyze the effects of a range of factors on individual and collective behavior.
Staging the Question	Quick-write: “Have you ever opened an app to check one thing and ended up scrolling for much longer than you meant to? What do you think happened?” Share out to preview the arc.

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	Supporting Q1	Supporting Q2
Supporting Questions	How are social media platforms designed to capture and hold attention, and what are the effects?	What specific risks and pressures do young people navigate online?
Formative Performance Task	Read a short, accessible explainer on recommendation algorithms and engagement design; analyze a composite case study of algorithm-driven “rabbit holes” and echo chambers; discuss signs of social media addiction; complete a “How the Feed Works” diagram.	Station rotation covering cyberbullying, body image, FOMO, pressure to conform, dangerous viral trends, and sleep disruption; complete a Risk & Response chart identifying each risk, why it happens, and one healthy response.
Featured Sources	*Short, accessible explainer on recommendation algorithms and engagement design; a composite case study*	*Brief readings on each risk area (cyberbullying impact, body image and edited content, FOMO and notifications, peer pressure online, viral-challenge safety concerns handled generally, sleep and screen-time research)*
Arc Summative Check	Arc 2 Checkpoint: students identify which platform-design feature or risk factor feels most significant to their own peer group and explain why, citing at least one piece of evidence from the arc.	

Inquiry Arc 3: How Can We Support Mental Health in a Digitally Connected World? (Lessons 6–8)

Compelling Question	Who is responsible for protecting young people's mental health?		
Standards & Practices	D2.Psy.6.9-12 — Examine the effects of social and cultural factors on mental health and well-being.		
Staging the Question	Framing discussion before the arc begins: students are not being asked to diagnose themselves or classmates, and mental health conditions are complex and should never be used to stereotype or stigmatize peers.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What are depression, anxiety, and ADHD, and how can they affect young people's experiences?	What factors beyond social media influence young people's mental health?	What actions can young people and their communities take to promote mental health and digital well-being?

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Formative Performance Task	Examine short informational sources on depression, anxiety, and ADHD in small groups, identifying what each is, how it may affect daily life, common misconceptions, and what support might help; complete a Mental Health Myth vs. Evidence Chart.	Examine a fictional case study using a Multiple Factors Model (individual, family/relationships, school, sleep/health, social media/technology, economic/community, cultural/social expectations); write a response identifying at least 3 interacting factors; discuss whether solutions should focus only on individual choices.	Categorize possible actions by level (individual, interpersonal, school/community, technology companies, government/society); complete the GRASPS resource; share/present; complete Taking Informed Action and a final reflection revisiting both compelling questions.
Featured Sources	*Short informational sources on depression, anxiety, and ADHD from credible mental-health organizations*	*The fictional case study; a brief reading introducing multiple-factors thinking about mental health*	*Student-compiled notes and evidence from Lessons 1–7 for the GRASPS resource*
Taking Informed Action (Optional)	**Understand:** Research how social media, self-perception, and mental health are connected. **Assess:** Evaluate what evidence suggests social media can create challenges, what evidence suggests it can provide benefits, what factors complicate the issue, and which groups have the greatest ability to create change. **Act:** Create and share an evidence-based resource for young people (outside of your class assignment). Possible authentic audiences: school administration, student government, the school counseling department, a youth organization, or a parent/family education program.		

Lesson-by-Lesson Sequence

Note:

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging	I will investigate the relationship between social media, identity, and mental health.	I can examine real data and identify central ideas in charts and graphs I can break down the claim, evidence, and argument of an expert I can reflect on my own social media use I can consider what I still need to learn when it comes to social media and mental health I can create questions about the relationship between social media, identity, and mental health.	A. Present statements (“Social media makes teenagers feel worse about themselves,” etc.); students respond Agree/Disagree/ Unsure and identify what they'd need to know to answer confidently (~25 min) B. examine a youth social media use survey/infographic and a short personal narrative (~25 min) C. complete an Inquiry Question Board: what we think we know, what we wonder, what evidence we'd need (~25 min) D. exit ticket (~13 min). Lesson 1: …	Completed Inquiry Question Board plus exit ticket.	Mental Health, Social Media
2	Arc 1 · SQ1	I will distinguish self-image, self-esteem,	I can use new vocabulary terms to	A. Rotate through short scenarios (e.g., edited images,	Completed Concept Relationship Map.	Self-Image, Self-Esteem, Self-Efficacy,

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	& SQ2	and self-efficacy, and analyze how digital environments influence social comparison.	evaluate scenarios I can collaborate with my peers to categorize scenarios and identify connections	negative comments, watching a peer succeed) and identify whether each relates to self-image, self-esteem, or self-efficacy (~35 min) B. analyze how the scenarios also involve social comparison and how digital environments amplify it (~25 min) C. complete a Concept Relationship Map (~28 min). Lesson 2: …		Social Compari-son
3	Arc 1 · SQ3 + Arc 1 Checkpoint	I will distinguish correlation from causation when evaluating claims about social media and mental health.	I can tell the difference between causation and correlation I can use evidence to support my opinion I can write a well supported and organized response	A. Examine several claims (e.g., “Social media causes depression”) and analyze what the evidence actually shows, what's missing, and whether it shows correlation, causation, or neither (~40 min)	Correlation vs. causation response plus Arc 1 Checkpoint answer.	Correlation

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				B. write an evidence-based response: a claim, two pieces of evidence, and one limitation (~30 min) C. Arc 1 Checkpoint: preliminary written answer to the Arc 1 compelling question (~18 min). Lesson 3: …		
4	Arc 2 · Staging + SQ1	I will understand how algorithms and engagement driven design work.	I can read and annotate the text to locate central ideas I can explain how a recommendation algorithm decides what content to show a user. I can define echo chamber and rabbit hole, and explain how they're related but different. I can construct an	A. Read a short, accessible explainer on recommendation algorithms, engagement design, and notifications (~25 min) B. analyze a composite case study of someone who intended to watch one video and ended up far afield; discuss echo chambers, content rabbit holes, and signs of social media addiction (~35 min)	Completed “How the Feed Works” diagram.	Algorithms, Echo Chambers, Rabbit Holes, Social Media Addiction

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			explanation using sound reasoning, correct sequence, and pertinent details tracing how a realistic scenario moves from algorithm → engagement → echo chamber/rabbit hole → possible overuse I can identify signs of overuse without pathologizing normal, everyday social media use. I can explain how social media platforms are designed to capture attention and where that can lead.	C. complete a "How the Feed Works" diagram tracing algorithm → engagement → echo chamber/rabbit hole → possible overuse (~28 min). Lesson 4: …		
5	Arc 2 · SQ2 +	I will understand specific risks and pressures	I can collaborate with my peers to gather	A. Station rotation covering cyberbullying, body image,	Completed Risk & Response chart plus Arc 2	Cyberbully-ing, Body Image,

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
	Arc 2 Checkpoint	young people navigate online and realistic responses to them.	relevant information from multiple real sources covering six distinct online risks I can identify causes of, effects of, and responses to risks online I can reflect and share my opinion with my classmates, while listening to theirs I can distinguish which risk feels most significant to my own peer group and explain why, using reasoning rather than assumption.	FOMO, pressure to conform, dangerous viral trends, and sleep disruption, each with a brief reading and discussion questions (~55 min) B. complete a Risk & Response chart identifying each risk, why it happens, and one healthy response (~20 min) C. Arc 2 Checkpoint: which factor feels most significant to your peer group, and why? (~13 min). Lesson 5: …	Checkpoint response.	Dangerous Viral Trends, FOMO, Pressure to Conform, Sleep Disruption
6	Arc 3 · Staging + SQ1	I will examine the effects of social and cultural factors on mental health and well-being by	I can define depression, anxiety, and ADHD using accurate clinical information	A. Framing discussion: students are not being asked to diagnose themselves or classmates, and	Completed Mental Health Myth vs. Evidence Chart.	Depression, Anxiety, ADHD

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		learning accurate, evidence-based information about depression, anxiety, and ADHD	from authoritative sources. I can identify at least one common misconception about each condition and the evidence that corrects it. I can describe how each condition may affect daily functioning and what kind of support might help. I can engage with this material as an academic subject, without diagnosing myself or my classmates.	everyday stress or worry doesn't automatically mean a condition is present (~13 min) B. examine short informational sources on depression, anxiety, and ADHD in small groups, identifying what each is, how it may affect daily life, common misconceptions, and what support might help (~50 min) C. complete a Mental Health Myth vs. Evidence Chart (~25 min). Lesson 6: …		
7	Arc 3 · SQ2	I will analyze the characteristics and causation of a young person's mental health challenges using a	I can identify evidence for each of the seven Multiple Factors Model categories within a single narrative.	A. Examine a fictional case study of a stressed, overwhelmed student facing academic pressure, a changed friend	Multiple Factors Model response identifying at least 3 interacting factors.	Review of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		multidisciplinary lens spanning individual, family, school, health, technology, economic, and cultural factors	I can construct an explanation, using sound reasoning and pertinent details, of how at least 3 factors interact rather than operate independently I can critique the assumption that solutions to complex problems should focus on individual choices alone I can participate in a discussion and listen to others' ideas	group, poor sleep, and heavy social media use (~15 min) B. analyze the case using a Multiple Factors Model (individual, family/relationships, school, sleep/health, social media/technology, economic/community, cultural/social expectations) (~40 min) C. write a response identifying at least 3 interacting factors (~20 min) D. discuss: should solutions focus only on individual choices? (~13 min). W Lesson 7: …		
8	Arc 3 · SQ3 + Sum	I will develop realistic, evidence-based recommendations for	I can demonstrate my knowledge of unit vocab	A. Vocabulary Quiz B. Categorize possible actions by level — individual,	GRASPS resource scored with the unit rubric; Taking Informed Action	Applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
	mative	supporting youth mental health and digital well-being.	I can categorize possible actions by level — individual, interpersonal, school/community, technology companies, and government/society I can construct an evidence-based resource that acknowledges competing perspectives and limitations I can present my resource to reach an audience beyond the classroom I can identify realistic, specific recommendations while clearly stating that young people should not diagnose	interpersonal, school/community, technology companies, government/society (~20 min) C. GRASPS workshop time to complete the Youth Mental Health & Digital Well-Being resource (~45 min) D. share/present resources (~23 min); remaining work may extend to a following period. E. Taking Informed Action and final reflection assigned. Lesson 8: …	follow-through; final reflection.	

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			or treat themselves or others.			

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Unit Overview	
Unit Title:	Safeguarding Society: Navigating Public Safety, Gun Rights, Ownership, Control, and Prison Policy
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	6 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will examine how American society balances individual rights with public safety. They will study the second amendment, public safety policy, and the criminal justice system. This unit is designed to encourage students to explore topics also covered in Criminal Justice, Introduction to Sociology, and Human Rights classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Civ.1.9-12 Distinguish the powers and responsibilities of citizens, interest groups, and media in shaping public policy.
- D2.Civ.5.9-12 Evaluate citizens' and institutions' effectiveness in addressing social and political problems.
- D2.Civ.14.9-12 Analyze historical, contemporary, and emerging means of changing societal systems to promote the common good.
- D2.His.16.9-12 (adapted) Integrate evidence from multiple relevant sources and interpretations into a reasoned argument.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.

- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.1 Initiate and participate effectively in collaborative discussions.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

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Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• The Second Amendment's meaning has been shaped by ongoing constitutional interpretation, and reasonable people disagree about its scope. • Public safety policy requires balancing competing values — individual rights, liberty, safety, fairness, and cost — and no policy satisfies every value at once. • Data on gun violence and incarceration can support different conclusions depending on framing, comparison groups, and underlying assumptions. • The criminal justice system serves multiple, sometimes competing goals — deterrence, incapacitation, rehabilitation, and retribution — and policy debates often reflect disagreement over which goal should be prioritized. • Civic engagement (testimony, advocacy, voting) is a legitimate way citizens influence public safety policy in a democracy.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Unit Compelling Question:** • How should American society balance individual rights with public safety? **Inquiry Arc 1: Guns in America** • What does the Second Amendment protect, and how have courts interpreted it? • What does the data show about gun ownership, gun violence, and existing regulations in the U.S.? • What is the range of perspectives on gun-control policy, and what trade-offs do they involve? **Inquiry Arc 2: Prisons & Punishment** • What are the goals of the U.S. criminal justice/prison system? • What does the data show about incarceration rates, recidivism, and disparities in the U.S.? • What reforms have been proposed or implemented, and what perspectives compete around them?

What will students <u>know...</u>	**What will students <u>be able to do…</u>**

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Factual information, vocabulary and basic concepts related to each standard/goal	Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Second Amendment • Gun Control • Background Check • Red flag law • Concealed/open carry • Mandatory minimum sentencing • Recidivism • Mass incarceration • Rehabilitation • Restorative justice	• Read and interpret a primary legal source (constitutional text, court-case summaries). • Interpret and analyze quantitative public-safety data (rates, trends, comparisons). • Evaluate the credibility and perspective of a source on a contested issue. • Distinguish correlation from causation in public-safety claims. • Construct an evidence-based written and oral argument that acknowledges counterclaims. • Engage in civil, evidence-based discourse about a highly contested policy issue.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Research and propose a public-safety policy — choosing either a Gun Policy track or a Criminal Justice Reform track — for consideration by a state legislative committee, balancing rights, evidence, and public safety. **Role** • You are a Legislative Policy Aide for a state Senate Public Safety Committee. **Audience** • The Committee panel (teacher and/or guest evaluators role-playing senators). **Situation** • The Committee is holding hearings on proposed legislation. You will choose a specific real or realistic bill within one track, research its constitutional and/or systemic considerations and supporting data, evaluate at least two competing viewpoints, and draft a recommendation with testimony. **Product/Performance/Purpose** • A written policy brief (2–3 pages) and 5-minute committee testimony with a data visual, addressing the compelling question directly. **Standards and Criteria for Success, including VoG Alignment**

- Uses at least 4 pieces of credible, cited evidence/data representing more than one perspective.
- Correctly applies at least 4 unit vocabulary terms.
- Addresses relevant constitutional considerations (Gun Policy track) or systemic/data considerations (Criminal Justice track).
- Evaluates trade-offs and directly addresses at least one counterargument.
- Proposal is specific and feasible (implementation, stakeholders, cost).
- Testimony is organized, civil in tone, cites sources, and uses a data visual accurately.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, rubric, and tracks

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and tracks

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across two IDM inquiry arcs. Arc 1 examines the constitutional, empirical, and political dimensions of gun rights and gun regulation. Arc 2 turns to the goals, realities, and reform of the U.S. prison system. Both arcs return to the same compelling question and feed a single GRASPS summative task, in which students choose a Gun Policy or Criminal Justice Reform track. Because classes meet in 88-minute blocks, each lesson below is written to comfortably hold a staging/opening, a core inquiry task, and a closing synthesis within one period — pacing suggestions are noted in the Key Activities column of the lesson table.

Inquiry Arc 1: Guns in America — Rights, Ownership & Regulation (Lessons 1–3)

Unit Compelling Question	How should American society balance individual rights with public safety?
Standards &	D2.Civ.1.9-12; D2.His.16.9-12 (adapted): Integrate evidence from multiple

Practices	sources into a reasoned argument about a current constitutional issue.		
Staging the Question	"Four Corners" activity (~15 min): students move to a corner (strongly agree / agree / disagree / strongly disagree) in response to statements such as "The government should be able to limit what types of firearms civilians can own," then discuss with others in their corner before the inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What does the Second Amendment protect, and how have courts interpreted it?	What does the data show about gun ownership, gun violence, and existing regulations in the U.S.?	What is the range of perspectives on gun-control policy, and what trade-offs do they involve?
Formative Performance Task	(~50 min) Read the full text of the Second Amendment plus paraphrased case-brief summaries of Heller and McDonald; complete a case-brief graphic organizer, then answer: what does the Amendment protect, and what limits has the Court allowed?	(~55 min) Analyze survey data on gun-ownership attitudes and summarized state-by-state regulation data (background checks, red-flag laws); complete a data-analysis worksheet distinguishing correlation from causation.	(~50 min) Structured academic controversy using two brief, paraphrased position summaries (rights/self-defense emphasis vs. public-safety/regulation emphasis); write a claim-evidence-reasoning paragraph acknowledging the other side; revisit the Lesson 1 four corners to see if views shifted.
Featured Sources	*Full text of the Second Amendment; paraphrased case-brief summaries of District of Columbia v. Heller (2008) and McDonald v. Chicago (2010)*	*Pew Research survey data on gun-ownership attitudes; summarized federal/state data on background-check and red-flag-law policies*	*Two brief, paraphrased position summaries representing different general viewpoints on gun policy*

Inquiry Arc 2: Prisons & Punishment — Policy and Reform (Lessons 4–6)

Unit Compelling Question	How should American society balance individual rights with public safety?

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Standards & Practices	D2.Civ.5.9-12; D2.Civ.14.9-12: Analyze historical, contemporary, and emerging means of changing societal systems to promote the common good.		
Staging the Question	Quick-write and share-out (~15 min): “What is prison for?” Students individually list what they believe prison’s purpose is; teacher sorts responses into four categories — deterrence, incapacitation, rehabilitation, retribution — to preview Arc 2.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What are the goals of the U.S. criminal justice/prison system?	What does the data show about incarceration rates, recidivism, and disparities in the U.S.?	What reforms have been proposed or implemented, and what perspectives compete around them?
Formative Performance Task	(~50 min) Read a short explainer on the four purposes of punishment; analyze brief policy scenarios (e.g., a three-strikes law, a drug court, a parole decision) and identify which purpose(s) each primarily serves.	(~55 min) Analyze incarceration-rate, recidivism, and disparity data, including an international comparison; complete a data-interpretation worksheet with guiding questions on causation vs. correlation.	(~55 min) Jigsaw of reform approaches (sentencing reform, restorative justice programs, reentry/job-training programs, enhanced-sentencing approaches); each group presents goals/evidence/critiques; whole-class discussion of trade-offs.
Featured Sources	*Short explainer reading on the purposes of punishment; brief sentencing-policy scenario descriptions*	*Bureau of Justice Statistics incarceration data; Sentencing Project or Pew data on recidivism and disparities; brief international-comparison graphic*	*Brief, paraphrased nonpartisan summaries of specific reform policies/programs; short profile of a restorative-justice or reentry program*
Taking Informed Action (Optional)	**Understand:** Research an actual gun-policy or criminal-justice bill currently pending in Congress or your state legislature, matching your chosen GRASPS track. **Assess:** Identify who supports and opposes the bill and why; evaluate		

	the rights, safety, and cost trade-offs involved. **Act:** Write a letter or email to a legislator, or draft and deliver simulated public testimony stating an evidence-based position, or design a public-awareness infographic for the school community.

Lesson-by-Lesson Sequence

Note: Note: with 88-minute blocks, Lesson 6 comfortably holds the GRASPS workshop, peer feedback, and testimony within one period for most classes. For a 7-lesson version, split Lesson 6 into a workshop/peer-feedback day and a separate testimony/presentation day.

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · SQ1	I will understand the Second Amendment's protections and limitations	I can share my opinion and listen respectfully to other opinions I can identify what the Second Amendment's text protects. I can summarize the core holdings of District of Columbia v. Heller (2008) and McDonald v. City of Chicago I can construct an explanation, using sound reasoning and pertinent	A. Four-corners staging (~15 min); B. read Second Amendment text and paraphrased Heller/McDonald case-brief summaries; complete case-brief organizer (~50 min) C. closing synthesis (~20 min). Lesson 1: S…	Case-brief graphic organizer plus a short written answer on what the Amendment protects and what limits courts have allowed.	Second Amend-ment

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			details, of what limits the Supreme Court has said remain constitutional I can gather and synthesize information from multiple legal sources representing this issue			
2	Arc 1 · SQ2	I will analyze data on gun ownership, gun violence, and existing regulations, and distinguish correlation from causation.	I can analyze real survey data on gun ownership and attitudes to identify specific patterns. I can analyze real state-by-state regulation data to identify specific patterns. I can collaborate to gather and synthesize information from multiple data sources representing this issue	A. Warm-up review (~10 min) B. small-group analysis of ownership-attitude survey data and state regulation summaries (~55 min) C. data-analysis worksheet and debrief (~20 min). Lesson 2: S…	Completed data-analysis worksheet identifying at least two patterns and one correlation-vs-causation caution.	Gun control, background check, red flag law, concealed/open carry

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can distinguish correlation from causation, identifying what additional evidence would be needed before concluding one thing caused another.			
3	Arc 1 · SQ3 (Arc 1 synthesis)	I will critique political arguments and explanations while acknowledging their strengths and weaknesses given their purpose and audience	I can accurately explain both a rights/self-defense-emphasis position and a public-safety/regulation-emphasis position on gun policy. I can collaborate to explain points of genuine agreement and disagreement between these two perspectives	A. Structured academic controversy using two brief, paraphrased position summaries (~55 min) B. revisit Lesson 1 four corners to check for shifts in thinking (~15 min) C. synthesis discussion (~15 min). Lesson 3: S…	Claim-evidence-reasoning paragraph identifying the more persuasive argument while acknowledging the other side.	Review of Arc 1 terms

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can write a claim-evidence-reasoning paragraph that identifies the more persuasive argument while fairly acknowledging the other side.			
4	Arc 2 · SQ4	I will analyze contemporary means by which societal systems address crime and punishment in pursuit of the common good.	I can identify the four purposes of punishment (deterrence, incapacitation, rehabilitation, retribution) I can construct an explanation, using sound reasoning and pertinent details, of which purpose(s) a specific policy primarily serves I can collaborate to analyze how a specific policy attempts to change or	A. “What is prison for?” quick-write and sort staging (~15 min) B. read purposes-of-punishment explainer and analyze policy scenarios in small groups (~50 min) C. graphic organizer and debrief (~20 min). Lesson 4: S…	Completed graphic organizer matching each scenario to the purpose(s) of punishment it primarily serves.	Rehabili-tation

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			maintain a societal system in pursuit of public safety.			
5	Arc 2 · SQ5	I will evaluate institutions' effectiveness in addressing a social problem using real quantitative evidence	I can analyze real incarceration, recidivism, and disparity data to identify specific patterns. I can construct an explanation, using sound reasoning and pertinent details, of what a specific data pattern does and does not establish I can identify competing explanations for a data pattern and what additional evidence would be needed to evaluate them.	A. Review of key terms (~10 min) B. small-group data-interpretation stations using BJS/Sentencing Project data and an international-comparison graphic (~55 min) C. worksheet and whole-class debrief (~20 min) Lesson 5: S…	Data-interpretation worksheet with guiding questions on causation vs. correlation.	Mandatory minimum sentencing, recidivism, mass incarceration

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can collaborate with my peers to understand charts and graphs			
6	Arc 2 · SQ6 + Summative	I will evaluate proposed criminal-justice reforms and construct an evidence-based policy proposal addressing the compelling question.	I can demonstrate my knowledge of unit vocab I can evaluate real reform approaches and their documented outcome I can organize and prioritize evidence from multiple sources to strengthen a policy claim I can refine my claim by addressing the strengths and limitations of a counterargument I can construct an argument using precise, cited	A. Vocabulary Quiz B. Jigsaw of reform approaches (~40 min) C. GRASPS workshop time and structured peer feedback (~35 min) D. committee testimony/presentations (~10–13 min, or use as a separate 7th-lesson presentation day) E. Taking Informed Action task assigned. Lesson 6: S…	Jigsaw notes; GRASPS policy brief and testimony scored with unit rubric; Taking Informed Action letter, testimony, or infographic.	Restorative justice; applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			evidence while acknowledging counterclaims I can present my argument to an audience beyond the classroom I can provide reasonable feedback to a peer and use their feedback to improve my work			

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Unit Overview	
Unit Title:	The State of Education: What Makes an Effective School System?
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	6 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will consider what factors make school systems effective or ineffective. They will examine how different schools measure success, and compare and contrast schools around the world. This unit is designed to encourage students to explore topics also covered in Introduction to Teaching, Introduction to Psychology, AP Psychology, and Child Development classes.

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.Civ.4.9-12 (adapted) Explain the role of civic institutions, including public schools, in shaping opportunity and civic participation.
- D2.Civ.7.9-12 (adapted) Apply civic virtues and democratic principles when proposing solutions to public institutions and systems.
- D2.Geo.5.9-12 Evaluate how political, economic, and cultural decisions influence the characteristics of places, systems, and institutions across regions.
- D2.Eco.13.9-12 (adapted) Evaluate the local, state, and national effects of a government policy on economic and social outcomes.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.7 Integrate quantitative/technical analysis with qualitative analysis of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence, counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.

- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.1 Initiate and participate effectively in collaborative discussions.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:

- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums, using origin/authority/context to guide selection.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.c Critique political arguments and explanations while acknowledging strengths and weaknesses given purpose and audience.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:

- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).

Creativity/Innovation Transdisciplinary Goal:

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Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Educational systems reflect a society's values and priorities. • There is no universally "perfect" education system. • Policies have intended and unintended consequences. • Educational success is measured differently across cultures. • Evidence and multiple perspectives are necessary for evaluating policy.

Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: How Should Schools Measure Success?** • How do different countries organize education? • What are the benefits and drawbacks of standardized testing? • Do international rankings tell the whole story? **Inquiry Arc 2: What Should Schools Change to Prepare Students for the Future?** • Should schools assign homework? • Should schools change the school week or school day? • What can we learn from other countries?

What will students <u>know...</u>	**What will students <u>be able to do…</u>**
Factual information, vocabulary and basic concepts related to each standard/goal	Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material

• Standardized testing • PISA • Equity • Equality • Curriculum • Educational Policy • Achievement Gap • School Choice • Student Well-Being • Inquiry	• Analyze data to compare educational systems across countries. • Interpret informational texts and evaluate policy proposals. • Construct evidence-based arguments (CER) that address counterarguments. • Collaborate with peers to solve authentic problems. • Evaluate the credibility and relevance of sources representing multiple perspectives.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence
What will the student produce? Use the GRASPS model below to design your performance task.

Goal
- Design a proposal for improving secondary education using evidence from global education systems.

Role
- You are an Educational Policy Consultant.

Audience
- The State Board of Education.

Situation
- The state wants to redesign high school to better prepare students for college, careers, and citizenship. Your consulting team has been hired to recommend changes.

Product/Performance/Purpose
- Choose one: a presentation, a policy brief, an infographic, or a video proposal.
- The product must address all of the following:
  - School Structure — calendar, schedule, start time, testing, homework.
  - Curriculum — graduation requirements, electives, career pathways, technology.
  - Student Supports — mental health, extracurriculars, wellness.
  - Global Evidence — at least three recommended policy changes, supported by evidence and data from at least three countries.
  - Consideration of counterarguments and a realistic implementation plan.
  - A closing reflection explaining why the redesigned school would better prepare students for adulthood.

Standards and Criteria for Success, including VoG Alignment
- Supports claims with evidence.
- Compares at least three countries.
- Addresses opposing viewpoints.
- Recommends realistic, feasible solutions.
- Presents professionally, appropriate to the chosen format.

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Resources Any materials and resources related to the performance task that the teacher or student would need to be successful.
• Link to directions, rubric, and organizer

Evaluative Criteria How will you evaluate this task? How will you provide feedback to students?
• Link to directions, rubric, and organizer

Comments Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.
• Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

Stage 3: Learning Plan

Overview: This unit unfolds across two IDM inquiry arcs. Arc 1 asks how schools should measure success, comparing education systems across countries and examining standardized testing and international rankings. Arc 2 asks what schools should change to prepare students for the future, examining homework policy, school schedules, and lessons from other countries — culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson comfortably holds a staging/opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table.

Inquiry Arc 1: How Should Schools Measure Success? (Lessons 1–3)

Compelling Question	How should schools measure success?
Standards & Practices	D2.Geo.5.9-12 — Evaluate how political, economic, and cultural decisions influence the characteristics of places, systems, and institutions across regions. | D2.Eco.13.9-12 (adapted) — Evaluate the effects of government policy on economic and social outcomes.
Staging the Question	Gallery walk with images and headlines — Finland's minimal standardized testing, South Korea's long school days, expanding four-day school weeks in the U.S., students sleeping less than recommended, and the U.S.'s high per-student spending. Students respond to: “What makes a school successful?”

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	Supporting Q1	Supporting Q2	Supporting Q3
Supporting Questions	How do different countries organize education?	What are the benefits and drawbacks of standardized testing?	Do international rankings tell the whole story?
Formative Performance Task	Complete a comparison chart of school year, school hours, testing, homework, and graduation requirements across Finland, Japan, the United States, Singapore, and Canada.	Read research supporting and criticizing standardized testing plus student opinion articles; complete a Pros/Cons T-chart; write a CER paragraph answering "Should standardized testing play a major role in schools?"	In small groups, analyze PISA and OECD graphs alongside student well-being reports, answering: What patterns exist? Which countries perform well? What factors besides scores matter?
Featured Sources	*OECD PISA overview; World Bank education profiles; country education fact sheets*	*Research supporting standardized testing; research criticizing standardized testing; student opinion articles*	*Latest PISA results; OECD data; student well-being reports*
Arc Summative Check	Inquiry Arc 1 Summative Argument: students answer "How should schools measure success?" using evidence gathered across the arc.		

Inquiry Arc 2: What Should Schools Change to Prepare Students for the Future? (Lessons 4–6)

Compelling Question	What should schools change to prepare students for the future?
Standards & Practices	D2.Civ.4.9-12 (adapted) — Explain the role of civic institutions, including public schools, in shaping opportunity and civic participation. | D2.Civ.7.9-12 (adapted) — Apply civic virtues and democratic principles when proposing solutions to public institutions.

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Staging the Question	Quick-write: “How much homework is too much — or not enough?” Students share initial reactions before the arc's inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	Should schools assign homework?	Should schools change the school week or school day?	What can we learn from other countries?
Formative Performance Task	Analyze homework research, student surveys, and parent and teacher perspectives; create a recommendation for homework policy.	Structured Academic Controversy: teams debate which policy — a four-day school week or later start times — would improve schools more, considering mental health, transportation, athletics, and family schedules.	Revisit Finland, Singapore, Japan, Canada, and Estonia; each group identifies one policy worth adopting, possible challenges, and expected outcomes.
Featured Sources	*Homework research studies; student surveys; parent perspectives; teacher perspectives*	*American Academy of Pediatrics guidance; RAND research; district case studies*	*Country education profiles for Finland, Singapore, Japan, Canada, and Estonia*
Arc Summative Check	Inquiry Arc 2 Summative Argument: students answer “What should schools change to prepare students for the future?” using evidence gathered across the arc.		
Taking Informed Action (Optional)	**Understand:** Investigate an educational issue currently being debated in your state or community. **Assess:** Evaluate the potential impacts on students, teachers, families, and taxpayers using evidence from the unit. **Act:** Choose one: write a letter to a school board member, create an informational social media campaign, present recommendations to administrators, or develop a student survey and share findings with school leadership.		

Lesson-by-Lesson Sequence

Note:

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging + SQ1	I will evaluate how political, economic, and cultural decisions influence the characteristics of education systems across regions	I can collaborate to compare how different countries organize their education systems. I can explain how new questions emerge when comparing varied education systems I can construct an explanation, using sound reasoning and pertinent details, of the differences across five real countries' school systems	A. Gallery walk staging with headlines/images (Finland's minimal testing, South Korea's long school days, expanding four-day weeks, student sleep data, U.S. per-student spending); respond to “What makes a school successful?” (~25 min) B. introduce the inquiry process and today's focus (~10 min) C. complete a 5-country comparison chart (Finland, Japan, U.S., Singapore, Canada) covering school year, hours, testing, homework, and graduation requirements (~40 min) D. debrief (~13 min). Lesson 1: St…	Completed 5-country comparison chart.	Curriculum, Educational Policy, Inquiry
2	Arc 1 · SQ2	I will evaluate the effects of educational policy on social outcomes,	I can collaborate to evaluate the benefits and drawbacks of standardized testing using	A. Warm-up review (~10 min) B. read research supporting and criticizing standardized testing, plus	Pros/Cons T-chart plus CER paragraph.	Standardized Testing, Achievement Gap

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		including its intended and unintended consequences	real, current evidence. I can explain points of genuine agreement and disagreement among researchers and stakeholders on this issue	student opinion articles, in small groups (~35 min) C. complete a Pros/Cons T-chart (~20 min) D. write a CER paragraph answering "Should standardized testing play a major role in schools?" (~23 min). Lesson 2: St…		
3	Arc 1 · SQ3 + Arc 1 Summative	I will evaluate how political, economic, and cultural decisions influence the characteristics of education systems across regions	I can evaluate whether international rankings tell the whole story about school success. I can collaborate to construct an explanation, using sound reasoning and pertinent details, of patterns in real PISA and well-being data in charts and graphs I can write an evidence-based argument	A. Review of key terms (~10 min) B. small groups analyze PISA/OECD graphs and student well-being reports, answering: What patterns exist? Which countries perform well? What factors besides scores matter? (~45 min) C. Arc 1 Summative Argument: written response to "How should schools measure success?" using evidence from the arc (~33 min). Lesson 3: St…	Graph-analysis notes plus Arc 1 Summative Argument.	PISA, Equity, Equality

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			answering the Arc 1 compelling question, integrating evidence from across the arc			
4	Arc 2 · Staging + SQ1	I will apply civic virtues and democratic principles when proposing solutions to a public institution	I can construct an evidence-based recommendation for school homework policy. I can collaborate to analyze homework research I can explain how a policy's intended and unintended consequences relate to student well-being. I can support a claim with specific evidence from research and multiple stakeholder perspectives	A. Staging quick-write: “How much homework is too much — or not enough?” (~10 min) B. analyze homework research, student surveys, and parent/teacher perspectives in small groups (~45 min) C. draft a homework-policy recommendation (~33 min). Lesson 4: St…	Written homework-policy recommendation supported by evidence.	Student Well-being
5	Arc 2 · SQ2	I will examine political	I can construct and defend an argument	A. Review of key terms (~10 min)	Structured Academic Controversy	Review of Arc 1 & 2 terms

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		arguments and explanations related to the 4-day school week while acknowledging their strengths and weaknesses given their purpose and audience	about school schedule reform using real evidence. I can explain points of genuine agreement and disagreement between competing school-schedule proposals I can address a counterargument fairly and directly. I can participate in the Structured Academic Controversy Protocol	B. Structured Academic Controversy: teams research and debate four-day school weeks vs. later start times using AAP, RAND, and district case-study evidence, addressing mental health, transportation, athletics, and family schedules (~65 min) C. debrief (~13 min). Lesson 5: St…	notes and participation, scored with a discussion rubric.	
6	Arc 2 · SQ3 + Summative Launch	I will design a proposal for improving a public institution using evidence from multiple sources, applying civic virtues and democratic principles	I can identify policies worth adopting from other countries and analyze possible challenges and expected outcomes. I can write an evidence-based argument answering the	A. Vocab Check B. Revisit Finland, Singapore, Japan, Canada, and Estonia in groups; each group identifies one policy worth adopting, possible challenges, and expected outcomes (~35 min) C. Arc 2 Summative Argument: written	Country policy-analysis notes; Arc 2 Summative Argument; GRASPS proposal and presentation scored with the unit rubric; Taking Informed Action follow-through.	School Choice; applied use of full vocabulary list

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			Arc 2 compelling question I can organize and prioritize evidence from at least three countries to support a policy recommendation I can present an argument to reach an audience beyond the classroom	response to “What should schools change to prepare students for the future?” (~20 min) D. launch the GRASPS “Redesign High School” task, form teams, and begin work time (~33 min); remaining GRASPS work and presentations extend to subsequent class periods. Taking Informed Action task assigned. Lesson 6: St…		

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Unit Overview	
Unit Title:	Who Owns Culture? Cultural Appropriation, Appreciation, and Representation
Teacher(s):	Heather Allenback, Colleen Money
Grade Level/Course:	9th and 10th
Length/Dates:	6 lessons
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	In this unit, students will study how culture is transferred from one group to another. They will consider the difference between intent and impact. Finally, students will make connections between cultural transfer and the economy. This unit is designed to encourage students to explore topics also covered in American Culture, Introduction to Sociology, and AP Human Geography classes

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

College, Career, and Civic Life (C3) Framework for Social Studies State Standards:

- D2.His.1.9-12 Evaluate how historical events and developments were shaped by unique circumstances of time and place, as well as broader historical contexts.
- D2.His.4.9-12 Analyze complex and interacting factors that influenced the perspectives of people during different historical eras.
- D2.Eco.1.9-12 Analyze how incentives influence choices that may result in policies with a range of costs and benefits for different groups.
- D2.Civ.14.9-12 Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights.

Common Core State Standards:

- RH.9-10.1 Cite specific textual evidence to support analysis, attending to source date and origin.
- RH.9-10.2 Determine the central ideas of a source and provide an accurate summary.
- RH.9-10.4 Determine the meaning of domain-specific words and phrases.
- RH.9-10.6 Analyze how an author's point of view or purpose shapes the content and style of a text.
- RH.9-10.9 Compare treatments of the same topic across multiple sources.
- WHST.9-10.1 Write arguments focused on discipline-specific content (claim, evidence,

counterclaim).
- WHST.9-10.2 Write informative/explanatory texts.
- WHST.9-10.9 Draw evidence from informational texts to support analysis and research.
- WHST.9-10.10 Write routinely over shorter time frames for a range of tasks.
- SL.9-10.4 Present information, findings, and evidence clearly and persuasively.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

Connecticut Elementary and Secondary Social Studies Inquiry Arc:
- Inq.1.a Explain how a question reflects an enduring issue in the field.
- Inq.1.b Explain how supporting questions contribute to an inquiry and how new questions emerge when engaging varied-perspective sources.
- Inq.1.c Explain points of agreement and disagreement experts have about compelling and supporting questions.
- Inq.3.b Organize and prioritize evidence from multiple sources to develop or strengthen claims.
- Inq.3.c Refine claims and counterclaims by pointing out strengths and limitations of arguments and explanations.
- Inq.4.a Construct arguments using precise, knowledgeable claims with evidence, acknowledging counterclaims and evidentiary weaknesses.
- Inq.4.b Construct explanations using sound reasoning, correct sequence, and pertinent details.
- Inq.4.d Present arguments and explanations to reach audiences outside the classroom using print, oral, or digital technologies.
- Inq.4.e Analyze the characteristics and causation of local, regional, and global problems using a multidisciplinary lens.

ONLY IF Taking Informed Action Task is Completed:
- Inq.4.f Evaluate and implement strategies for individual and collective action to address problems in and out of school.

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Critical Thinking Transdisciplinary Goal:
Students inquire, identify, and ethically solve real-world problems through reasoning and a reflection on the challenges and benefits of the process and/or solution(s).
Creativity/Innovation Transdisciplinary Goal:

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Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.

Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.

Communication Transdisciplinary Goal:
Students effectively communicate and use interpersonal skills in a range of formal and informal contexts.

Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	• Culture is constantly changing through interaction, exchange, adaptation, and creativity; cultural exchange is not automatically harmful or automatically positive. • Whether cultural borrowing counts as appreciation, appropriation, or exploitation depends on factors such as context, history, power, intent, impact, and economic benefit — and these categories are not always easy to distinguish. • Good intentions do not automatically eliminate harmful impact, and reasonable people can interpret the same example of cultural borrowing differently. • Cultural borrowing can become exploitative when one group profits from another group's culture while that culture's members are excluded, ignored, or stigmatized. • People and communities can disagree about cultural issues while still using evidence and engaging respectfully.
Essential Question(s): These questions are related to the enduring understandings and provide relevance for the learning in the unit.	**Inquiry Arc 1: How Does Culture Move from One Group to Another?** • What is culture, and how does cultural exchange happen? • Why do some cultural practices become popular while others remain overlooked or misunderstood? • How do power, media, and money influence cultural exchange? **Inquiry Arc 2: When Does Cultural Borrowing Become Appreciation, Appropriation, or Exploitation?** • How should we evaluate the difference between appreciation and appropriation? • How can cultural borrowing create economic opportunity or exploitation? • What responsibilities do creators, companies, celebrities, and consumers have?

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What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• Culture • Cultural exchange • Cultural appreciation • Cultural appropriation • Cultural exploitation • Representation • Stereotype • Context • Intent • Impact	• Analyze current pop-culture examples for point of view, purpose, and reliability of sources. • Compare intent and impact, and analyze power and economic benefit, in a cultural controversy. • Distinguish among competing interpretations of a controversial issue. • Construct a nuanced, evidence-based argument that acknowledges competing perspectives. • Develop a recommendation for a specific real-world audience.

Stage 2: Evidence of Student Learning

Performance Tasks

Assessment Evidence What will the student produce? Use the GRASPS model below to design your performance task.
Goal • Create an evidence-based resource that helps a specific audience understand the difference between cultural exchange, appreciation, appropriation, and exploitation. **Role** • You are a Pop Culture and Cultural Issues Advisor. **Audience** • Choose one: a school community, a student government, a youth organization, a media or entertainment company, a social media audience, or a group of young consumers. **Situation** • A current pop-culture controversy has led to disagreement about whether a cultural practice, symbol, style, tradition, or form of expression is being respectfully shared or improperly used. Your audience wants to understand the issue — but not through an oversimplified answer. **Product/Performance/Purpose** • A social media education campaign for the app of your choice: X, Instagram, or TikTok **Standards and Criteria for Success, including VoG Alignment** • Identifies a current or recent pop-culture example and explains the cultural practice, symbol, style, or tradition involved, with relevant historical and cultural context.

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- Analyzes the issue using at least 4 of: intent, impact, context, power, economic benefit, credit, representation.
- Uses at least 3 credible sources and explains at least 2 different perspectives.
- Makes an evidence-based judgment or recommendation — the goal is not simply to assign a label, but to explain and defend a conclusion using evidence and context.
- Avoids treating an entire culture or community as having only one opinion.

Resources
Any materials and resources related to the performance task that the teacher or student would need to be successful.

- Link to directions, rubric, and organizer

Evaluative Criteria
How will you evaluate this task? How will you provide feedback to students?

- Link to directions, rubric, and organizer

Comments
Frame this as any information that would be helpful for a new teacher or a teacher teaching this course for the first time.

- Be sure to check the extra information documents and resources in the folder. They can help provide more detail on how these assignments are all connected, and where in each lesson the standards can be found.

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Stage 3: Learning Plan

Overview: This unit unfolds across two IDM inquiry arcs, each with its own compelling question feeding the unit's overarching question, “Who owns culture?” Arc 1 asks how culture moves from one group to another, grounding students in cultural exchange, popularity, and the role of power and media. Arc 2 asks when cultural borrowing becomes appreciation, appropriation, or exploitation, examining intent vs. impact and who benefits economically — culminating in the GRASPS summative task. Because classes meet in 88-minute blocks, each lesson comfortably holds an opening, a core inquiry task, and a closing synthesis; pacing suggestions are noted in the Key Activities column of the lesson table.

Recurring routine: open each class period with a 5–10 minute “Culture Watch” — students bring in and discuss a current pop-culture development using the guiding questions in the appendix. This keeps the unit genuinely connected to Current Issues; select examples carefully and provide enough context that students analyze the issue rather than simply react to a headline.

"Culture Watch” Recurring Routine

Inquiry Arc 1: How Does Culture Move from One Group to Another? (Lessons 1–3)

Compelling Question	Who owns culture when ideas, traditions, and creative expressions move between groups?		
Standards & Practices	D2.His.4.9-12 — Analyze complex and interacting factors that influenced the perspectives of people during different historical eras. | D2.Eco.1.9-12 — Analyze how incentives influence choices that may result in a range of costs and benefits for different groups.		
Staging the Question	“Pop Culture Trend Watch”: students view several current or recent examples of cultural borrowing (music, fashion, hairstyles, food, dance, sports celebrations, social media trends, film/TV, advertising, celebrity culture) and respond to: What cultural element is being used? Where did it come from? Who is using it now? Who appears to benefit? The goal is not to reach a final answer.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	What is culture, and how does cultural exchange happen?	Why do some cultural practices become popular while others remain overlooked or misunderstood?	How do power, media, and money influence cultural exchange?
Formative Performance Task	Complete a Pop Culture Culture Map (cultural element → original/associated community → current use → who benefits →	Concept Sorting: place hypothetical examples (food, music, clothing, hairstyles, dance, symbols, language) on an	Four-Lens Analysis (Culture / Power / Economics / Representation) of a current pop-culture example; short written

	open questions) using a current example students bring in from the news.	exchange–appreciation –appropriation continuum; complete a Cultural Borrowing Analysis Chart addressing intent, impact, credit, and historical context.	response using at least two of context, intent, impact, power, economics, or representation.
Featured Sources	*Curated set of current pop-culture examples with brief context notes; a short reading introducing the unit's key vocabulary*	*Composite/hypothetical examples spanning food, music, clothing, hairstyles, dance, symbols, and language*	*A short case study of a cultural practice or style treated differently depending on who uses it; brief news coverage of a representation debate*
Arc Summative Check	Inquiry Arc 1 Checkpoint: students return to the Arc 1 compelling question and write a preliminary answer, to be revisited at the unit's end.		

Inquiry Arc 2: When Does Cultural Borrowing Become Appreciation, Appropriation, or Exploitation? (Lessons 4–6)

Compelling Question	When does borrowing from another culture become harmful?		
Standards & Practices	D2.Civ.14.9-12 — Analyze historical, contemporary, and emerging means of changing societies, promoting the common good, and protecting rights. | D2.His.1.9-12 — Evaluate how historical events and developments were shaped by unique circumstances of time and place.		
Staging the Question	Opening question: “If someone did not intend to offend anyone, can their action still cause harm?” Students consider examples from advertising, celebrity fashion, film/TV, music videos, social media trends, and school/sports mascots before the inquiry begins.		
	Supporting Q1	**Supporting Q2**	**Supporting Q3**
Supporting Questions	How should we evaluate the difference between appreciation and appropriation?	How can cultural borrowing create economic opportunity or exploitation?	What responsibilities do creators, companies, celebrities, and consumers have?
Formative Performance Task	Intent and Impact Matrix: place current examples into a positive/negative-intent by low/high-impact	“Follow the Money” case analysis identifying who created/maintained a tradition, who	Civic-action research and options chart; launch the GRASPS performance task, form teams, and begin work

	grid; written sentence-frame analysis of one example, supported with evidence.	popularized it, who owns the brand, and who is credited or paid; Who Benefits? Analysis weighing Perspective A (opportunity), B (exploitation), and C (context-dependent).	time using evidence gathered across the unit.
Featured Sources	*Brief case examples of advertising, celebrity fashion, or media portrayals for the intent/impact matrix*	*A "follow the money" case study of a commercially successful cultural product or trend; the three suggested Perspectives (A, B, C) for discussion*	*Student-selected current-event example plus evidence and organizers compiled across Lessons 1–5*
Taking Informed Action (Optional)	**Understand:** Research a current cultural issue in pop culture and investigate its historical and cultural context. **Assess:** Evaluate what different perspectives exist, who is affected, who benefits, what evidence supports each perspective, and what role power and history play. **Act:** Create an educational resource or recommendation for a specific audience — for example, giving credit to cultural creators, consulting cultural communities, avoiding stereotypes, sharing financial benefits, improving representation, educating consumers, or changing company/media practices.		

Lesson-by-Lesson Sequence

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
1	Arc 1 · Staging + SQ1	I will analyze complex interacting factors that shape how cultural elements move between	I can identify real, current examples of cultural borrowing across music, fashion, dance, and social media.	A. "Pop Culture Trend Watch" staging: examine current examples of cultural borrowing across music, fashion, food, dance, and social media (~20 min)	Completed Pop Culture Culture Map plus exit-ticket response on what's needed before	Culture, Cultural Exchange

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		groups using current real world examples across cultures.	I can explain how new questions emerge from examining varied, current examples, rather than reaching a premature conclusion I can complete a Culture Map tracing a cultural element from its original community to its current use and identifying who appears to benefit. I can identify what additional information I would need before judging whether a specific example is appreciation or appropriation.	B. Current Events Connection: students share a recent example from the news (~15 min) C. complete a Pop Culture Culture Map organizer (~40 min) D. exit ticket (~13 min). Lesson 1: Who_…	judging appreciation vs. appropriation.	
2	Arc 1 · SQ2	I will analyze how power	I can distinguish	A. Concept Sorting: place hypothetical	Completed Cultural	Cultural Appreciation,

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
		dynamics and economic incentives shape whether cultural borrowing is experienced as exchange, appreciation, or appropriation	cultural exchange, cultural appreciation, and cultural appropriation using precise definitions. I can collaborate to place a hypothetical example on a continuum and explain points of genuine disagreement I can construct an explanation using sound reasoning and pertinent details, applying the power/credit/profit lenses to a specific example	examples (food, music, clothing, hairstyles, dance, symbols, language) on an exchange–appreciation–appropriation continuum in small groups (~40 min) B. Key Analysis Questions discussion (power, credit, profit) (~25 min) C. complete Cultural Borrowing Analysis Chart (~23 min). Lesson 2: Who_…	Borrowing Analysis Chart.	Cultural Appropriation
3	Arc 1 · SQ3 + Arc 1 Checkpoint	I will analyze how power, money, and representation influence cultural controversies.	I can explain a well-documented pattern of differential treatment of the same cultural practice.	A. Mini-lesson on differential treatment of the same cultural practice by different groups (~15 min) B. Four-Lens Analysis (Culture / Power / Economics / Representation) of a current pop-culture example (~40 min)	Four-Lens Analysis plus Arc 1 Checkpoint response.	Cultural Exploitation, Representation

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Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			I can apply all four lenses — Culture, Power, Economics, Representation — to a real, current example I can write a short, evidence-based response using at least two of the four lenses. I can write a preliminary, revisable answer to the unit's Arc 1 compelling question.	C. short written response using at least two factors (~15 min) D. Arc 1 Checkpoint: preliminary written answer to the Arc 1 compelling question (~18 min). Lesson 3: Who_…		
4	Arc 2 · SQ1	I will analyze the relationship between intent and impact in cultural controversies.	I can share my opinion with my classmates and listen respectfully to theirs I can distinguish intent, impact, and context using precise definitions. I can construct an explanation,	A. Opening question: can an unintended action still cause harm? (~10 min) B. Intent and Impact Matrix activity using examples from advertising, celebrity fashion, media, and mascots (~40 min) C. discussion: can positive intent still lead to harmful impact? (~15 min) D. sentence-frame written analysis of a current example (~23 min).	Intent and Impact Matrix plus sentence-frame written analysis, supported with evidence.	Intent, Impact, Context

Southington Public Schools Curriculum
Current Issues

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			using sound reasoning and pertinent details, placing a real example on an Intent × Impact matrix I can evaluate whether positive or neutral intent can still coexist with high real-world impact. I can write a sentence-frame analysis of a current example, supported with evidence.	Lesson 4: Who_…		
5	Arc 2 · SQ2	I will analyze the economic consequences of cultural borrowing.	I can trace a real cultural practice's economic path from creation to popularization to present-day profit. I can explain points of genuine disagreement between	A. "Follow the Money" case analysis: who created it, who popularized it, who profits, who's credited? (~35 min) B. discussion of Perspectives A (opportunity), B (exploitation), and C (context-dependent) (~30 min) C. Who Benefits? Analysis writing task (~23 min).	Who Benefits? Analysis with evidence-based reasoning.	Stereotype; reinforcement of Cultural Exploitation

Southington Public Schools Curriculum
Current Issues

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			competing perspectives on economic exploitation I can write a Who Benefits? analysis using evidence-based reasoning.	Lesson 5: Who_…		
6	Arc 2 · SQ3 + Summative	I will construct and communicate an evidence-based argument about a current cultural controversy.	I can demonstrate my knowledge of unit vocab I can select a current, specific cultural controversy and explain its relevant historical and cultural context. I can construct an argument using precise, knowledgeable claims with evidence, acknowledging counterclaims I can organize and prioritize evidence from multiple	A. Vocabulary Quiz B. “Trend Watch” selection of a current controversy, trend, or example (~15 min) C. GRASPS workshop time to build the chosen resource (guide, PSA, podcast, video essay, infographic, article, or campaign) (~50 min) D. share/present resources (~13 min); remaining work and presentations may extend to a following period. Taking Informed Action task assigned. Lesson 6: Who_…	GRASPS cultural-issues resource scored with the unit rubric; Taking Informed Action follow-through.	Applied use of full vocabulary list

Southington Public Schools Curriculum
Current Issues

Lesson	Arc / Focus	Learning Target	Success Criteria	Key Activities	Formative Assessment	New Vocab
			credible sources to support my claims I can present my argument to reach a real audience beyond the classroom			

Current Issues Curriculum

SHS Social Studies

Why Current Issues?

A Current Issues course is essential at the high school level because students need more than knowledge of current events—they need the skills to **evaluate information, recognize bias, understand global issues, and participate responsibly in civic life**. Research shows that media-literacy instruction can improve students' ability to evaluate news and increase their political knowledge and civic confidence.[1] Research also finds that positive attitudes toward news and current events are strong predictors of adolescents' intentions to participate in civic life.[2]

1: Sabine Geers, Mark Boukes, and Judith Moeller, "Bridging the Gap? The Impact of a Media Literacy Educational Intervention on News Media Literacy, Political Knowledge, Political Efficacy among Lower-Educated Youth," Journal of Media Literacy Education 12, no. 2 (2020): 41–53.

2: "Learning to Engage: How Positive Attitudes about the News, Media Literacy, and Video Production Contribute to Adolescent Civic Engagement," Educational Media International 50, no. 4 (2013).

Course Overview

The Current Issues course will teach students the importance and value of paying attention to the world around them. Throughout 5 units, students will develop the skills necessary to critically think about current events and issues. They will understand their civic responsibilities and role global citizens.

What makes this course unique is that students have a say in which units are taught. Their Unit 1 Performance Task requires them to convince their classmates and teacher that a specific topic deserves to be one of the three units at the end of the semester. The 3 best arguments will then become the last 3 units of the course.

Mandatory Introductory Units

Unit 1: Why Current Issues?

This is the mandatory opening unit. It will ask students to consider what it means to be a global citizen and the importance of staying informed. Essentially, why study current issues? The semester's final three units are then chosen using arguments that students build in this unit's summative task.

Lesson Topics & Activities Include:

- Civic Knowledge Data Analysis
- Headlines Gallery Walk
- Local-to-Global Case Study
- Argumentative Essay

Unit 2: Decoding the Headlines

This unit examines the fundamentals of today's news and the dangers of fake news and media bias. Over the course of this unit, students will learn about what makes an event truly "newsworthy", the differences and dangers of misinformation and disinformation and how media bias can influence our views on the world and current events. Students will practice identifying the criteria of a news story, the tactics used to spread disinformation and how to spot media bias in the news.

This unit is meant to support media literacy skills used across all disciplines and emphasize real life applications to students.

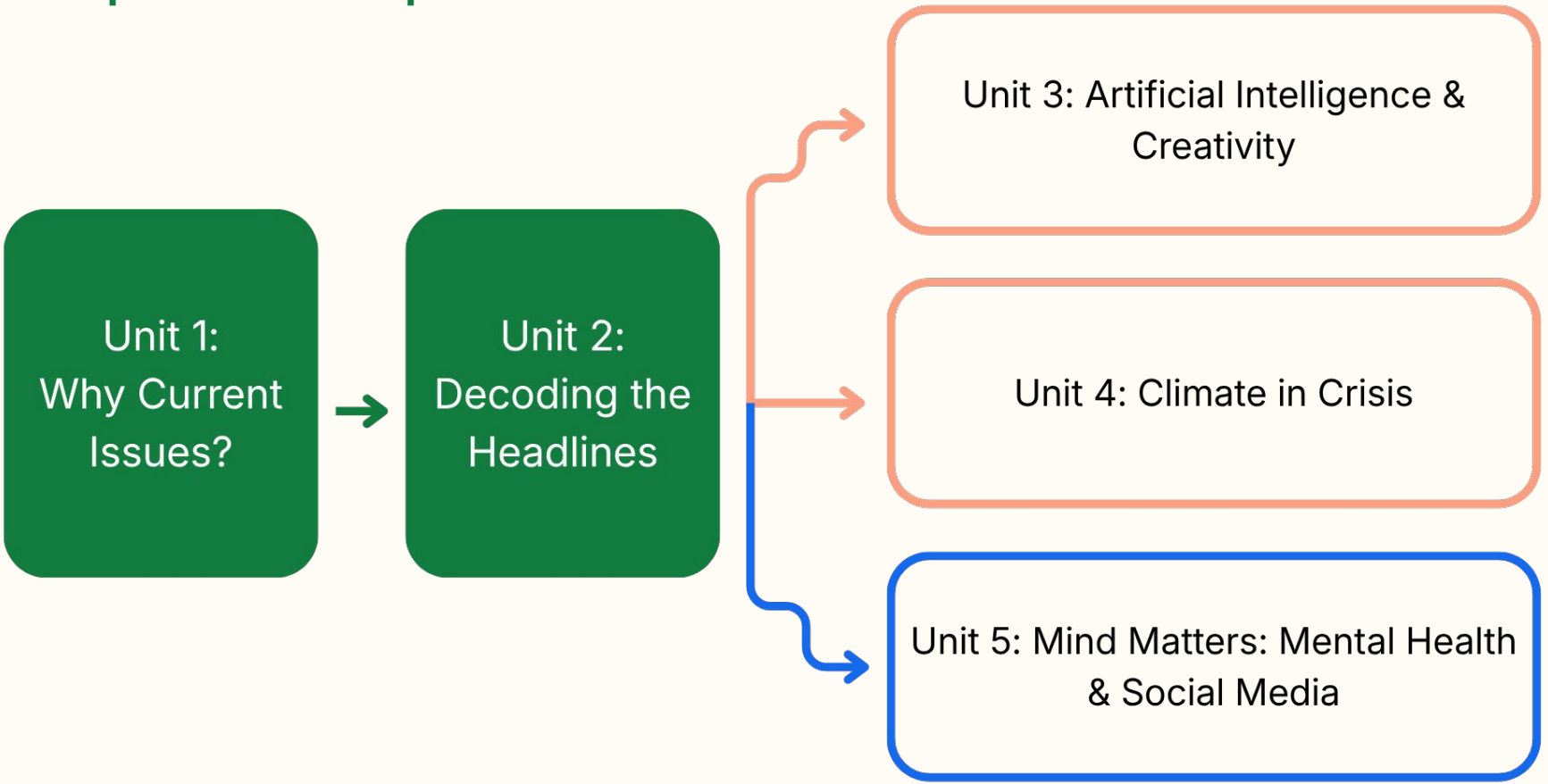
Unit 1:
Why Current Issues?

Unit 2:
Decoding the Headlines

- Artificial Intelligence & Creativity
- Bridging the Gap: Income Inequality in the U.S.
- Climate in Crisis
- Displaced Dreams: Refugees
- Hot Spots: Political Issues of the 21st Century
- Mind Matters: Mental Health & Social Media
- Safeguarding Society: Navigating Public Safety
- The State of Education
- Who Owns Culture?

Each unit connects to other electives at SHS, fostering curiosity of further exploration

Example Semester Experience



Why Current Issues at SHS?

A dedicated course gives students regular opportunities to analyze current events, compare sources, evaluate evidence, discuss complex issues, and connect local events to national and global developments. Rather than telling students **what to think**, Current Issues teaches them **how to think critically** about the information they encounter and how to participate thoughtfully in their communities and the world.

BOARD OF EDUCATION
SOUTHINGTON, CONNECTICUT

Informational Only X **Board Meeting Date** October 29, 2026

Decision Requested _____ **Agenda Code** 9 h.

AGENDA REPORTING FORM

Agenda Topic: SHS History - American Culture - Revised - First Reading.

Summary of Issue: SHS History - American Culture - Revised - First Reading.

Background: _____

Alternative Strategies: N/A

Cost (if applicable): N/A **Funding Source:** N/A

Beginning Date of Program or Project: N/A

Ending Date of Program or Project: N/A

Recommendation or Comment: The Board of Education Curriculum & Instruction Committee is bringing the SHS History - American Culture - Revised – to the full Board for a First Reading.

Titles of Attachments:

1. Course Proposal

Signature of Staff Member Submitting Report

Signature of Superintendent of Schools

Southington Public Schools Curriculum
American Culture

Unit 1 Overview	
Unit Title:	**Unit 1: Prosperity, Conformity, and the American Dream (1950–1962)**
Teacher(s):	**Kurt Armintrout; Charles Kemp**
Grade Level/Course:	**10th - 12th Grade**
Length/Dates:	**11 class sessions (88 minutes each)**
Unit Summary: 2-4 sentences describing the main ideas, content and skills of the unit.	**Students examine how postwar prosperity, suburbanization, television, consumer culture, teen popular culture and Cold War anxieties shaped American identity. Students evaluate competing definitions of success and explore who was included—and excluded—from the postwar American Dream.**

Stage 1: Desired Results

Grade Level/Subject Standard(s)
List the Content Standards, Guiding Principles, or Cross-Curricular Skills this unit will address

CT Social Studies Framework:
CG.Civ.5.b. Evaluate the effectiveness of strategies used by an individual, group or institution in addressing a social problem at the local, state, tribal, national, and/or international level (e.g., social protest movements, get-out-the-vote campaigns, conscious consumerism).
US.Eco.13.a Explain why investments in infrastructure and industry expanded consumer culture and increased standards of living in the United States (e.g., housing access, mass production, urbanization, utilities).
US.His.5.b Analyze the role of popular culture, subculture, and counterculture in shaping public perception of national identity during the post-World War II era (e.g., Beat Generation, Rock and Roll, Motown, Jazz, Hippies, television sitcoms, Hollywood films).

Inquiry Standards:
US.Inq.1.a Explain how compelling and supporting questions reflect an enduring issue in United States History.
US.Inq.3.a Gather relevant information from multiple sources representing a wide range of views and mediums while using the origin, authority, structure, context, and corroborative value to guide the selection of credible sources.
US.Inq.3.b Organize and prioritize evidence directly and substantively from multiple sources in order to develop or strengthen claims.

Common Core State Standards:
CCSS.ELA-Literacy.RH.11-12.3 Evaluate various explanations for actions or events and determine which

explanation best accords with textual evidence.
CCSS.ELA-Literacy.RH.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media in order to address a question or solve a problem.
CCSS.ELA-Literacy.WHST.11-12.1.a Write arguments focused on discipline-specific content: Introduce precise, knowledgeable (claims), establish the significance of the claim(s), distinguish the claim(s), from an alternate or opposing claims, and create an argument that logically sequences the claim(s), counter-claims, reasons and evidence.

Other Goal(s)
List the Disciplinary Transfer Goals that this unit will address

- Reading comprehension
- Reading maps & charts
- Primary Source work (reading & understanding, sourcing, writing a claim)
- Analyzing multimedia sources
- Inquiry

Transfer Goals (Vision of the Graduate)
List the long-term and/or school-wide independent student behaviors that this unit will address.

Creativity/Innovation Transdisciplinary Goal:
Students work creatively to design and refine implementation of ideas by taking risks, persevering, and exploring possibilities.
Collaboration Transdisciplinary Goal:
Students flexibly and cooperatively work with others in physical and virtual environments and assume shared responsibility for completing a project or achieving a goal.
Citizenship Transdisciplinary Goal
Students demonstrate an empathetic understanding of social issues and value different perspectives so that they can contribute to local and global communities.

Enduring Understanding(s): What are the big picture understandings that are transferable across contexts, places, and times?	1. American identity is shaped by historical events, shared values, and cultural institutions, but different groups experience that identity in different ways. 2. The American Dream reflects changing cultural values and is influenced by economic opportunity, social expectations, and access to resources, although the American Dream has never been equally available to all Americans. 3. Consumer culture in America influences how individuals express identity, define success, and measure social status. 4. Popular culture both reflects and reinforces societal beliefs about race, gender, and belonging. 5. Americans continually balance individual freedom with social responsibility. 6. Cultural change often begins when individuals or groups challenge existing norms and institutions.
Essential Question(s):	1. What does it mean to be an American? 2. Who has access to the American Dream? 3. How does consumer culture shape identity?

Southington Public Schools Curriculum
American Culture

These questions are related to the enduring understandings and provide relevance for the learning in the unit.	4. How have representations of racial and ethnic groups in American popular culture changed over time, and what do those representations reveal about belonging and power? 5. When should Americans challenge the status quo? 6. What values defined America?

What will students <u>know...</u> Factual information, vocabulary and basic concepts related to each standard/goal	**What will students <u>be able to do…</u>** Skills, processes and/or knowledge that are related to each standard/goal and which students will be able to use in new contexts/with new material
• American Dream: competing definitions of success, security, mobility, and belonging • Consumerism and materialism: postwar purchasing power, advertising, status, and identity • Suburbanization and the Baby Boom: housing growth, family ideals, infrastructure, and unequal access • Conformity and the nuclear-family ideal: gender roles, social expectations, and pressures to belong • Mass media and television culture: creation of shared narratives and reinforcement of social norms • Teen culture and rock and roll: youth purchasing power, racial/cultural exchange, and generational change • Civil Rights Movement: segregation, integration, early direct action, and challenges to unequal access **Vocabulary** • American Dream • Consumerism • Materialism • Conformity • Suburbanization • Baby Boom • Cold War • McCarthyism • Red Scare • Mass Media • Television Culture	• Analyze primary and secondary historical and cultural sources for context, perspective, purpose, and evidence. • Gather and evaluate relevant information from multiple text, visual, audio, and multimedia sources, considering origin, authority, context, and corroboration. • Organize and prioritize evidence from multiple sources to develop and strengthen a claim. • Interpret and analyze data from maps, charts, graphs, and demographic evidence. • Evaluate multiple historical and cultural perspectives, including perspectives that complicate dominant narratives. • Construct evidence-based historical and cultural arguments that acknowledge tension, exclusion, and counterevidence. • Identify continuity and change in cultural values. • Analyze how media (advertisements, television, film, music) both reflected and reinforced public attitudes and social norms. • Evaluate the effectiveness of strategies used by individuals and groups to challenge social problems and cultural norms.

• Civil Rights Movement • Segregation • Integration • Nuclear Family • Beat Generation • Rock and Roll	

AMERICAN CULTURE CURRICULUM

SHS Social Studies

Why study American Culture?

American culture is an important part of understanding who we are, what we value, and how Americans understand their place in society. Popular culture, media, music, television, film, technology, consumerism, and social movements all reflect and influence American values and identity. Without an understanding of American culture, students are less prepared to understand the ways Americans have understood and debated identity, race, equality, opportunity, and freedom.

Course Unit Overview

01 Prosperity, Conformity, and the American Dream

02 Rights, Resistance, and Cultural Revolution

03 Culture Wars, Consumerism, and Media Expansion

04 Digital America: Identity, Connection, and Polarization

01

Prosperity, Conformity, and the American Dream

Unit 1: Prosperity, Conformity, and the American Dream (1950-1962)

This unit introduces students to postwar American culture and the development of the 1950s American Dream. Students explore prosperity, suburbanization, consumer culture, gender roles, race and segregation, rock 'n' roll, conformity, and the impact of the Cold War on American life.

Performance Task: The American Dream on Trial

Students use historical sources and popular culture to evaluate who had access to the American Dream—and who did not. They will present their findings in a multimedia presentation.

02

Rights, Resistance, and Cultural Revolution

Unit 2: Rights, Resistance, and Cultural Revolution (1963-1979)

Students will examine the Civil Rights Movement, Black Power, the women's movement, counterculture, the Vietnam War, protest movements, Woodstock, rock music, television, and political and social divisions. Students will investigate how Americans challenged established ideas about race, gender, authority, freedom, and the status quo.

Performance Task: Culture in Conflict

Students investigate a cultural conflict and analyze competing perspectives, values, and challenges to the status quo by creating a podcast episode.

03

Culture Wars, Consumerism, and Media Expansion

Unit 3: Culture Wars, Consumerism, and Media Expansion (1980–2000)

This unit examines the changing cultural landscape of the 1980s and 1990s. Students will explore Reagan-era America, consumerism, the War on Drugs, racial tensions, mass incarceration, the rise of hip-hop, culture wars, globalization, and the expansion of cable television and the internet.

Performance Task: Teen Identity Over the Decades

Students create a cultural magazine article that examines the evolution of teen identity and the portrayal of teens in popular media over multiple decades.

04

Digital America: Identity, Connection, and Polarization

Unit 4: Digital America: Identity, Connection, and Polarization (2001-2025)

Students examine 9/11, the War on Terror, the 2008 financial crisis, social media, racial justice, political polarization, misinformation, and technology. Students will consider whether technology has strengthened American culture or contributed to greater division and polarization.

Performance Task: The 2008 Financial Crisis: Who's to Blame?

Students evaluate the causes of the financial crisis and participate in a debate where they work collaboratively to defend one party's actions and argue why other parties are to blame for the crisis.

THANK YOU

Southington Public Schools

Continuous Improvement Outcomes

2025-2026 School Year

October 29, 2026

Next Generation Accountability System

Connecticut's Next Generation Accountability System is "a broad set of 12 indicators that **help tell the story** of how well a school is **preparing its students for success** in **college, careers and life**. It provides a **holistic, multifactor perspective** of district and school performance" (CSDE Next Generation Accountability Dashboard).

Schools and districts earn points for performance in the indicators below:

- **Academic Achievement: Literacy, Math, Science**
- **Academic Growth: Literacy, Math, English Proficiency**
- Chronic Absenteeism
- College and Career Readiness: Participation and Performance
- High School Graduation: On-Track and Graduation Rates
- Postsecondary Entrance & Persistence
- Physical Fitness
- Arts Access

Grades K-8 Literacy Achievement and Growth

SBA Literacy: Achievement Overview

District and State Achievement Comparison, SBA Literacy, 2025-2026

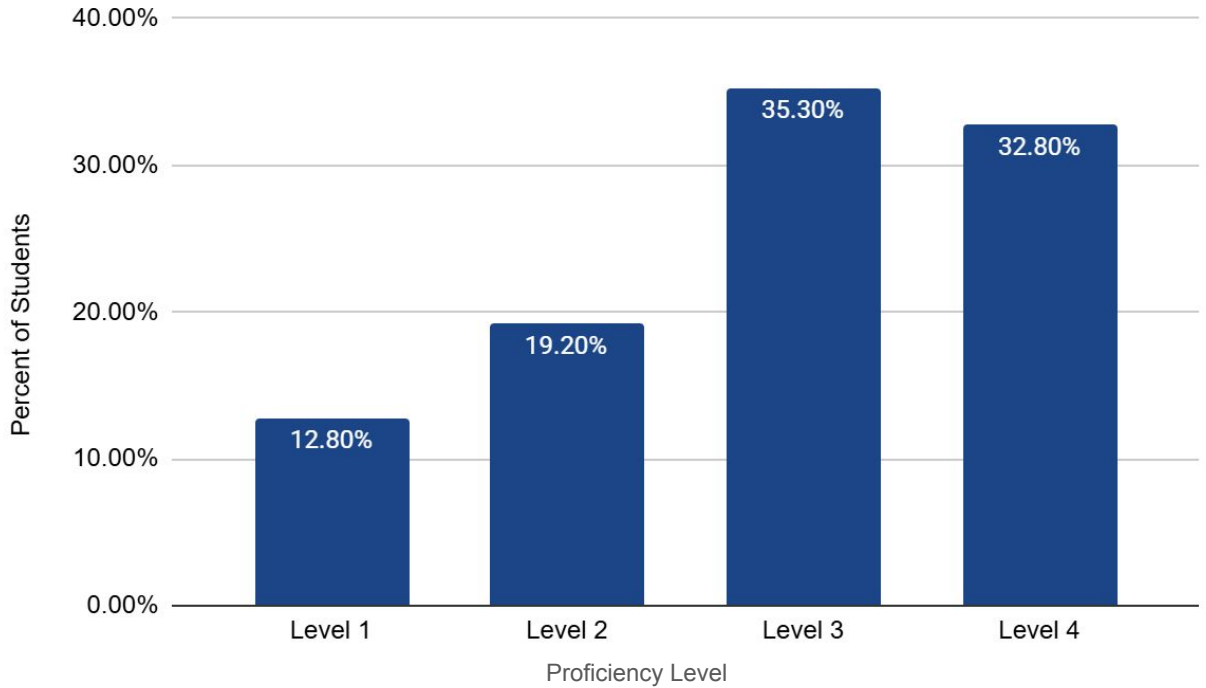
	District Average	State Average
Percent of Students Level 3 or 4	68%	51%

District Achievement by Grade, SBA Literacy, 2025-2026

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Percent of Students Level 3 or 4	67%	66.4%	65.2%	68.7%	73.5%	67.4%

SBA Literacy: Score Distribution

District Score Distribution, SBA Literacy, All Grades, 2025-2026



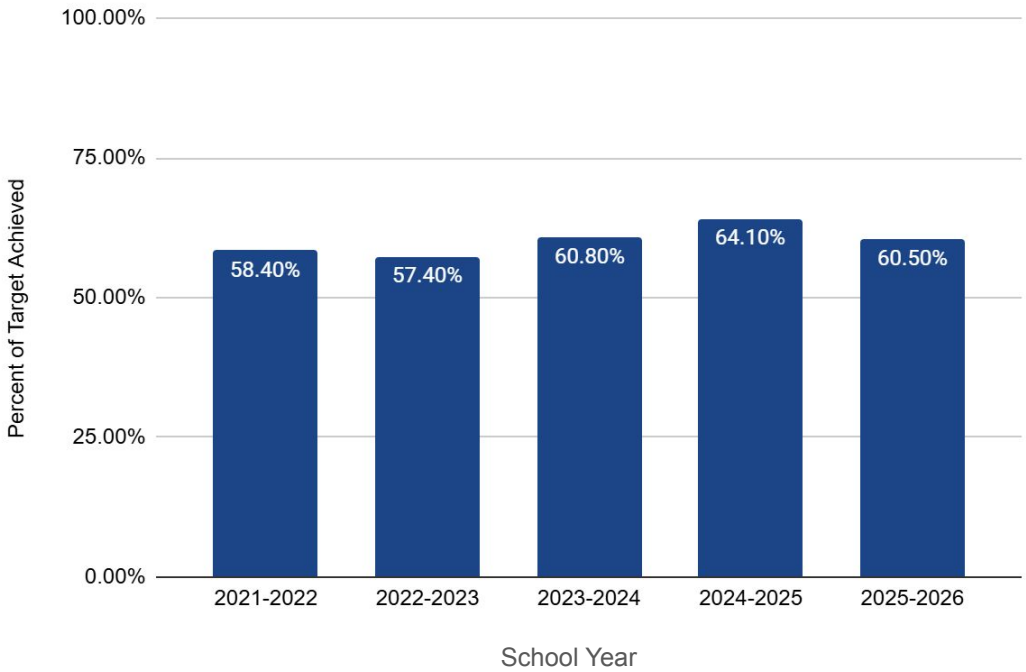
SBA Literacy: Achievement Trend, All Students and High Needs

District Achievement Trend, All Students and High Needs, SBA Literacy

	2018-2019	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
All Students: Percent Level 3 or 4	68.1%	64.1%	62.8%	64.9%	66.9%	68.0%
High Needs Students: Percent Level 3 or 4	45.5%	39.9%	41.7%	40.3%	44.7%	46.1%

SBA Literacy: Growth Trend

Average Percent of Growth Target Achieved, SBA Literacy, Trend



Grades K-2 Reading

DIBELS End of Year Benchmark, Grades K-2, 2025-2026

	Percent Meeting/Exceeding EOY Benchmark		
	2023-2024	2024-2025	2025-2026
Kindergarten	87%	89%	90%
Grade 1	81%	86%	87%
Grade 2	73%	76%	80%

K-12 LAS Links Literacy

District Growth, LAS Links Assessment, 2025-2026

	Growth Rate	Average Percent of Target Achieved
Literacy	43.8%	70.3%
Oral	46.9%	71.7%

Grades 3-8 Math Achievement and Growth

SBA Math: Achievement Overview

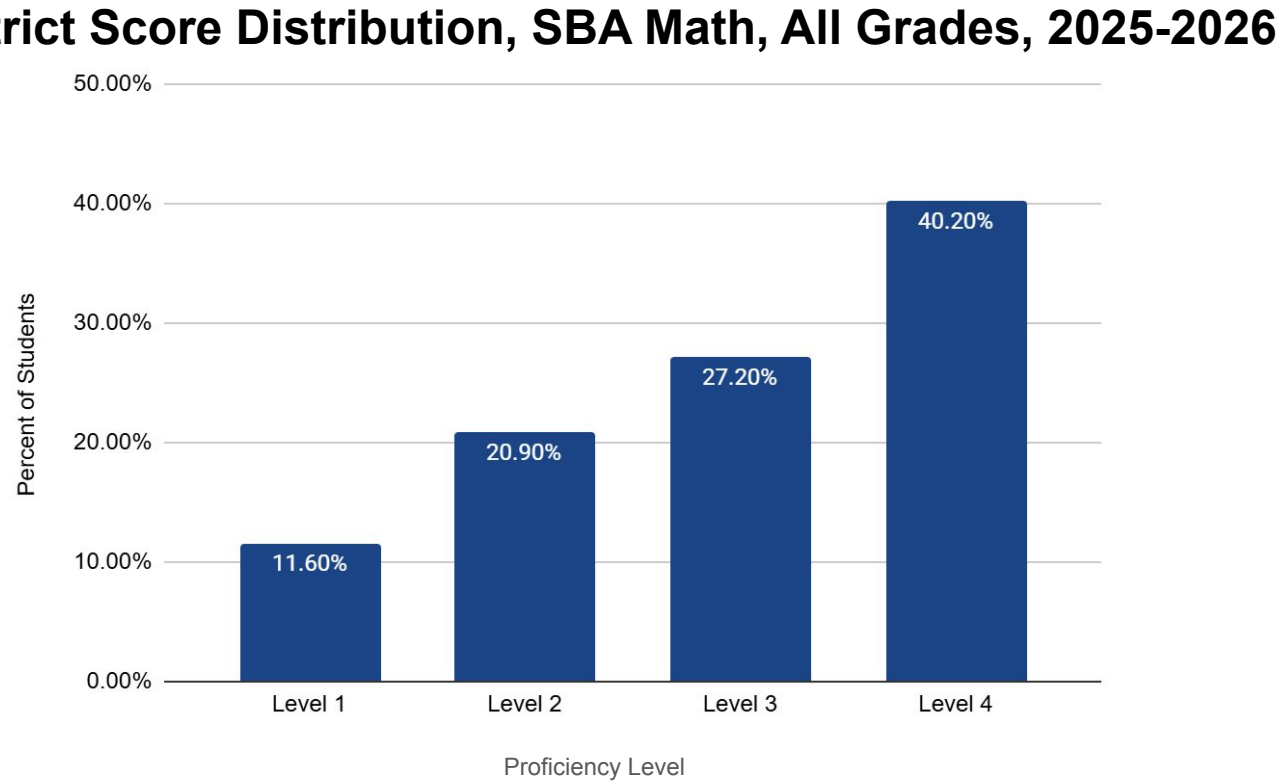
District and State Achievement Comparison, SBA Math, 2025-2026

	District Average	State Average
Percent of Students Level 3 or 4	67.4%	46.7%

District Achievement by Grade, SBA Math, 2025-2026

	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Percent of Students Level 3 or 4	72%	70%	64.6%	66.8%	70.1%	61%

SBA Math: Score Distribution



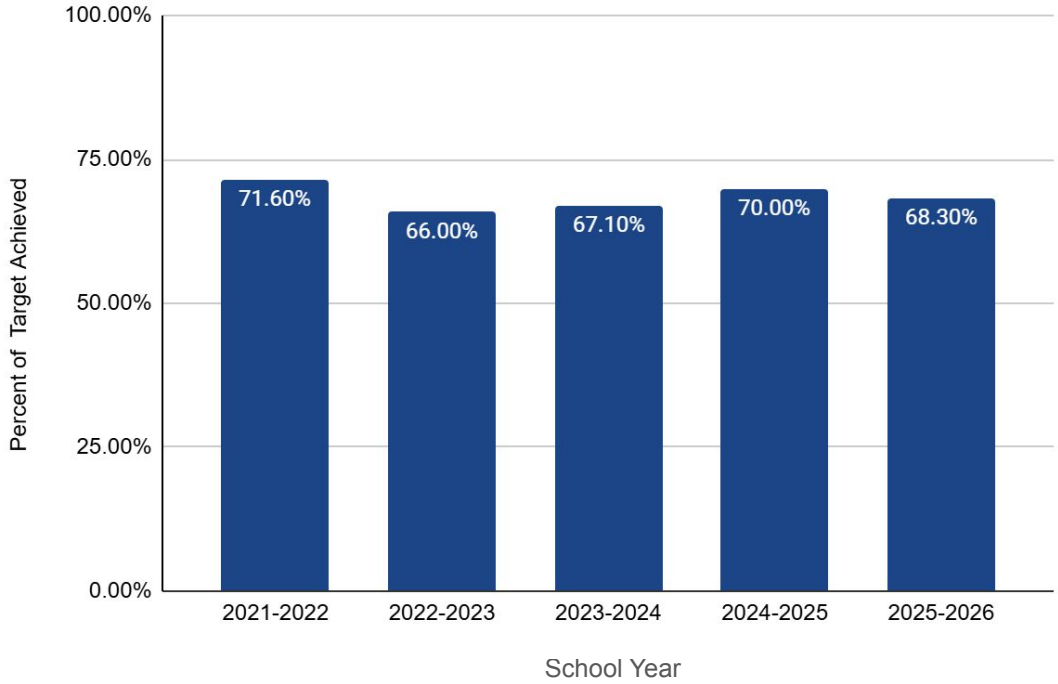
SBA Math: Achievement Trend, All Students and High Needs

District Achievement Trend, All Students and High Needs, SBA Math

	2018-2019	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
All Students: Percent Level 3 or 4	62.5%	58.4%	61.2%	63.7%	66.7%	67.4%
High Needs Students: Percent Level 3 or 4	38.5%	32.9%	37.1%	37.2%	42.6%	44.8%

SBA Math: Growth Trend

Average Percent of Growth Target Achieved, SBA Math, Trend



Grades 5, 8, 11
Science Achievement

NGSS Assessment: Achievement Overview

District and State Achievement Comparison, NGSS Assessment, 2025-2026

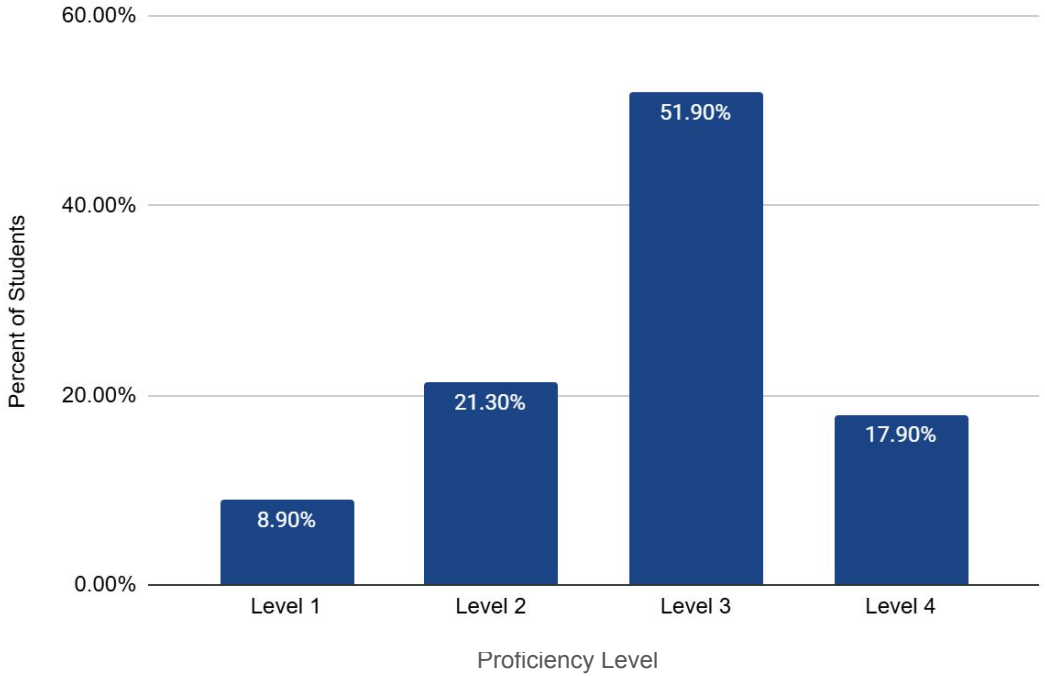
	District Average	State Average
Percent of Students Level 3 or 4	69.8%	51.4%

District Achievement by Grade, NGSS Assessment, 2025-2026

	Grade 5	Grade 8	Grade 11
Percent of Students Level 3 or 4	67%	75.4%	67.5%

NGSS Assessment: Score Distribution

District Score Distribution, NGSS Assessment, 2025-2026



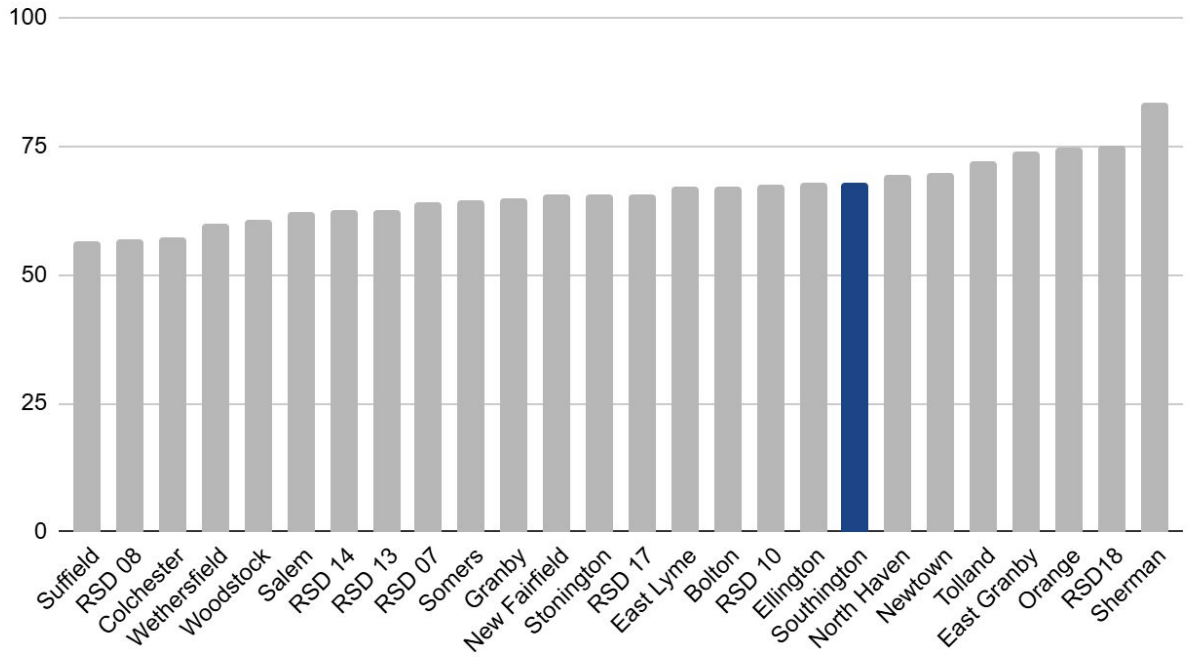
NGSS Assessment: Achievement Trend, All Students and High Needs

District Achievement Trend, All Students and High Needs, NGSS Assessment

	2018-2019	2021-2022	2022-2023	2023-2024	2024-2025	2025-2026
All Students: Percent Level 3 or 4	65%	62.9%	65.9%	65.8%	69.3%	69.8%
High Needs Students: Percent Level 3 or 4	45%	38.5%	42.6%	43.1%	48.9%	47.1%

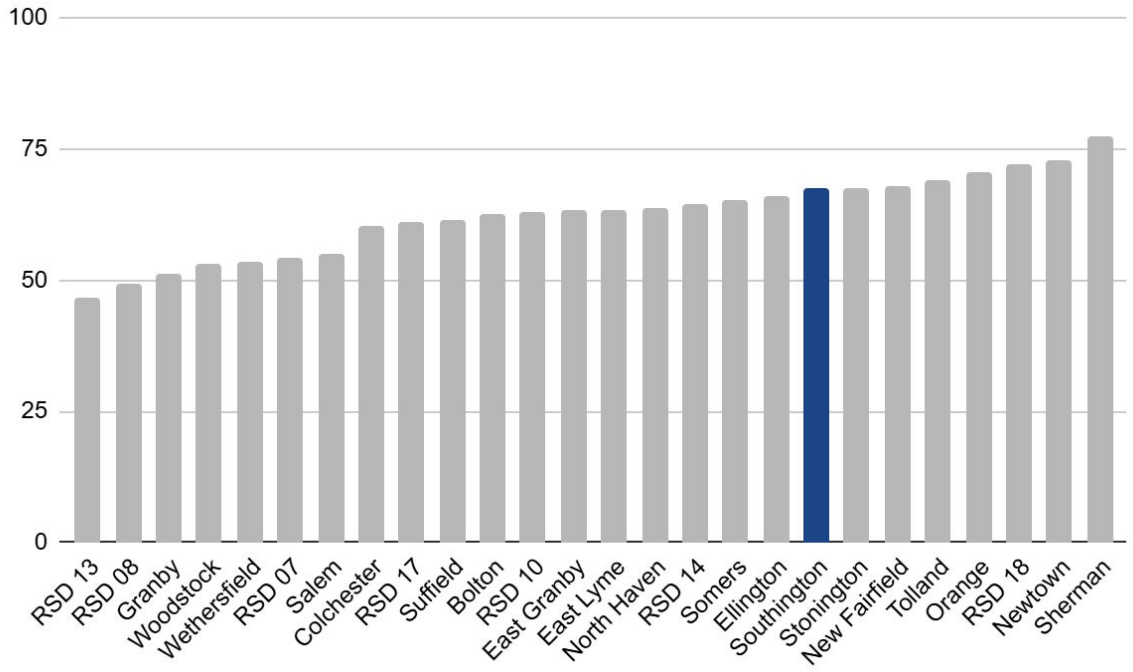
DRG C Comparison, Literacy

Grades 3-8 Smarter Balanced Literacy, Percent of Students Levels 3 or 4, 2025-2026



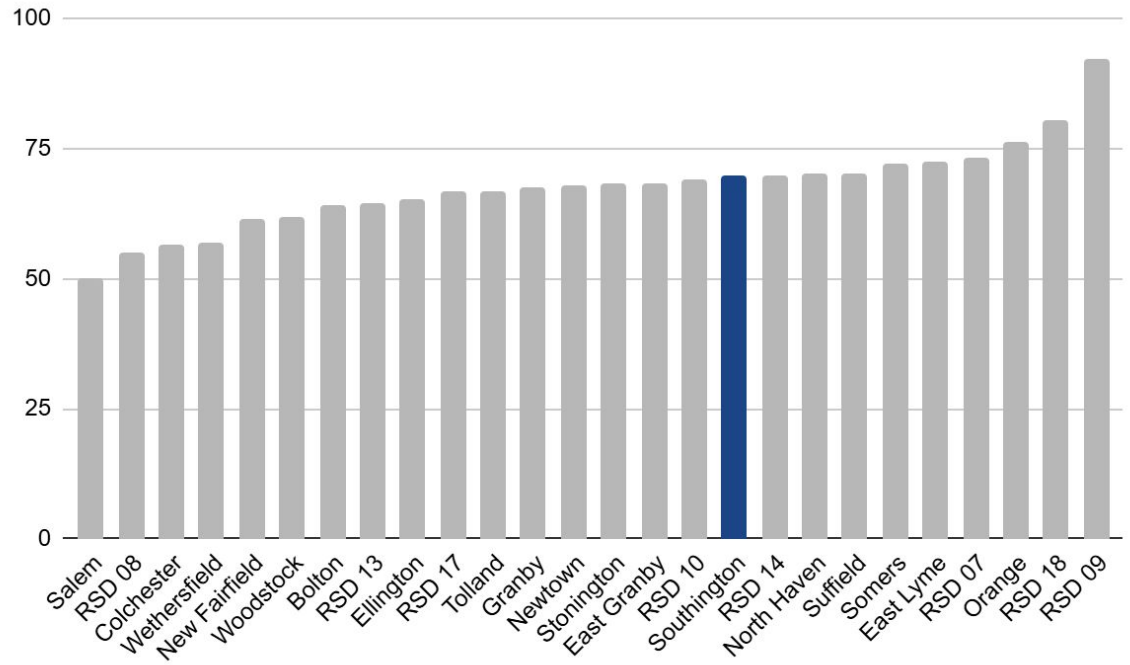
DRG C Comparison, Math

Grades 3-8 Smarter Balanced Math, Percent of Students Levels 3 or 4, 2025-2026



DRG C Comparison, Science

Grades 5, 8, 11 NGSS Assessment, Percent of Students Levels 3 or 4, 2025-2026



Continuous Improvement Strategies

Strategic Priority 1

- Consistent, rigorous, aligned curriculum
- Evidence-based professional learning and coaching
- Framework for equitable, high-quality teaching and learning for all

Strategic Priorities 2, 6

- Systems and structures for student support
- Strategies for student social-emotional learning and wellbeing

Southington Public Schools
BOARD OF EDUCATION
2027 REGULAR MEETING DATES
7:00 p.m.
John Weichsel Municipal Center Public Assembly Room
200 North Main Street, Southington, CT



January 14, 2027
January 19, 2027 (Budget Workshop)
January 21, 2027 (Budget Workshop)
January 28, 2027

February 25, 2027

March 25, 2027

April 8, 2027
April 29, 2027

May 20, 2027
May 27, 2027

June 10, 2027

August 19, 2027

September 9, 2027
September 23, 2027

October 14, 2027
October 28, 2027

November 18, 2027

December 16, 2027

DRAFT

Board Approved xxxxx

10/20/2026 9:07 AM