Board of Education Curriculum, Assessment & Professional Practices Committee Meeting

Thursday, April 7, 2022 7:00 PM
Board of Education Conference Room E, 1 School Street, PO Box 253, Bethel, CT 06801

1. **STEAM Course - Bethel Middle School**
2. **SEL Update**
3. **New Business**
4. **Public Comment**
   (Please note: The Board welcomes Public Comment and asks that speakers please limit their comments to 2 minutes. Speakers may offer objective comments of school operations and programs that concern them. The Board will not permit any expression of personal complaints or defamatory comments about Board of Education personnel and students, nor against any person connected with the Bethel Public School System.)
5. **Adjourn**

Bethel Middle School Essentials Course

Barbara Sheehan • Donna Burns • Bryan Watson

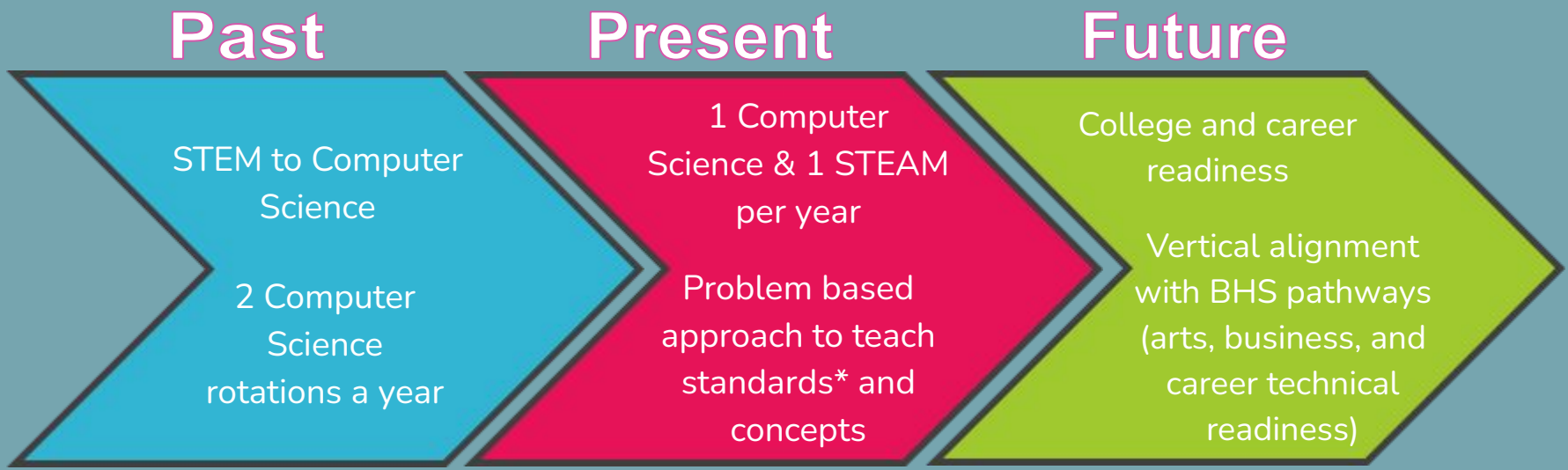
Course Description

- Problem Based Learning approach
- Implement Engineering Design Process
- Reinforce math and science standards
- Incorporate research and inquiry
- Apply Global Competencies
- Infuses art and technology

Course Details

- BMS Essentials Course
- 6, 7 & 8th grade
- 36 days
- 1:28 ratio
- interdisciplinary

Rationale



*Computer Science Teaching Association (CSTA), NGSS Engineering & Design, ISTE, Common Core, BPS Global Competencies

Statement of Need

Goal: Broaden Exposure, Reinforce & Support Content Areas, Application & Transfer

- Broaden student exposure to **diverse content**
- Apply design and **critical thinking** across grade levels
- Apply previous year's **standards** in novel ways
- Extend NGSS standards - **Engineering** Design Process, Human Impact
- Utilize a problem based approach to reinforce the BPS **Global Competencies**
- Provide interdisciplinary opportunities that **transfer skills** across content areas
- Inspire curiosity, build persistence

Course Objectives

Long Term Goal

Global Competency Transfer Goal 4- exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community.

Transfer Goal

Actively seek and analyze new information and perspectives to define problems and develop solutions

Essential Understandings:

- The application of the design process is an important problem-solving method to the development of inventions and innovations.
- The creative process of developing a new design to solve a problem is a central element of engineering.
- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.
- Technological design is a creative process that anyone can do which may result in new innovations and inventions.
- Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate.
- Engineers draw on research from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

Resources & Materials

- No textbook
- Consumable Materials
- Digital Resources:
  - Defined Learning
    - Current cost = $0
    - CSDE purchasing Defined Learning and Defined Careers through June 30, 2024
    - Cost as of July 1, 2024
      - Defined Learning Building License: $5,000/yr, or
      - Defined Careers: $7/student

  - Gizmos $980 educator license
- BEF Grant Application

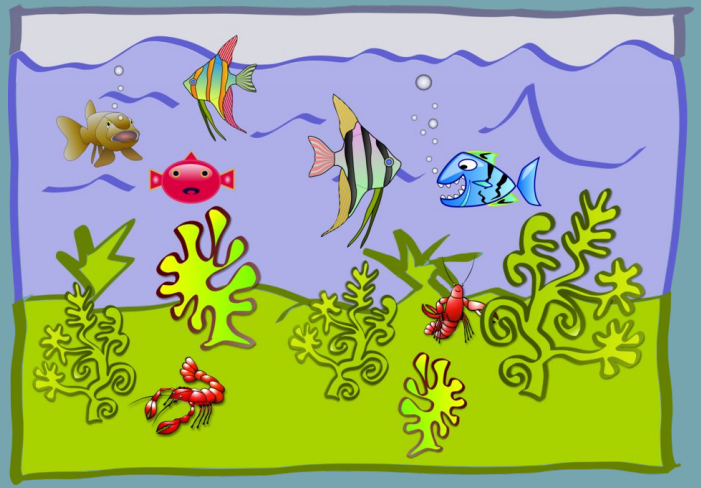
DefinedLearning

Aquarium Designer

As a new designer with a background in aquatic habitats, you want to win over the design and production team of the hottest new interior design firm in the north...

Grade 6: Aquarium Designer

Problem: *You are applying for a job with a design firm that makes custom aquariums. Design and create an innovative aquarium considering environment, fish and other organisms, as well as calculating volume of your aquarium*

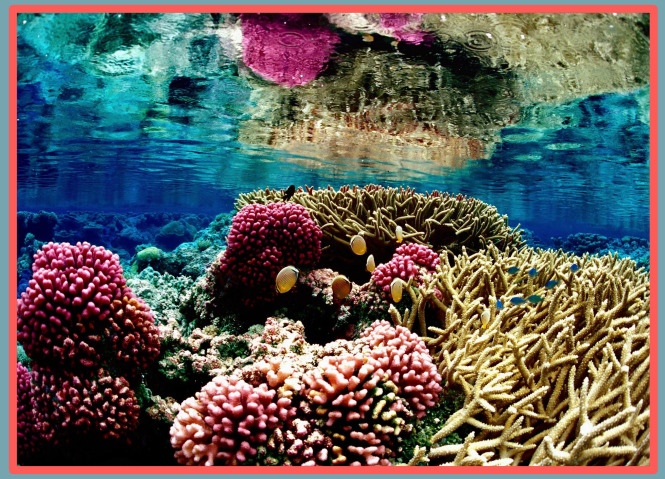


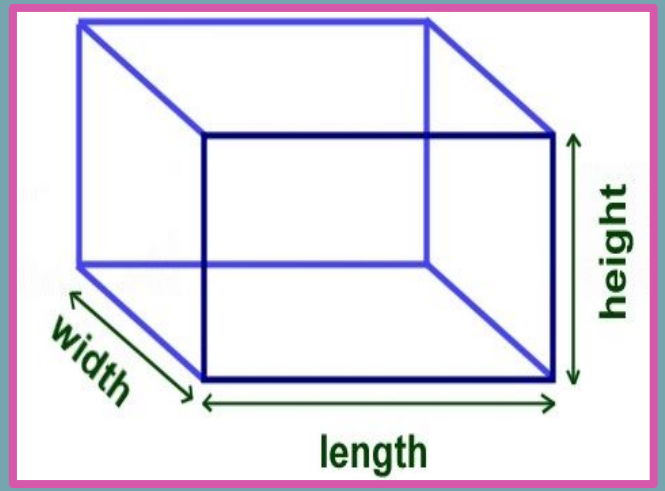
Product: *Students will create a prototype aquarium using classroom materials*

Process: *Design process Students will research and brainstorm to connect organisms to the volume of the tank. STudents to recognize the design criteria and constraints.*

STEAM

- Careers
- Scaled Models
- Habitats and Environments
- How do Fish Thrive, Breath
- Ecosystems





Grade 7 -
Mars Transportation Consultant, creating a Spaceport

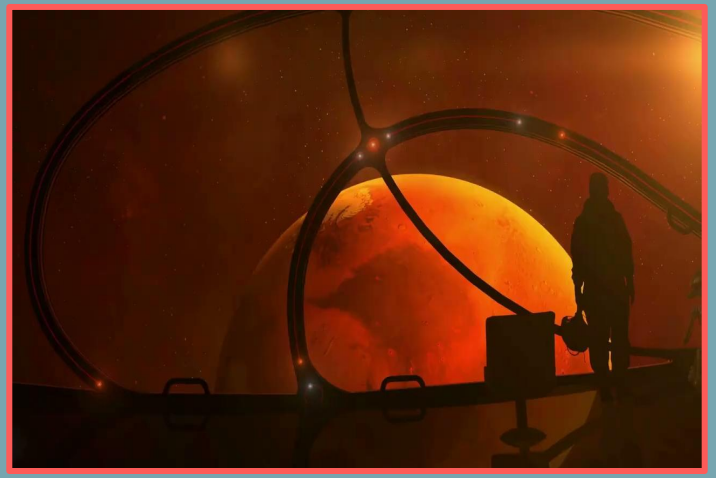
Problem: *Problem: As a transportation consultant, how would you entice people to want to travel to Mars?*

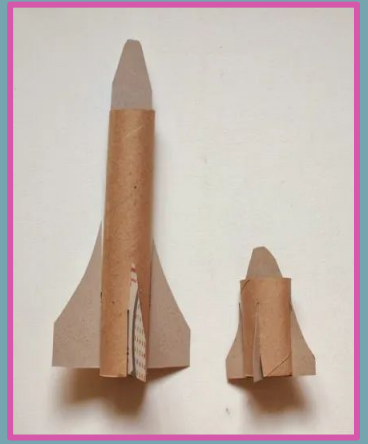
Product: *WeVideo commercial*

Process: *Using the design process, students brainstorm what they believe customers would need to travel to, or settle on Mars. They also consider any information they can discover about the planet and atmosphere. Students plan the commercial by deciding relevant facts. Create: A script with relevant points, and use wevideo to find images for you commercial. When done, students will group together to provide constructive criticism to reflect on what things could be improved.*

STEAM

- Modeling
- Research
- Science–Newton’s Law
- NASA virtual Tour–Satellites
- Bottle Rockets
- Careers in Aeronautics



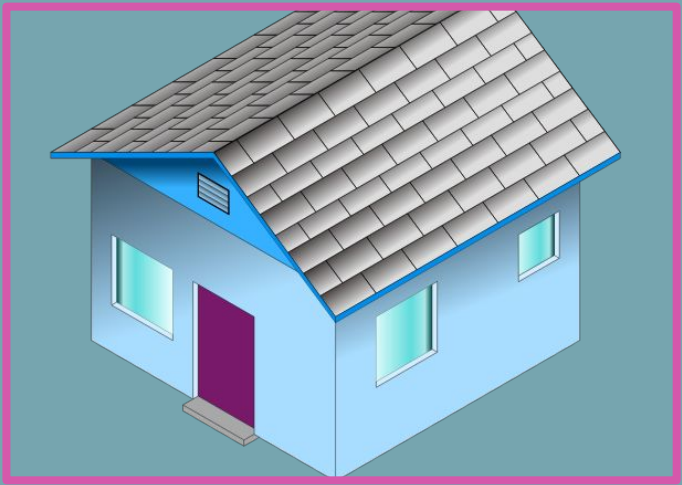


Research: ***Problem Solving and Design:***

Sources You Consulted : Include Link or MLA Citation (Citation maker here)	Ideas Taken From Sources: • Use bullet notes to explain the ideas from each source	What Issues did you Encounter In Your Build and Design: • Explain using bullet notes	How Did You Problem Solve? • Explain how you solved the issues you mentioned in the previous column
Also NASA	The space shuttle was piloted by an internal crew	Radio communication between Earth and outer space would have a long delay. Meaning the spaceplane would need an onboard pilot in the form of a computer or crew.	Onboard cargo could be switched out for a crew compartment.
	The space shuttle has two exits, a side and top exit. Both exits have thermal aprons to protect the astronauts from burning theirselves on the plane.	We don’t have that < I don’t think I even put a door on it…	Add two mid-ship side hatches, one with a docking mechanism, and another hatch with a deployable ladder to the roof.
Britannica	The space shuttles had external fuel+oxidizer tanks	Not enough room on the spaceplane, meaning we’d have much less fuel than we need	Copy NASA and put on an external tank. This would be easy since we already have an external port for fuel.
NASA	The Appollo 11 crew service compartment had parachutes for a soft landing	Landing would be very difficult without a very long runway for the plane to lose speed.	Parachutes could be added to both ends of the plane. One for emergency landing and another for regular use.
Gale (Images)	The space shuttle has a part of wing thats angled \/		Flaps on both of the wings will help with drag and

Grade 7 - Tiny House Architect

Problem: *Problem: How can we as architects and engineers, create a tiny house that is more affordable and environmentally conscious than traditional housing?*

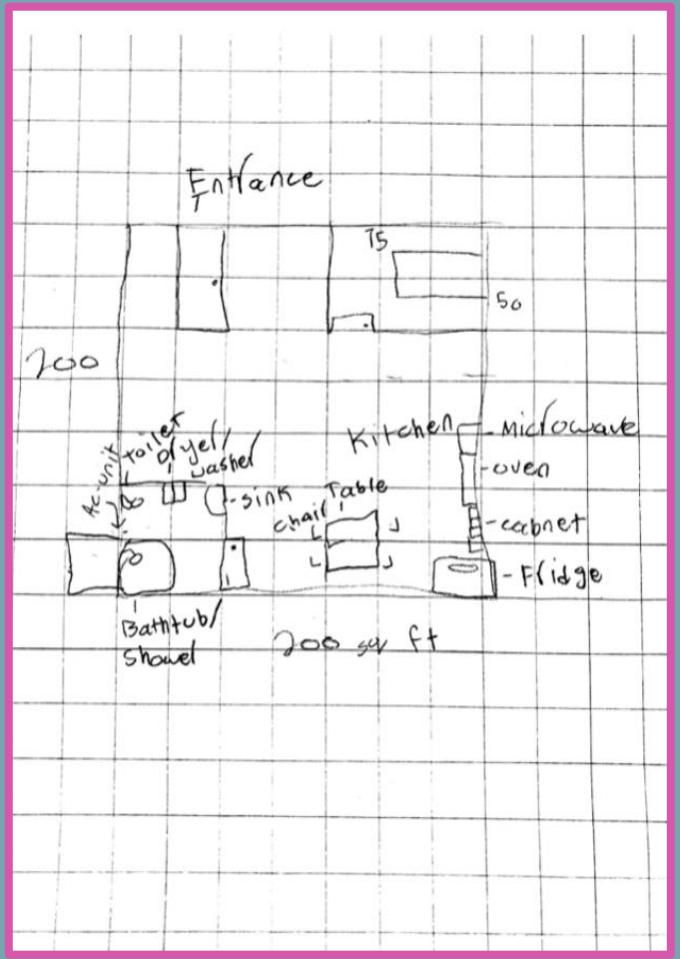


Product: Your team is designing a model home for the new Tiny House Community. As part of this work, they will need to create a scale model (blueprint) for the model tiny house. This model can be done on graph paper or using technology.

Process: Problem Based Learning experiences. Examples include: Design process....decide upon measurements of each room. Design according to the project constraints of 400 sq ft total. Students apply prior knowledge of scale.

STEAM

- Scaled Layouts
- Research
- Scale Factor
- Measurement- Area
- Renewable Energy
- Careers in Architecture



Next Steps

Continued PL to expand teacher expertise

- Problem/Project based learning
- STEAM Education
- Engineering Design & Design Thinking
- Defined Learning

Curriculum work to build and refine documents

- Explore and Align with Math & Science Curriculum documents
- Refine current curriculum maps and unit plans
- Connections with departments

Bethel Public Schools
Course Proposal

1. **Title of Course**: STEAM

2. **Department(s):** Computer Science

3. **Submitted by**: Barbara Sheehan, Donna Burns, Bryan Watson

4. **Length of Course (full year, semester):** Essentials Course Rotation

5. **Grade Level(s), if applicable**: 6, 7, & 8

6. **Prerequisites, if any**: N/A

7. **Short Course Description, suitable for Program of Studies:**
   Steam Engineering

   This course teaches students the Engineering Design Process (Ask, Imagine, Plan, Create, Improve) through Problem Based Learning, and reinforces mathematical and scientific knowledge. The global competencies are applied in this course through research, inquiry, design, and presentation.

8. **Statement of Need for this Course**: ***Give the rationale for the proposal, including its relationship to past, current, and future development in the school system.***

   Previously BMS had a STEM course offering that shifted to a Computer Science course that focuses more on programming, robotics and web design. Students had two computer science rotations a year in grades 6, 7 and 8. Last year an opportunity presented to shift one of these two computer science classes to a STEAM course, broadening student exposure to diverse content, supporting engineering and design, and utilizing a problem based approach to teach to and reinforce the BPS

Global Competencies, Computer Science Teaching Association (CSTA) standards, Engineering & Design, ISTE and Common Core Standards. This course also gives students exposure to components of the BHS Pathways, including career-based learning.

This STEAM course is an interdisciplinary course that blends research, inquiry, and design to present students with novel situations to apply science and math standards. Utilizing the previous year's science and math standards, students are presented with new contexts for applying their understandings.

9. **Course Objectives*****:*** ***The purpose of the new or modified course should be stated here. What is it that the course seeks to help students achieve? What are the student outcomes expected at the end of a given time? What additional outcomes are being sought which cannot be defined in behavioral terms? What are relevant long-term course targets such as student participation rates and evaluation criteria?***

Long-term outcomes:
Global Competency Transfer Goal 4- exhibit curiosity, imagination, flexibility, and perseverance in order to innovate and make valuable contributions to the community.

Transfer goals:
Transfer Goal 1 - Actively seek and analyze new information and perspectives to define problems and develop solutions.

Essential Understandings:
Students will understand that…

- The creative process of developing a new design to solve a problem is a central element of engineering.
- Geometric relationships can be described, analyzed, and classified based on spatial reasoning and/or visualization.
- Technological design is a creative process that anyone can do which may result in new innovations and inventions.
- Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate.
- The application of the design process is an important problem-solving method to the development of inventions and innovations.
- Engineers draw on research from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.

Summary:

Through this course, students will be presented with a problem that they can address in a variety of ways, evaluating and testing solutions while adhering to a set of design constraints.

As previously noted, this STEAM course is an interdisciplinary course that blends research, inquiry, and design to present students with novel situations to apply science and math standards, reinforcing previous years standards while integrating opportunities to apply grade level standards to a collaborative design challenge, such as designing and creating an aquarium, tiny house or spaceport.

While the course incorporates a project students must complete, the focus is really on the process itself to achieve the objectives. Multiple checkpoints are embedded to reflect, articulate and refine thinking and both give and receive feedback aligned with the BPS Global Competencies. Also, the course aims to build students' executive functioning skills, habits of mind, and social-emotional competencies as they persist through the design process, refine their thinking when presented with challenges, and self-manage independently and as part of a team.

Additionally, the new course expands the vertical alignment with the BHS pathways, incorporating elements of the arts, business, and career technical readiness.

10. **Scope and Substance of the Course*:***

- Course offered in 36 day UA Rotations.
- Grade 6, 7, and 8 offering
- Currently utilizing Defined Learning to support the problem based learning structure and apply math and science standards. The learning process includes integration of art, design, research and inquiry models.
- Here is the curriculum so far. We will be bringing this curriculum to the Board when it has been refined and finalized. The curriculum includes:
    - **Grade 6:** Aquarium Designer
        - **Problem:** You are applying for a job with a design firm that makes custom aquariums. Design and create an innovative aquarium considering environment, fish and other organisms as well as calculating volume of your aquarium.
        - **Product:** Students will create a prototype aquarium using classroom materials.

        - **Process:** Design process Students will research and brainstorm to connect organisms to the volume of the tank. Students recognize the design criteria and constraints.
    - **Grade 7 - Mars Transportation Consultant, creating a Spaceport**
        - **Problem:** As a transportation consultant, how would you entice people to want to travel to Mars?
        - **Product:** WeVideo commercial
        - **Process:** Using the design process, students brainstorm what they believe customers would need to travel to, or settle on Mars. They also consider any information they can discover about the planet and atmosphere. Students plan the commercial by deciding relevant facts. Create: A script with relevant points, and use WeVideo to find images for your commercial. When done students will group together to provide constructive criticism to reflect on what things could be improved.
    - **Grade 8 Tiny House Architect**
        - **Problem**:How can we as architects and engineers, create a tiny house that is more affordable and environmentally conscious than traditional housing?
        - **Product:**Your team is designing a model home for the new Tiny House Community. As part of this work, they will need to create a scale model (blueprint) for the model tiny house. This model can be done on graph paper or using technology.
        - **Process:** Problem Based Learning experiences. Examples include: Design process….1) decide upon measurements of each room. Design according to the project constraints of 400sq ft total. Students apply prior knowledge of scale.
    - These projects may change but the embedded goals will remain consistent and continue to align with core curriculum (i.e. science, math), district global competencies, and new innovations/careers.

11. **Class Size*: State minimum and maximum class size and pupil/teacher ratio.***
Maximum class size is 28. 1:28 ratio (not including push in individual paras).

12. **What specific improvements will this proposal make to the school's academic program and the commitment to the implementation of the *Common Core Standards*?**

The STEAM course will continue to support our district goal to build empowered learners that exhibit agency and self-efficacy. This course presents a problem based approach to teach to and reinforce the BPS Global Competencies, CSTA, Engineering & Design, ISTE and Common Core Standards. Students have choice in how they want to solve the design problems. It is also an opportunity for students to embed in the inquiry process their personal interests and skills, as appropriate.

13. **What impact – positive or negative – will this proposal have upon other courses or programs offered within the subject area in <u>your building</u>?** ***For example, will the addition of this course reduce the number of pupils in other courses in the department?***

This course enhances and builds upon core content areas by:

- reinforcing math and science skills (particularly the design cycle), problem solving and solution finding, research and inquiry.
- incorporating text based analysis and visual thinking.
- addressing habits of mind, executive functioning skills, SEL/CASEL competencies.

This course offers another exploratory learning opportunity for BMS students within the UA rotation.

14. **What impact – positive or negative – will this proposal have on other courses/programs offered in the <u>other buildings</u>?** ***For example, would this proposal cause adjustments to be necessary in feeder programs or follow-up programs? Would this proposal reduce the number of pupils in other departments (in teacher assignments, etc.) be necessary?***

The new STEAM course expands the vertical alignment with the BHS pathways, incorporating elements of the arts, business, and career technical readiness. Through career based projects and embedded problems, students gain exposure to components of professions/future courses, such as architecture, and gain insight into practical applications of the subject matter they are studying in core subjects, specifically math and science.

15. **Would adoption of this proposal require staff adjustments, e.g., employing new staff, retraining veteran staff?** ***If yes, show the number of positions involved the first year, compared to the past, and project the figure for each of the three successive years?***

- Reallocated staff member - One staff member will teach 5 rotations of STEAM a year to 6th, 7th and 8th grade students.

- Continued PL to expand teacher expertise
- Curriculum work to build and refine documents

Resources & Development Needs:

1. **Will a writing team be necessary to prepare a curriculum guide?** ***If so, submit a proposal for curriculum work along with this course proposal.***

   We have begun to write the curriculum for this course. We will continue to work on curriculum development over the summer. A proposal has been submitted to Dr. Brooks for approval.

2. **What research has been conducted in the area addressed by this course?** ***Summarize that research and indicate the relationships of the research to this proposed course. Indicate any trends or practices in other schools.***

   - Based on instructional standards - NGSS, AASL, ISTE, CSTA
   - Engineering Design Process is a component of the NGSS and science curriculum throughout the state. This course would supplement work being done in science classes and make connections to other elements of STEAM—technology (digital platforms, databases, data analysis) and the arts.

3. **Textbook (if applicable):** N/A

4. **Other Resources Recommended:**
   Possible Digital Resources:
   - Defined Learning (CSDE has verbally committed to purchasing Defined Learning and Defined Careers through June 30, 2024, after that Defined Learning Building License: $5,000/yr or Defined Careers: $7/student)
   - Gizmos (exploring this as an alternate resource…$980 per educator license)
   - Consumable materials

5. **Names of Staff Who May Teach the Course:** Barbara Sheehan

6. **Training of Staff Required:**
   Define learning webinars and PL opportunities connected to project- and problem-based instruction/learning

7. **Department Approval**: ***Please have at least 50% of the department members or grade level teachers indicate their approval with their signature and date.***

_____ Date _____

_____ Date _____

_____ Date _____

Signature of School Administration:

_____Bryan Watson _____ Date _____3/28

Signature of District Administration:

_____3/25/22

_____ Date _____

Please submit this form electronically to Dr. Brooks and also submit a hard copy with signatures via inter-office mail. Thank you!