Course Title:	Content Area:	Grade Level:	Credit (if applicable)
Grade 3 Science	Science	**Grade 3**	N/A

Course Description:

The performance expectations in third grade help students formulate answers to questions such as:

What is typical weather in different parts of the world and during different times of the year? How can the impact of weather-related hazards be reduced? How do organisms vary in their traits? How are plants, animals, and environments of the
past similar or different from current plants, animals, and environments? What happens to organisms when their environment changes? How do equal and unequal forces on an object affect the object? How can magnets be used?"

Third grade performance expectations include PS2, LS1, LS2, LS3, LS4, ESS2, and ESS3 Disciplinary Core Ideas from the NRC Framework. Students are able to organize and use data to describe typical weather conditions expected during a particular season. By applying their understanding of weather-related hazards, students are able to make a claim about the merit of a design solution that reduces the impacts of such hazards. Students are expected to develop an understanding of the similarities and differences of organisms' life cycles. An understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops, is acquired by students at this level. In addition, students are able to construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. Students are expected to develop an understanding of types of organisms that lived long ago and also about the nature of their environments. Third graders are expected to develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die. Students are able to determine the effects of balanced and unbalanced forces on the motion of an object and the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. They are then able to apply their understanding of magnetic interactions to define a simple design problem that can be solved with magnets. The crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; interdependence of science, engineering, and technology; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the third grade performance expectations, students are expected to demonstrate grade-appropriate proficiency in asking questions and defining problems; developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

Aligned Core Resources:	Connection to the *BPS Vision of the Graduate*
N/A	Collaboration • Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal • Assume shared responsibility for collaborative work and value the individual contributions made by each team member Critical Thinking and Problem Solving • Collect, assess and analyze relevant information • Reason effectively. • Make sound judgements and decisions. Identify, define and solve authentic problems and

	essential questions. • Reflect critically on learning experience, processes and solutions. • Transfer knowledge to other situations
Additional Course Information: ***Knowledge/Skill Dependent courses/prerequisites***	**Link to *Completed Equity Audit***
N/A	Grade 3 Science Equity Audit

Standard Matrix

District Learning Expectations and Standards	**Unit 1**	**Unit 2**	**Unit 3**
3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	X		
3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	X		
3-PS2-3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	X		
3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.	X		
3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	X		
3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.		X	X
3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.		X	
3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.		X	
3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.		X	
3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.			X
3-LS2-1 Construct an argument that some animals form groups that help members survive.			X
3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.			X
3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.			X

3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.			X
3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.			X
3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.			X
3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.			X
3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.			X

Unit Links

If unit headings are formatted as a heading, then we can link a Table of Contents to better organize and provide faster access to each unit

Unit 1: The Case of Odd Motion

Unit 2: The Case of Harper's Fossil Find

Unit 3: The Case of the Missing Monarchs

Unit Title:

Unit 1: The Case of Odd Motion

Relevant Standards: Bold indicates priority

3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	
	SEP: Planning and Carrying Out Investigations • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.
	DCI: PS2.A: Forces and Motion • Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. PS2.B: Types of Interactions • Objects in contact exert forces on each other.
	CCC: Cause and Effect • Cause and effect relationships are routinely identified.
3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	
	SEP: Planning and Carrying Out Investigations • Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
	DCI: PS2.A: Forces and Motion • The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it.
	CCC: Patterns • Patterns of change can be used to make
3-PS2-3 Ask questions to determine cause and effect	

<table>
<tr>
<td>relationships of electric or magnetic interactions between two objects not in contact with each other.</td>
<td>
<table>
<tr><td>SEP</td><td>Asking Questions and Defining Problems
● Ask questions that can be investigated based on patterns such as cause and effect relationships.</td></tr>
<tr><td>DCI</td><td>PS2.B: Types of Interactions
● Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depends on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.</td></tr>
<tr><td>CCC</td><td>Cause and Effect
● Cause and effect relationships are routinely identified, tested, and used to explain change.</td></tr>
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<td>3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.</td>
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<table>
<tr><td>SEP</td><td>Asking Questions and Defining Problems
● Define a simple problem that can be solved through the development of a new or improved object or tool.</td></tr>
<tr><td>DCI</td><td>PS2.B: Types of Interactions
● Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depends on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.</td></tr>
<tr><td>CCC</td><td>N/A</td></tr>
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<tr>
<td>3-5-ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.</td>
<td>
<table>
<tr><td>SEP</td><td>Planning and Carrying Out Investigations
● Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.</td></tr>
<tr><td>DCI</td><td>ETS1.B: Developing Possible Solutions
● Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.

ETS1.C: Optimizing the Design Solution
● Different solutions need to be tested in</td></tr>
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	order to determine which of them best solves the problem, given the criteria and the constraints.
CCC	N/A

Essential Question(s):	**Enduring Understanding(s):**
• What makes objects move the way they do? • How do different strengths of forces affect motion? How does the direction of a force affect motion? • How do the properties of an object affect how an object moves when a force is applied? • How can some unseen forces that act on an object be investigated and explained? • What can magnetic forces do? How can we use the properties of magnets to solve a problem? • What forces caused this new case of odd motion?	• Determine the effects of balanced and unbalanced forces on the motion of an object. • Identify the cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. • Apply understanding of magnetic interactions to define a simple design problem that can be solved with magnets.
Demonstration of Learning:	**Pacing for Unit**
Claim, Evidence, Reason for the Case of the Floating Tree	6 weeks
Family Overview (link below)	**Integration of Technology:**
Family Overview Unit 1 Grade 3	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning.* • Forces and Motion: Basics- Phet Interactive Model • Balloons and Static Electricity- Phet Interactive Model
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**

plan	conduct	investigation
data	evidence	variables
fair test	trials	controlled
force	strength	direction
net force	speed, motion	exert
observe	measure	phenomenon

- Football Punt (2:27 - 3:31 without sound)
- Levitation Wand
- Forces Make Things Move by Kimberly Brubaker Bradley
- I Face the Wind by Vicki Cobb
- What's an Engineer? video
- Defining Gravity: Crash Course Kids #4.1 video
- I Fall Down by Vicki Cobb
- Gravity is a Mystery by Franklyn Branley
- Gravity by Jason Chin
- How does Static Electricity Work video
- The Sticky Balloon Trick! video

design solution	pattern	prediction
cause and effect	relationships	electric
magnetic	properties	magnets
orientation	relative to	problem
tool	distance	magnetic forces
failure points	elements	design
criteria	constraints	

- Attract and Repel - A Look at Magnets by Jennifer Boothroyd
- Fun with Magnets! video

Opportunities for Interdisciplinary Connections:

Literacy connections:
- Students are asking and answering questions
- Referring to a text
- Recalling information and data from multiple sources

Mathematics connections:
- Measuring and estimating
- Creating scaled graphs to track data
- Use appropriate tools strategically

Anticipated misconceptions:

- The terms "energy" and force are interchangeable
- If an object is at rest, no forces act on it
- Force is a property of an object
- Large objects always exert a greater force than smaller objects
- Friction always hinders motion, thus reducing friction is always desired
- An object a person is sitting or standing on doesn't push back with equal force
- If something is moving, there must be a greater force on it
- The faster an object is moving the greater force on it
- Force is a property of an object. An object has force, and when it runs out of force, it stops moving
- All things fall down due to gravity but heavy things always fall fastest

Connections to Prior Units:

Connections to:
- K Unit 3: Push, Pull, Play! with forces content.
- K-2 units with engineering and design problems.

Connections to Future Units:

Connections to:
- Grade 4 Unit 1: National Parks with the effects of forces on an object
- Grade 4 Unit 2: Bear Sense with observing and measuring patterns in the motion of objects.
- Grade 5 Unit 3: Expedition Antarctica with strength and direction of forces.

Differentiation through *Universal Design for Learning*

UDL Indicator	**Teacher Actions:**
3.3 Guide information processing and visualization	• Give explicit prompts for each step in a sequential process • Provide interactive models that guide exploration and new understandings

	• Provide multiple entry points to a lesson and optional pathways through content

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can construct grade appropriate oral and written claims and support them with reasoning and evidence. An EL can participate in grade appropriate oral and written exchanges of information, ideas, and analyses, responding to peer, audience, or reader comments and questions.	I can use words and phrases acquired in conversations, reading, and being read to, and academic and domain specific words I can ask questions to gain information or clarify understanding

Lesson Sequence	**Learning Target & Success Criteria**	**Assessments/ Resources**
1	I can make observations and ask questions about cause and effect relationships of motion. ☐ I observe each video and demonstrate. ☐ I can record what I noticed and wondered. ☐ I can share my observations with the class.	• Evidence log
2	I can make observations and draw conclusions about cause and effect relationships of motion. ☐ I can move objects in a variety of ways. ☐ I can observe the movements and write down what affects their movement. I can plan and conduct an investigation. ☐ I can conduct an investigation with controls. ☐ I can investigate the impact of the strength of a push or pull on an object's motion. ☐ I can record my data and create a bar graph representing data. I can make observations and provide an explanation. ☐ I can explain patterns in my data. ☐ I can define the following words: push, pull, force, rest, speed, change in direction, change in motion, change in speed, force strength, control. I can make observations and ask questions about cause and effect relationships of motion. ☐ I can observe and ask questions about motion. ☐ I can explain how different strengths of forces and direction affect motion. ☐ I can generate a claim with evidence on how the surface impacts the motion of the ball or the car. I can develop an explanatory model to demonstrate an understanding of the strength and direction of forces. ☐ I can work collaboratively to develop an explanatory model. ☐ I can create an explanatory model that demonstrates an	• Force investigation • Forces Make Things Move by Kimberly Brubaker Bradley • Forces and Motion: Basics- Phet Interactive Model • I Face the Wind by Vicki Cobb

	understanding of strength and direction of forces. I can make observations and provide an explanation. ☐ I can work collaboratively to record observations and explanations on motion. ☐ I can decide what information should be included in our evidence log.	
3	I can compare and contrast object properties and predict how that may affect their movement. ☐ I can understand and explain what an engineer is. ☐ I can compare and contrast object properties ☐ I can predict how force may affect movement of objects with different properties. I can plan and conduct an investigation. ☐ I can conduct the design challenge investigation. ☐ I can record my data for each trial. ☐ I can share my results with the class. I can make observations and draw conclusions about cause and effect relationships of motion. ☐ I can draw conclusions from my data. ☐ I can share my observations and conclusion with the class. ☐ I can understand that there is a cause and effect relationship. I can make observations and draw conclusions about cause and effect relationships of motion. ☐ I examined each odd motion. ☐ I can write on a sticky note and describe what I know about each object. ☐ I can share my thinking with the class.	• Design Challenge • What's an Engineer? Video
4	I can plan and conduct an investigation. ☐ I can conduct an investigation to help me better understand gravity. ☐ I can draw and label a picture that shows gravitational force. I can explain the effects of an unseen force on an object. ☐ I can build background knowledge on gravity. ☐ I can create an explanatory model that shows how to prevent an object from falling. I can explain the effects of an unseen force on an object. ☐ I can learn about and research electrostatic force. ☐ I can draw and label a picture that show electrostatic force. ☐ I define the following words: static electricity, electrostatic force, attract, repel, and charge.	• Assessment: Magnetic explanatory model • Defining Gravity: Crash Course Kids #4.1 video • I Fall Down by Vicki Cobb • Gravity is a Mystery by Franklyn Branley • Gravity by Jason Chin • Balloons and Static Electricity- Phet Interactive Model • How does Static Electricity Work

		video • The Sticky Balloon Trick! video
5	I can plan and conduct an investigation. ☐ I can complete each station and record what I noticed and wondered. ☐ I can share my thinking with the class. I can explain how magnetic forces work. ☐ I can research using sources to learn more about magnetic forces. ☐ I can explain and create a class poster explaining magnetic forces. I can develop an explanatory model to solve a real world problem using magnetic force. ☐ I can define a problem including magnets. ☐ I can construct a model to demonstrate the solution to my magnet question. ☐ I can design a new idea or improve upon an already existing idea with a magnet. I can make observations and provide an explanation. ☐ I can create a model explaining the force. ☐ I can use vocabulary to describe the force. Summative Assessment I can make observations and draw conclusions about cause and effect relationships of motion. ☐ I can make observations and draw conclusions about the video. ☐ I can make connections between the video and what we've learned about forces and motion. ☐ I can complete a Scene Analysis with evidence for the final assessment.	• Assessment: Floating Tree Scene Analysis • Attract and Repel - A Look at Magnets by Jennifer Boothroyd • Fun with Magnets! video

Unit Title:	
Unit 2: The Case of Harper's Fossil Find	
Relevant Standards: Bold indicates priority	
3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	SEP: **Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and

		revising simple models and using models to represent events and design solutions. ● Develop models to describe phenomena. **Connections to Nature of Science** Scientific Knowledge is Based on Empirical Evidence ● Science findings are based on recognizing patterns.
	DCI	**LS1.B: Growth and Development of Organisms** ● Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.
	CCC	**Patterns** ● Patterns of change can be used to make predictions.
3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.		
	SEP	**Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ● Analyze and interpret data to make sense of phenomena using logical reasoning.

	DCI	**LS3.A: Inheritance of Traits** ● Many characteristics of organisms are inherited from their parents. **LS3.B: Variation of Traits** ● Different organisms vary in how they look and function because they have different inherited information.
	CCC	**Patterns** ● Similarities and differences in patterns can be used to sort and classify natural phenomena.
3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.	SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ● Use evidence (e.g., observations, patterns) to support an explanation.
	DCI	**LS3.A: Inheritance of Traits** ● Other characteristics result from individuals' interactions with the environment, which can range

		from diet to learning. Many characteristics involve both inheritance and environment. **LS3.B: Variation of Traits** ● The environment also affects the traits that an organism develops.
	CCC	**Cause and Effect** ● Cause and effect relationships are routinely identified and used to explain change.
3-LS4-1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.		
	SEP	**Analyzing and Interpreting** Data Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ● Analyze and interpret data to make sense of phenomena using logical reasoning.
	DCI	**LS4.A: Evidence of Common Ancestry and Diversity** ● Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: moved from K-2) ● Fossils provide evidence about the types of organisms that lived long ago and also about the

	nature of their environments.
CCC	**Scale, Proportion, and Quantity** • Observable phenomena exist from very short to very long time periods. **Connections to Nature of Science** Scientific Knowledge Assumes an Order and Consistency in Natural Systems • Science assumes consistent patterns in natural systems.

Essential Question(s):	**Enduring Understanding(s):**
• What can we notice and wonder about organisms and their environments? • What are fossils and what can we learn from them? • How are organisms today similar and different from their ancestors? • What patterns can be described in various organisms' life cycles? • Why do offspring look similar to their parents? • How do environmental conditions impact an organism's traits?	• develop an understanding of the similarities and differences of organisms' life cycles • acquire an understanding that organisms have different inherited traits, and that the environment can also affect the traits that an organism develops • construct an explanation using evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing • develop an understanding of types of organisms that lived long ago and also about the nature of their environments • develop an understanding of the idea that when the environment changes some organisms survive and reproduce, some move to new locations, some move into the transformed environment, and some die
Demonstration of Learning:	**Pacing for Unit**
Claim, evidence, reasoning describing an organism using a novel fossil: type of fossil, type of organism, diet, and life cycle	6 weeks
Family Overview (link below)	**Integration of Technology:**
Family Overview Unit 2 Grade 3	*Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning*

	• Discover a Crossbreed - inheritance simulation
Unit-specific Vocabulary:	**Aligned Unit Materials, Resources, and Technology (beyond core resources):**
<table><tr><td>organism</td><td>environment</td><td>paleontologist</td></tr><tr><td>fossil</td><td>trace fossil</td><td>true fossil</td></tr><tr><td>omnivore</td><td>carnivore</td><td>herbivore</td></tr><tr><td>predator</td><td>prey</td><td>trait</td></tr><tr><td>inherited trait</td><td>offspring</td><td>ancestors</td></tr><tr><td>life cycle</td><td>heredity</td><td>acquired trait</td></tr><tr><td>behavior</td><td>learned behavior</td><td></td></tr></table>	• What is a Paleontologist video • *Curious About Fossils* by Kate Waters • *Fossils Tell of Long Ago* by Aliki • *Tooth by Tooth* by Sarah C. Levine • What Can Fossil Footprints Tell Us? Article • 10 Facts About Dinosaur Eggs article • *Fossil* by Bill Thompson • *Grandmother Fish* by Jonathan Tweet • *Oviraptor* by Susan H. Gray • *Life Cycle of a Butterfly* by Meg Gaertner • Discover a Crossbreed simulation • *Heredity: Pass it On!* by Rebecca Hirsh • *Traits and Attributes* by Natalie Hyde • *Inheritance of Traits: Why is my Dog Bigger than Your Dog?* By Jen Green • *Oviraptor* by Jennifer Zeiger • Why Are Flamingos Pink? video • Learned Behavior in Capuchin Monkeys video
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Literacy Connections: • Synthesizing information from multiple sources • Using texts to build background knowledge • Using text evidence to support a claim Mathematics Connections: • Analyze and interpret data	• Fossils can include preserved tissue or indirect evidence left behind • Both trace and true fossils give clues about organisms' lives • All living things, animal and non-animal,can leave fossils • Parents do not pass down all of their traits to their offspring • Learned behavior can be acquired unconsciously • Despite differences in the way they develop, all organisms go through 4 major life cycles stages: birth, growth, reproduction, and death
Connections to Prior Units:	**Connections to Future Units:**
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
3.4 Maximize transfer and generalization	• Provide organizers and sticky notes • Provide templates, graphic organizers, concept maps to support note-taking • Offer opportunities over time to revisit key ideas and linkages between ideas

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can construct grade appropriate oral and written claims and support them with reasoning and evidence. An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.	I can use words and phrases acquired in conversations, reading, and being read to, and academic and domain specific words. I can present findings using sources to answer questions.

Lesson Sequence	Learning Target & Success Criteria	Assessments/ Resources
1	I can make observations and generate questions to begin to understand the organism and its environment. ☐ I can understand what a paleontologist is. ☐ I can make observations about the organism and its environment in my science notebook. ☐ I can generate questions when observing the organism in my science notebook.	• Student Notebook (ongoing throughout unit) • Class Summary Table (ongoing throughout unit)
2	I can draw conclusions about an organism and its environment from examining fossil evidence. ☐ I can make observations about fossils. ☐ I can make predictions about fossils and their environment based on fossil evidence. I can draw conclusions about an organism and its environment from examining fossil evidence. ☐ I can explain the difference between a trace and a true fossil. ☐ I can use fossil clues to make inferences about an organism and its environment I can analyze true fossils and present day organisms in order to identify patterns in skull structures and teeth. ☐ I can make observations about what an animal eats based on their skull structures and teeth. ☐ I can present a claim about Harper's Fossil and support it with evidence based on patterns in skull structures and teeth. I can analyze trace fossils in order to identify patterns in tracks. ☐ I can analyze trace fossils and explain/make predictions about their patterns. ☐ I can describe what I learned using footprint trace fossils. I can analyze trace fossils in order to identify patterns in tracks. ☐ I can analyze trace fossils and explain/make predictions about their patterns. ☐ I can describe what I learned using footprint trace fossils. I can research eggs to help me better understand Harpers Fossil Find. ☐ I can work in partnerships and research facts about eggs. ☐ I can share what I learned with the group by Repeating and	• *Curious About Fossils* by Kate Waters • *Fossils Tell of Long Ago* by Aliki • *Tooth by Tooth* by Sara Levine • What can Fossil Footprints Tell Us? article • footprint puzzle • Trace Fossil Scene • student sheet • 10 Facts About Dinosaur Eggs article

	Rephrasing what I learned. ☐ I can use the information I learned about eggs to explain Harpers Fossil find.	
3	I can compare the appearance and function of inherited traits in fossils and present day organisms. ☐ I can identify at least one inherited trait from a fossil in the text that is similar to a present day organism. ☐ I can describe at least two similarities in the appearance of the trait in each organism. ☐ I can describe at least two similarities in the function of the trait in each organism. I can make inferences about a fossilized organism based on its traits. ☐ I can accurately match fossils to living organisms based on their traits. ☐ I can correctly infer where a fossilized organism lived and explain how the traits I observed in the fossil helped me draw my conclusion. ☐ I can explain how organisms changed over time based on their traits. I can define and identify “inherited traits”. ☐ I can accurately explain what “inheritance” means. ☐ I can explain the relationship between two organisms based on inherited traits. I can use fossil clues to make predictions about Harper's Fossil and its life. ☐ I can describe at least two ways that fossils give clues about how oviraptors lived.	• *Fossil* by Bill Thompson • Fossil cards • *Grandmother Fish* by Jonathan Tweet • *Oviraptor* by Susan H. Gray
4	I can observe and record data on the life cycle of a living organism. ☐ I can draw a picture and label what I notice. ☐ I can observe the organisms and record at least 3 things that I noticed or wondered about. I can compare and contrast the life cycles of different organisms. ☐ I can identify the stages of at least three different life cycles. ☐ I can identify at least two similarities and two differences between the life cycles of different organisms. ☐ I can make an inference about which life cycle Harper’s fossil is most similar to and explain my thinking with evidence.	• Observation Notebook (ongoing)
5	I can predict what offspring would look like based on parent appearance. ☐ I can predict at least three traits that an offspring might inherit from its parents. ☐ I can identify traits in an offspring that were inherited from each parent. I can identify and define hereditary traits. ☐ I can explain what a hereditary trait is.	• Discover a Crossbreed simulation • *Heredity: Pass it On!* By Rebecca Hirsh • *Traits and Attributes* by Natalie Hyde • Inheritance of Traits: Why is my Dog Bigger than

	☐ I can identify at least three traits that are hereditary in animals and plants. I can make inferences about an organism's life based on its inherited traits. ☐ I can make a claim about whether I believe the egg belongs to the oviraptor or another creature. ☐ I can identify at least three pieces of evidence related to inherited traits that support my claim. ☐ I can explain how my evidence connects to my claim. I can explain how inheritance affects an organism's appearance. ☐ I can identify traits that an offspring has inherited. ☐ I can explain the relationship between inherited traits and the way an organism looks.	Your Dog? by Jen Green • *Oviraptor* by Jennifer Zeiger
6	I can differentiate between inherited traits vs acquired traits. ☐ I can look at pictures and determine if it is an inherited or acquired trait. ☐ I can explain my thinking using evidence. I can explain if a trait is a learned behavior or influenced by the environment and how it affects the organism. ☐ I can watch the two videos and explain if the trait is learned or influenced by the environment. ☐ I can explain how the trait affects the organism. I can explain if a trait is a learned behavior or influenced by the environment and how it affects the organism. ☐ I can observe and analyze information about eggs to determine if egg color is an environmental or inherited trait. ☐ I can use what I learned about eggs to make a claim about whether the oviraptor is more closely related to a bird or a reptile.	• Why Are Flamingoes Pink? video • Learned Behavior in Capuchin Monkeys video

Unit Title:	
Unit 3: The Case of the Missing Monarchs	
Relevant Standards: Bold indicates priority	
3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	SEP: **Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using

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<tr><td></td><td>models to represent events and design solutions.
Develop models to describe phenomena.

Connections to Nature of Science
Scientific Knowledge is Based on Empirical Evidence
Science findings are based on recognizing patterns.</td></tr>
<tr><td>DCI</td><td>LS1.B: Growth and Development of Organisms
Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.</td></tr>
<tr><td>CCC</td><td>Patterns
Patterns of change can be used to make predictions.</td></tr>
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<tr>
<td>3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</td>
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<table>
<tr><td>SEP</td><td>Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate</td></tr>
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<tr><td></td><td>relationships.</td></tr>
<tr><td>DCI</td><td>ESS2.D: Weather and Climate
Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.</td></tr>
<tr><td>CCC</td><td>Patterns
Patterns of change can be used to make predictions.</td></tr>
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<tr>
<td>3-LS2-1 Construct an argument that some animals form groups that help members survive.</td>
<td>
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<tr><td>SEP</td><td>Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
Construct an argument with evidence, data, and/or a model.</td></tr>
<tr><td>DCI</td><td>LS2.D: Social Interactions and Group Behavior
Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically</td></tr>
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	in size.
CCC	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change.

3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Use evidence (e.g., observations, patterns) to construct an explanation.
DCI	**LS4.B: Natural Selection** • Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.
CCC	**Cause and Effect** • Cause and effect relationships are routinely identified and used to explain change.

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<tr><td>3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.</td><td>
<table>
<tr><td>SEP</td><td>Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
Construct an argument with evidence</td></tr>
<tr><td>DCI</td><td>LS4.C: Adaptation
For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.</td></tr>
<tr><td>CCC</td><td>Cause and Effect
Cause and effect relationships are routinely identified and used to explain change.</td></tr>
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<tr><td>3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</td><td>
<table>
<tr><td>SEP</td><td>Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).</td></tr>
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		• Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.
	DCI	**LS2.C: Ecosystem Dynamics, Functioning, and Resilience** • When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.(secondary) **LS4.D: Biodiversity and Humans** • Populations live in a variety of habitats, and change in those habitats affects the organisms living there.
	CCC	**Systems and System Models** • A system can be described in terms of its components and their interactions. ***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of**

	Engineering, Technology, and Science on Society and the Natural World • Knowledge of relevant scientific concepts and research findings is important in engineering.
3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.	SEP: **Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. DCI: **ESS2.D: Weather and Climate** • Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. CCC: **Patterns** • Patterns of change can be used to make predictions.
3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	SEP: **Engaging in Argument from Evidence**

		Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ● Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.
	DCI	**ESS3.B: Natural Hazards** ● A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.
	CCC	**Cause and Effect** ● Cause and effect relationships are routinely identified, tested, and used to explain change. ***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** ● Engineers improve existing technologies or develop new ones to increase

	their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). ***Connections to Nature of Science*** **Science is a Human Endeavor** • Science affects everyday life.
3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	
SEP	**Asking Questions and Defining Problems** Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.
DCI	**ETS1.A: Defining and Delimiting Engineering Problems** • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution

		is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.
	CCC	**Influence of Science, Engineering, and Technology on Society and the Natural World** • People's needs and wants change over time, as do their demands for new and improved technologies.
3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.		
	SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. • Generate and compare multiple solutions to a problem based on how well they meet the criteria

	and constraints of the design problem.
DCI	**ETS1.B: Developing Possible Solutions** • Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.
CCC	**Influence of Science, Engineering, and Technology on Society and the Natural World** • Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

Essential Question(s):	**Enduring Understanding(s):**
• How and why is the monarch butterfly population changing? • Why does the monarch butterfly migrate? • What is the difference between weather and climate? • How can climate be described in different	• Understand how to organize and use data to describe typical weather conditions expected during a particular season • Understand weather-related hazards • Make a claim about the merit of a design solution that reduces the impacts of

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<td>regions of the world?
• How do specific traits and behaviors help an organism survive in a particular habitat?
• How can non-weather changes to environments impact the monarch butterfly? What can humans do to reduce these changes and impacts?
• How can weather related hazards change environments?
• How can humans reduce the impact of a drought on the monarch butterfly?</td>
<td>weather-related hazards
• Develop an understanding of the similarities and differences of organisms' life cycles</td>
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<td>Demonstration of Learning:</td>
<td>Pacing for Unit</td>
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<tr>
<td>Creation of an explanatory model that explains what is happening to the eastern monarch population and how people can help</td>
<td>6 weeks</td>
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<tr>
<td>Family Overview (link below)</td>
<td>Integration of Technology:</td>
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<tr>
<td>Family Overview Unit 3 Grade 3</td>
<td>Intentionally aligned use of digital tools and resources to support acquisition of content, researching, organizing and communicating learning
• Journey North - tracking monarch migration</td>
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<tr>
<td>Unit-specific Vocabulary:</td>
<td>Aligned Unit Materials, Resources, and Technology (beyond core resources):</td>
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<table>
<tr><td>naturalist</td><td>migration</td><td>habitat</td></tr>
<tr><td>egg</td><td>caterpillar</td><td>chrysalis</td></tr>
<tr><td>pupa</td><td>metamorphosis</td><td>larva</td></tr>
<tr><td>weather</td><td>climate</td><td>precipitation</td></tr>
<tr><td>polar</td><td>temperate</td><td>arid</td></tr>
<tr><td>tropical</td><td>mountains</td><td>climate zones</td></tr>
<tr><td>adaptation</td><td>drought</td><td>weather-related hazard</td></tr>
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<td>• News Clip
• Traveling Butterflies book on Epic!
• Monarch Butterfly by Gail Gibbons (Loomed version)
• National Geographic Readers: Great Migrations Butterflies By Laura Marsh on epic! Books
• Give Me Five Template
• Text Monarch and Milkweed-Inside of front and back cover
• Weather vs. Climate video
• Weather video
• Book- How the Weather Works-recommend pages 1 & 2 what causes weather, 9 & 10 predicting weather, 13 & 14 what is climate
• Document-Weather Collecting Journal
• Video-weather watchers.
• Video-Rain, Rain Comes our Way
• Habitat Resource with Recording Sheet
• Weather CFA
• Video-Crash Course on Weather
• Adaptation organizer
• Adaptations Links

• monarchs LS 4 elaborate
• Video on Moths
• Video on Cardinals
• Survival game picture cards
• CER/CFA</td>
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	• Butterfly Table LS-5 • On EPIC, National Geographic Readers: Great Migrations Butterflies pages 36-37, 40-45 • Monarch Butterfly Migration pages 25-29 • Impact of fire • Sci show kids wildfire helps • Loomed Epic Text, Wildfires • Myth Busting About Wildlife and Fire • NAT GEO - Fire Helps! **(positive impacts)** • CER Template • ABC News Monarch clip • Crash Course Kids-Severe Weather • How Weather Works Text (p.11-12) • Video Close Up on Hurricanes • Optional: Epic Library on severe weather • Drought impact on wildlife-Text • Video on drought • Water for butterflies-text • Video to see the design process • Design challenge organizer
Opportunities for Interdisciplinary Connections:	**Anticipated misconceptions:**
Literacy Connections: • Summarizing informational texts • Identifying main idea and key details of texts • Synthesizing information from a variety of choices • Using evidence to support a claim Mathematics Connections: • Collecting and analyzing weather data • Graphing weather data • Interpreting data/graphs about the monarch population	• Weather vs climate: weather is the short-term change in atmosphere, climate is the long-term pattern of weather • Fire can have both determinents and benefits for the environment • Each year survival of the monarch may vary due to weather conditions/human impact
Connections to Prior Units:	**Connections to Future Units:**
Differentiation through *Universal Design for Learning*	
UDL Indicator	**Teacher Actions:**
3.2 Highlight patterns, critical features, big ideas, and relationships	• Highlight or emphasize key elements in text, graphics, and diagrams • Use graphic organizers to emphasize key ideas and relationships • Use cues and prompts to draw attention to

	critical features

Supporting Multilingual/English Learners	
Related *CELP standards:*	**Learning Targets:**
An EL can construct grade appropriate oral and written claims and support them with reasoning and evidence. An EL can conduct research and evaluate and communicate findings to answer questions or solve problems.	I can use words and phrases acquired in conversations, reading, and being read to, and academic and domain specific words. I can present findings using sources to answer questions.

Lesson Sequence	**Learning Target & Success Criteria**	**Assessments/ Resources**
1	I can share my prior knowledge about butterflies. ☐ I can identify at least three pieces of prior knowledge I have about butterflies. I can identify patterns of change in the monarch butterfly population from data. ☐ I can generate at least 5 questions that help determine why the monarch population is declining. ☐ I can identify questions that are the most important to help determine why the monarch population is declining. ☐ I can organize questions into categories with similar questions.	• News Clip • *Traveling Butterflies* book on Epic!
2	I can identify stages of the monarch butterfly life cycle. ☐ I can describe each stage of the monarch life cycle using at least two text details. ☐ I can explain at least one way the monarch's life cycle is similar and different to another organism's life cycle using evidence from the text and prior knowledge. I can make observations and ask questions about monarch migration using data from a map. ☐ I can explore the Journey North website to learn more about sightings of monarch eggs, larva, and butterflies. ☐ I can record what I noticed and wondered about. I can gather information to make a claim about monarch migration. ☐ I can make a claim about why monarch butterflies migrate. ☐ I can use sources to learn about why and where monarch butterflies migrate.	• *Evidence Log* • *Monarch Butterfly* by Gail Gibbons (Loomed version) • Journey North Website • National Geographic Readers: Great Migrations Butterflies By Laura Marsh on epic! Books • Give Me Five Template • Text Monarch and Milkweed-Inside of front and back cover

3	I can explain the difference between weather and climate. ☐ I can look at a variety of sources to learn about weather and climate. ☐ I can explain the difference between weather and target. I can record and analyze the weather data to understand patterns and make predictions about weather. ☐ I can record weather data for 5 days and graph my results. ☐ I can predict the weather for the 6th day based on my analysis of the data. I can obtain information to describe climate zones and habitats from different regions of the world. ☐ I can research a habitat. ☐ Using my organizer I can record information describing the temperature, precipitation, seasonal changes, climate/weather, and landscape. ☐ I can share the information I learned with my class. I can explain the difference between weather and climate. ❏ I can think about what I already know about weather/climate. ❏ I can watch the video to learn about weather/climate. ❏ I can answer both questions about weather/climate.	• Evidence Log • Video-Weather vs. Climate video • Book- How the Weather Works-recommend pages 1 & 2 what causes weather, 9 & 10 predicting weather, 13 & 14 what is climate • Document-Weather Collecting Journal • Video-weather watchers. • Video-Rain, Rain Comes our Way • Habitat Resource with Recording Sheet • Weather CFA • Video-Crash Course on Weather
4	I can make predictions about desirable survival traits per habitat. ☐ I can make a prediction about physical traits or behavioral traits they might have adapted to help them survive in each region/area. I can explain how an organism's adaptive traits help it survive in a particular environment. ☐ I can select an animal. ☐ I can use the resources to research my animals. ☐ I can write caveman notes on my organizer. ☐ I can share the information with my classmates.	• Adaptation organizer • Adaptation Research Links • Adaptations Links • monarchs LS 4 elaborate • Video on Moths • Video on Cardinals • Survival game picture cards • CER/CFA
5	I can make predictions about how environmental changes can affect the monarch butterfly population.	• Read the Author's note at the end of Monarch and

	☐ I understand what an environmental change is. ☐ I can determine what/how environmental changes affect the Monarch. ☐ I can evaluate the changes and determine the two most impactful. I can explain how humans affect butterfly migrations and what they can do to help them survive. ☐ I can learn about problems that butterflies face when migrating. ☐ I can determine ways humans can help butterflies survive. I can make a claim on the effect of fire on a habitat and its organisms. ☐ I understand what an environmental change is. ☐ I can determine what/how environmental changes affect the Monarch. ☐ I can evaluate the changes and determine the two most impactful. I can make a claim on the merit of a solution. ☐ I can choose one solution and make a claim. ☐ I can evaluate criteria and constraints of a solution. ☐ I can present my claim to a specific audience.	Milkweed • Butterfly Table • On EPIC, National Geographic Readers: Great Migrations Butterflies pages 36-37, 40-45 • On EPIC, Monarch Butterfly Migration pages 25-29 • Impact of fire video • Sci show kids wildfire helps video • Loomed Epic Text, Wildfires • Myth Busting About Wildlife and Fire • NAT GEO - Fire Helps! POSITIVE • IF NEEDED, CER Template • ABC News Monarch clip
6	I can identify weather related hazards and their possible impacts to environments. ☐ I can identify weather related hazards and how they impact the environment. ☐ I can identify one weather related hazard that might impact the monarch butterfly population and support my reasoning. I can explain how a drought would impact the monarch butterfly. ☐ I can explain what a drought is. ☐ I can explain what happens to plants and animals during a drought. ☐ I can describe what humans can do to help feed and give water to butterflies. ☐ I can create a model to explain how droughts affect butterflies	• Crash Course Kids-Severe Weather • How Weather Works (p.11-12) • Close Up on Hurricanes • Optional: Epic Library on severe weather • drought impact on wildlife,

	and their habitat. I can create a plan to help butterflies by reducing the impact of a drought in Bristol, CT. ☐ I can create a plan to help butterflies by reducing the impact of a drought in Bristol, CT. ☐ I can fill out my organizer and create a stretch and/or build a project.	• video on drought, • water for butterflies • Watch this video to see the design process. • Design challenge organizer