

Sustainable Jersey for Schools Education for Sustainability UNIT Questionnaire

Complete this form to provide information about the unit that you are submitting for points under the Education for Sustainability (EfS) Integrated Unit action. **Be sure to fully answer Question 7** if the unit was delivered remotely and is to be considered for Digital Schools Star recognition.

1. List the name, position, grade level, and discipline of the educators and staff members involved with developing and delivering the unit.

This Unit for First Grade, Designs Inspired by Nature was created by Project Lead the Way and is included in their curriculum. It was adapted to meet the Sustainability Standards by the STEM teachers, Lisa Roesch and Kelly Stone at the George L Catrambone School under the guidance of our Principal Ms. Jessica Alonzo and out supervisor Jenna Valdivieso to teach during the current school year 2020-21. Both teachers are K-5 STEM Teacher and see all first-grade students weekly for 35 minutes. This unit will be taught weekly over 14 weeks of school. Students will be evaluated at the end of the unit with a Summative Assessment which is included in the documentation. In additional formative assessments are taken throughout the unit in the form of activities, observations, exit slips, and other such activities and stored digitally across platforms like but not limited to google classroom and seesaw.

2. The unit must have taught about and assessed for at least **one** of the enduring understandings of education for sustainability listed below. Check off the enduring understanding(s) that the unit addressed:

☐ **A Healthy and Sustainable Future Is Possible**

We can learn how to live well within the means of nature. This viewpoint inspires and motivates people to act.

☒ **We Are All In This Together**

We are interdependent on each other and on the natural systems.

☐ **Healthy Systems Have Limits**

Rather than exceeding or ignoring the limits, tap the power of limits. Constraints drive creativity.

☒ **Recognize and Protect The Commons**

The Commons are the creations of nature and society that we inherit jointly and freely, and hold in trust for future generations. We all depend on them and we are all responsible for them.

☐ **Reconcile Individual Rights with Collective Responsibilities**

Responsible and ethical participation and leadership are required in order to make the changes we need to make. We must reconcile the conflicts that exist between our individual rights and our responsibilities as citizens.

☐ **Diversity Makes Our Lives Possible**

Diversity is required to support rich complex systems (like us), to build strength and to develop resilience in living systems. Biological diversity, cultural, gender, political and intergenerational diversity all serve this purpose.

☐ **Create Change at The Source Not the Symptom**

Distinguish problems from symptoms. Identify the most upstream problem within your sphere of influence.

_____ Think Far into the Future (1,000 Years)

Envision the kind of future we want and start working towards it. We should not sacrifice our children's future to meet our needs.

_____ Read the Feedback

We need to pay attention to the results of our behavior on the systems upon which we depend. If we keep our eyes on the feedback, we can adjust our thinking and behavior before we cross detrimental thresholds.

_____ It All Begins With a Change In Thinking

Thinking drives behavior and behavior causes results. As Einstein had observed, the significant problems we face cannot be solved with the same level of thinking we used to create them. Think systems, cycles and out of the box.

X Live By The Natural Laws

We must operate within the natural laws and principles rather than attempt to overcome them. It is nonnegotiable.

_____ We Are All Responsible

Everything we do and everything we don't do make a difference.

3. Describe the process for integrating sustainability enduring understandings checked off above into the unit plan.

In this module, students learn that offspring are like, but not exactly like, their parents. They observe photographs of parents and offspring to look for similarities and differences. Offspring need their parents for survival. The offspring communicate their needs in different ways. Students develop an understanding that animals communicate for various reasons. Offspring might cry to indicate they are hungry, or an animal might dance to attract a mate. Students learn about the different forms of communication and categorize them into four groups: sight, hearing, touch, and smell.

Besides communication, plants and animals have other ways to meet their needs.

Students discover how plants and animals use their external parts to help them survive, grow, and meet their needs. They learn that some animals use the external parts of their bodies to communicate. Then, students follow the engineering design process to design a set of animal ears with a specific function.

Students will also learn the importance of having these animals in nature. How the diversity of animal species helps survival. They will learn the importance of protecting these animals and the habitats that are their homes.

Engineers are inspired by many things. Students learn that inspiration can come from nature. This is called biomimicry. Students explore how animals mimic the eyes of other organisms as a form of communication. Students apply this knowledge, as they design a mask for a scarecrow that keeps birds away.

After students develop an understanding of plant and animal external parts, they use the design process to design an outdoor shelter, inspired by nature, that remains dry inside, is hidden from sight, and keeps out animals. This structure will be inclusive of

nature without causing harm or disruption of environment for native species to the area because what we do make a difference in all living things.

4. **Provide samples of exemplary student work that meet and/or exceed expectations from the summative assessment and the accompanying performance criteria.** *(Either provide a link to the sample work on a shared drive or website, paste a picture of the sample into this document, or upload the sample as a separate file on the action submission page.)*

The exemplary work samples are uploaded within the documentation.

5. **Provide copies and explanation of assessment tools.** *(Either provide a link to the assessment tools on a shared drive or website, paste a picture of the tool into this document, or upload the tool as a separate file on the action submission page.)*

The assessment tool is uploaded within the documentation.

6. **Teacher reflections on the unit's effectiveness: How did the attributes of education for sustainability that you selected add value to this unit?**

The attributes of education for sustainability enhanced this lesson effectiveness by providing a stronger connection for students to understand how important their environment is. We were able to include additional lessons where students gained an understanding of the importance of having diversity in species. The gained a foundation of how to live within the natural structure's nature provides. They are beginning to understand that we are all responsible for the actions we do and that we can use nature to fix and solve some problems. We learned that we could look to nature to help us move forward. Specifically, with regards to Africa's Baobab Tree, students learned how nature can support and be a model for so many of the inventions that are created to help people.

7. **For Remote Digital Units Only:** To apply points for a remotely delivered unit towards *Digital Schools Star* recognition, answer the questions below to describe how your unit was adapted to be most effective for a remote digital or hybrid learning environment:
- a. **Describe the timing and sequence of the synchronous and asynchronous elements of the unit and how they are coordinated.** *(For example: Did students have opportunities to review learning materials – such as videos, documents, webpages – on-demand on their own time to enhance live class discussions?)*

All learning, lesson points and activities were delivered in a hybrid setting with some students being in school while the majority remained at home. While all materials were presented and discussed each week in the live virtual instruction. Links to activities, videos, supports, assignments, and projects were also made available virtually through google classroom and the SeeSaw app. This allowed students who were unable to attend scheduled zoom lessons the chance to participate and learn asynchronously. This also allowed for parents to review and participate in the lessons that were shared with their students. These activities could also be reviewed by students while they were working on assignments at home to enhance their learning and projects.

- b. Describe the interactive elements to engage students in the unit and to give them the opportunity to demonstrate their learning. *(For example: Did students have break out rooms for peer to peer discussions? Were chats enabled? Were digital whiteboards shared or other collaborative spaces used?)*

Throughout the module, students participated in activities and sessions that included multiple ways and opportunities to demonstrate their learning.

Sessions were offered in ZOOM weekly, during which students completed assignments through the google classroom using tools like google doc, google slide, and google draw. Students engaged in group discussions and contributions through platforms like Google Jamboards, Using the SeeSaw platform students were able to participate in and submit assignments practicing what they learned through drawing, typing, writing, recording their voices, listening to books virtually, taking photographs and video recordings. Students were excited to demonstrate their understandings through these modes in addition to speaking and participating during class. The addition of these digital tools made it possible for students to not only participate after class hours and at times conducive their schedules but offered our reluctant learners the opportunity to participate in a sheltered safe environment from their homes where they felt comfortable participating and contributing from the lesson. In addition, they were also able to work with additional support from their families.

- c. Describe the methods and tools used to assess student performance.

With the young age of our students, a large portion of our formative assessment was taken through observation and participation in the activities, synchronously and asynchronously. Their classwork was submitted and reviewed through Google Classroom and SeeSaw for teachers to review and provide written and recorded audio feedback. Students were assessed through their activities, videos, recordings, photos, work samples, class participation in live sessions and through submitted work. Students are also assessed through the completion of projects, submitted by photo, video, drawing and explanations, as well as a summative assessment at the end of the module (attached.) This is shared and submitted through SeeSaw and Google classroom.

PLTW Curriculum Framework – First Grade

Designs Inspired by Nature

Established Standards/ Goals/Practices		Desired Results (Stage 1)		
<p>For full details, see the <i>Connections to Standards page in the Teacher Guide.</i></p> <p>Next Generation Science Standards</p> <p><u>Science and Engineering Practices</u></p> <ul style="list-style-type: none"> 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 Obtaining, Evaluating, and Communicating Information 		<p>Transfers: Students will be able to independently use their learning to...</p> <ul style="list-style-type: none"> T1: Evaluate a problem in a new and novel situation. T2: Apply a step-by-step design process to solve a problem. T3: Analyze how living things survive, grow, and meet their needs. <p>Essential Questions: Students will keep considering...</p> <ul style="list-style-type: none"> EQ1: Why do animals communicate as they do? EQ2: How can nature inspire solutions to human problems? EQ3: How can a step-by-step process help you design or improve a solution to a problem? 		
Meaning		Acquisition		
<p>Understandings</p> <p>Understandings are long-term takeaways that go beyond factual knowledge into broader and more conceptual comprehensions.</p> <p>“Students will understand that...”</p>		<p>Learning Objectives</p> <p>Objectives articulate what students need to be able to do. (The learning objectives will become targets of assessment.)</p> <p>“Students will be able to...”</p>		
<p>U1: Science and Engineering Practices</p> <p>Scientists and engineers use standard practices to explain the world or solve problems.</p>		<p>O1.1: Follow a step-by-step method to solve a problem.</p>		
		<p>Knowledge and Skills</p> <p>Knowledge and skills include the essential facts and basic concepts that a student should know and be able to do to perform the competency.</p> <p>“It is expected that students will...”</p>		
		<p>KS1.1.1: Define a simple design problem reflecting a need or a want.</p>		
		<p>KS1.1.2: Brainstorm possible solutions to the problem.</p>		
		<p>KS1.1.3: Make and use a model to test a design or aspects of a design, and to compare the effectiveness of different design solutions.</p>		

Established Standards/ Goals/Practices	Meaning	Acquisition	
		Learning Objectives	Knowledge and Skills
<u>Disciplinary Core Ideas</u> <ul style="list-style-type: none"> Structure and Function Information Processing Growth and Development of Organisms Inheritance of Traits Variation of Traits Engineering Design 			KS1.1.4: Evaluate a model solution through observations and/or measurements and consider what revisions to the initial model are needed.
		O1.2: Use scientific reasoning to ask questions, make observations, and investigate ideas to acquire knowledge and solve problems.	KS1.2.1: Ask and identify questions to gain knowledge or solve problems. KS1.2.2: Make observations to draw conclusions of phenomena.
<u>Crosscutting Concepts</u> <ul style="list-style-type: none"> Structure and Function Patterns 	U2: Parents and Offspring Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.	O2.1: Analyze how offspring look very much, but not exactly, like their parents.	KS2.1.1: Make observations to describe how offspring look like their parents. KS2.1.2: Make observations to describe how offspring look different from their parents.
			KS2.1.3: Observe patterns between parents and offspring.
<u>Connections</u> <ul style="list-style-type: none"> Influence of Science, Engineering, and Technology on Society and the Natural World Scientific Knowledge is Based on Empirical Evidence 		O2.2: Analyze behaviors that help animals survive.	KS2.2.1: Identify behaviors that help animals survive. KS2.2.2: Understand the cause and effect relationship of specific animal behaviors.
			KS2.2.3: Understand that animals communicate for different purposes.
			KS2.2.4: Describe the different forms of animal communication.
<u>Common Core English Language Arts</u> <ul style="list-style-type: none"> Reading: Informational Text 			

Established Standards/ Goals/Practices	Meaning		Acquisition	
	Understandings	Learning Objectives	Knowledge and Skills	
<ul style="list-style-type: none"> • Writing • Speaking and Listening Common Core Mathematics <ul style="list-style-type: none"> • Mathematical Practices 	U3: Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s).	O3: Apply knowledge of the relationship between structure and function to solve problems.	KS3.1: Understand how plants and animals use their external parts, or structures, to survive, grow, and meet their needs. KS3.2: Describe how the structure of an external part helps a plant or animal function to meet a need or want. KS3.3: Describe how the function of an external part of a plant or animal relates to its structure. KS3.4: Design a structure to meet a specific function. KS3.5: Develop a basic understanding of biomimicry.	
	U4: Mathematical Thinking Mathematical thinkers apply complex thinking and reasoning strategies where thinking is intentional and reflected upon.	O4: Apply mathematical thinking to solve problems.	KS4.1: Make sense of problems and persevere in solving them. [CCSS.MATH.PRACTICE.MP1] KS4.2: Reason abstractly and quantitatively. [CCSS.MATH.PRACTICE.MP2] KS4.3: Construct viable arguments and critique the reasoning of others. [CCSS.MATH.PRACTICE.MP3] KS4.4: Attend to precision. [CCSS.MATH.PRACTICE.MP6]	

Established Standards/ Goals/Practices	Meaning		Acquisition	
	Understandings	Learning Objectives	Knowledge and Skills	
	U5: Collaboration Professionals function effectively and efficiently on multidisciplinary teams to be successful.	O5: Collaborate effectively on a diverse and multidisciplinary team.	KS5.1: Generate ideas as a team.	
			KS5.2: Value the contributions of each team member.	
			KS5.3: Demonstrate collaboration through effective communication.	
	U6: Communication Professionals communicate effectively with a variety of audiences using multiple modalities to be successful.	O6: Communicate effectively for specific purposes and settings.	KS6.1: Document work in an organized notebook.	
			KS6.2: Explain findings and justify evidence-based conclusions with others.	
			KS6.3: Present data and information accurately and effectively.	
	U7: Ethics Professionals conduct themselves so as to maximize benefits for society and minimize harm.	O7: Practice ethical behavior in all settings.	KS7.1: Engage in and maintain positive interactions and relationships with other children and adults.	

Evidence (Stage 2)		
Activity, Project, Problem (APB)	Show evidence of the student's ability to...	Assessment opportunities include...
Introduction Story <i>Learning from Nature</i>		<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • Discussion
Activity 1 Parents and Their Offspring	LO1.2 LO2.1 LO4 LO5 LO6 LO7	<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • PLTW Launch Log • Discussion • Reflecting on essential questions and conclusion questions through guided discussion
Activity 2 Animal Communication	LO1.2 LO2.2 LO4 LO5 LO6 LO7	<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • PLTW Launch Log • Discussion • Reflecting on essential questions and conclusion questions through guided discussion
Activity 3 Structure and Function	LO1.1 LO1.2 LO3 LO4 LO5	<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • PLTW Launch Log • Discussion • With guidance, demonstrate an understanding of the design process

Learning Plan (Stage 3)		
APB Description		Knowledge and Skills
Introduction Story The design challenge to design a model of an outdoor shelter that mimics the external parts of plants and/or animals is introduced.		
Activity 1 Students view photographs to observe how offspring are like, but not exactly like, their parents. Students observe similarities and differences between parents and offspring and record their findings on a Venn diagram. Then, students play a matching game to pair offspring with their parents.		KS1.2.1 KS4.2 KS1.2.2 KS4.3 KS2.1.1 KS4.4 KS2.1.2 KS5.3 KS2.1.3 KS6.1 KS6.2 KS7.1
Activity 2 Students explore how animals communicate with each other. They learn that communication takes many forms, such as sight, sound, touch, and smell. Then students apply what they have learned as they communicate a message to a partner through sight, sound, and touch.		KS1.2.1 KS4.2 KS1.2.2 KS4.3 KS2.2.1 KS4.4 KS2.2.2 KS5.3 KS2.2.3 KS6.1 KS2.2.4 KS7.1
Activity 3 Students learn that plants and animals have external parts to help them survive, grow, and meet their needs. The external parts are structured to meet a specific function. As students learned in Activity 2,		KS1.1.1 KS4.1 KS1.1.2 KS4.2 KS1.1.3 KS4.3 KS1.1.4 KS4.4 KS1.2.1 KS5.1

Evidence (Stage 2)		
Activity, Project, Problem (APB)	Show evidence of the student's ability to...	Assessment opportunities include...
	LO6 LO7	<ul style="list-style-type: none"> • Reflecting on essential questions and conclusion questions through guided discussion
Project Biomimicry	LO1.1 LO1.2 LO3 LO4 LO5 LO6 LO7	<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • PLTW Launch Log • Discussion • With guidance, demonstrate an understanding of the design process • Reflecting on essential questions and conclusion questions through guided discussion

Learning Plan (Stage 3)		
APB Description		Knowledge and Skills
<p>animals communicate certain messages with their external parts.</p> <p>Then students deepen their understanding of structure and function as they learn more about animal ears. Students follow the design process to sketch, build, and reflect on a new pair of animal ears.</p>		KS3.1 KS5.2 KS3.2 KS5.3 KS3.3 KS6.1 KS3.4 KS6.2 KS6.3 KS7.1
<p>Project</p> <p>Students explore how nature inspires design by observing a photograph of a kingfisher and a bullet train. When engineers learn from nature to solve human problems, it is called biomimicry. Many inventions have been inspired by plants and animals, such as airplanes, boat hulls, hook and loop material, and water filters.</p> <p>Then students learn about animals with false eyes. These false eyes help to deter predators and to communicate with other animals. Students apply their knowledge of biomimicry and false eyes to design a mask for a scarecrow that keeps birds away.</p>		KS1.1.1 KS4.1 KS1.1.2 KS4.3 KS1.1.3 KS5.1 KS1.1.4 KS5.2 KS1.2.1 KS5.3 KS3.1 KS6.1 KS3.2 KS6.2 KS3.3 KS6.3 KS3.4 KS7.1 KS3.5

Evidence (Stage 2)		
Activity, Project, Problem (APB)	Show evidence of the student's ability to...	Assessment opportunities include...
Problem The Outdoor Shelter	LO1.1 LO1.2 LO2.2 LO3 LO4 LO5 LO6 LO7	<ul style="list-style-type: none"> • Interpreting essential concepts through formative assessment <ul style="list-style-type: none"> • PLTW Launch Log • Discussion • With guidance, demonstrate an understanding of the design process • Interpreting essential concepts through summative assessment <ul style="list-style-type: none"> • Design a model of an outdoor shelter that mimics the external parts of plants and/or animals. • Reflecting on essential questions and conclusion questions through guided discussion

Learning Plan (Stage 3)		
APB Description		Knowledge and Skills
Problem Students observe photographs of animal homes and reflect on the importance of the homes for offspring. Finally, students apply the knowledge and skills gained throughout the module as they follow the design process to sketch, build, evaluate, and explain a model of an outdoor shelter that mimics the external parts of plants and/or animals.		KS1.1.1 KS5.1 KS1.1.2 KS5.2 KS1.1.3 KS5.3 KS1.1.4 KS6.1 KS1.2.1 KS6.2 KS2.2.1 KS6.3 KS3.4 KS7.1 KS4.1 KS4.3

Connections to Standards

PLTW programs are designed to empower students to thrive in an evolving world. As a part of this process, we take connections to standards into account when developing and updating our curriculum. The PLTW Launch modules address standards from the following:

- Next Generation Science Standards (NGSS)
- Common Core State Standards (CCSS) in English/Language Arts (ELA) and Mathematics

This document lists the standards identified from each of these sources that apply to the Designs Inspired by Nature module.

Next Generation Science Standards

Performance Expectations

- 1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.
- 1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- 1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
- K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Science and Engineering Practices

- Asking Questions and Defining Problems. Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions.
- Developing and Using Models. Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- **Planning and Carrying Out Investigations.** Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
- **Analyzing and Interpreting Data.** Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- **Constructing Explanations and Designing Solutions.** Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and in designing solutions.
 - Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.
 - Use materials to design a device that solves a specific problem or a solution to a specific problem.
- **Engaging in Argument from Evidence.** Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s).
- **Obtaining, Evaluating, and Communicating Information.** Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
 - Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world.

Disciplinary Core Ideas

- **LS1.A: Structure and Function.** All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
- **LS1.B: Growth and Development of Organisms.** Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.
- **LS1.D: Information Processing.** Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.
- **LS3.A: Inheritance of Traits.** Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents.
- **LS3.B: Variation of Traits.** Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.
- **ETS1.A: Defining and Delimiting an Engineering Problem.** Asking questions, making observations, and gathering information are helpful in thinking about problems.

- ETS1.B: Developing Possible Solutions. Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.
- ETS1.C: Optimizing the Design Solution. Because there is always more than one possible solution to a problem, it is useful to compare and test designs.

Crosscutting Concepts

- Structure and Function. The shape and stability of structures of natural and designed objects are related to their function(s).
- Patterns. Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

Connection to Engineering, Technology, and Applications of Science

- Influence of Science, Engineering and Technology on Society and the Natural World. Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.

Connection to Nature of Science

- Science Knowledge is Based on Empirical Evidence. Scientists look for patterns and order when making observations about the world.

Common Core State Standards ELA and Mathematics

English Language Arts

- CCSS.ELA-LITERACY.RI.1.1. Ask and answer questions about key details in a text.
- CCSS.ELA-LITERACY.RI.1.2. Identify the main topic and retell key details of a text.
- CCSS.ELA-LITERACY.RI.1.10. With prompting and support, read information texts appropriately complex for grade 1.
- CCSS.ELA-LITERACY.W.1.7. Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).
- CCSS.ELA-LITERACY.W.1.8. With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.
- CCSS.ELA-LITERACY.SL.1.1. Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.
- CCSS.ELA-LITERACY.SL.1.2. Ask and answer questions about key details in a text read aloud or information presented orally or through other media.

- CCSS.ELA-LITERACY.SL.1.5. Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Mathematics

- CCSS.MATH.PRACTICE.MP1. Make sense of problems and persevere in solving them.
- CCSS.MATH.PRACTICE.MP2. Reason abstractly and quantitatively.
- CCSS.MATH.PRACTICE.MP3. Construct viable arguments and critique the reasoning of others.
- CCSS.MATH.PRACTICE.MP6. Attend to precision.

Sources

National Governors Association Center for Best Practices, & Council of Chief State School Officers. (2010). *Common Core State Standards*. Washington, DC: National Governors Association Center for Best Practices, Council of Chief State School Officers.

NGSS Lead States. (2013). *Next Generation Science Standards: For states by states*. Washington, DC: The National Academies Press.



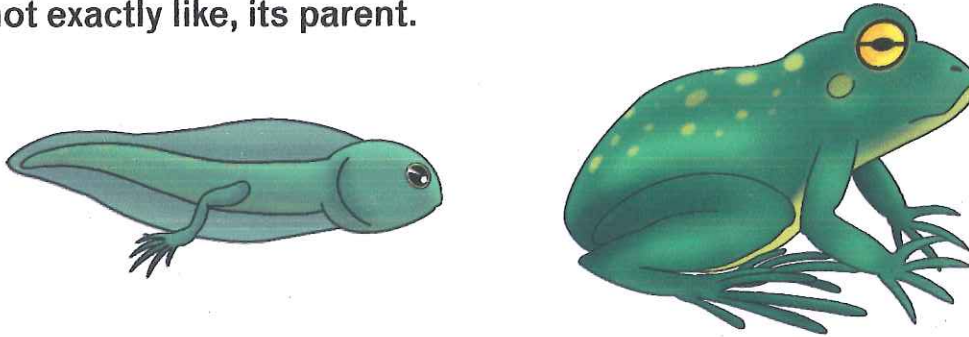
Designs Inspired by Nature: End-of-Module Summative Assessment

	Basic	Proficient	Advanced
Criteria	A student who has reached the highest achievement of the Basic level should be able to do the following.	A student who has just reached the Proficient level should be able to do the following.	A student who has just reached the Advanced level should be able to do the following.
Science and Engineering Practices O1.1 – Follow a step-by-step method to solve a problem.	With support, student follows some steps of the design process as they design, create, and test a model.	With support, student follows all steps of the design process as they design, create, and test a model.	Student independently follows the design process as they design, create, and test a model.
Structure and Function O3 – Apply knowledge of the relationship between structure and function to solve problems.	With support, student designs and builds a model of an outdoor shelter that remains dry, is hidden, and keeps out animals. Student attempts to explain how they solved a human problem by mimicking plant and/or animal external parts.	Student designs and builds a model of an outdoor shelter that remains dry, is hidden, and keeps out animals. With support, student explains how they solved a human problem by mimicking plant and/or animal external parts.	Student designs and builds a model of an outdoor shelter that remains dry, is hidden, and keeps out animals. Student independently explains how they solved a human problem by mimicking plant and/or animal external parts.
Collaboration O5 – Collaborate effectively on a diverse and multidisciplinary team.	Student participates most of the time and shares ideas with others. Student demonstrates flexibility in thinking and behavior some of the time.	Student fully participates and shares their ideas with their group, while valuing the contribution of team members. Student demonstrates flexibility in thinking and behavior most of the time.	Student fully participates and shares their ideas with their group, while valuing the contributions of team members. Student models and encourages others to demonstrate flexibility in thinking and behavior.
Communication O6 – Communicate effectively for specific purposes and settings.	With support, student accurately describes findings from the Problem. Student attempts to use the Launch Log to communicate their thinking.	Student accurately and effectively describes findings from the Problem. Student uses the Launch Log to communicate their thinking.	Student justifies findings from the Problem with evidence-based conclusions. Student uses the Launch Log to communicate their thinking.
Ethics O7 – Practice ethical behavior in all settings.	With support, student engages in positive interactions and relationships with other students some of the time.	With support, student engages in and maintains positive interactions and relationships with other students. Student is kind and respectful when they disagree.	Student independently engages in and maintains positive interactions and relationships with other students. Student is kind and respectful when they disagree.

Designs Inspired by Nature

Check for Understanding

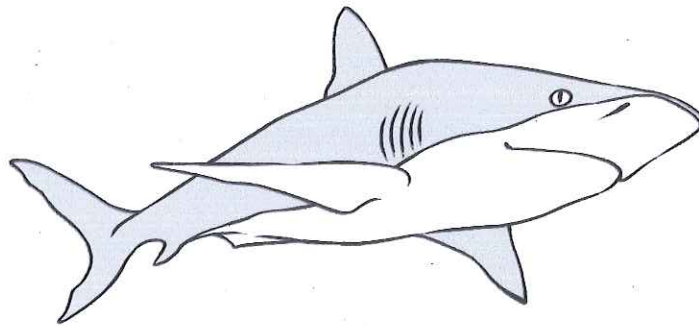
1. Look at the pictures of the frog and tadpole. Describe how the tadpole is like, but not exactly like, its parent.



2. Why is communication important for animals?

3. Describe two ways that animals communicate with each other.

4. How does this shark use its external parts to help it survive? Include two external parts in your answer.



5. How does structure and function we see in nature help us solve human problems?

6. How can we help protect the animals you have learned about?

Lessons Taught with Activities in SeeSaw

This module was taught to all 8 first grade classes in GLC reaching 131 first grade students in the grade level at GLC.



Animal Eggs

How do animals lay their eggs? What do animal eggs look like? What do they need to grow?

1. Click on the **Animal Eggs** button.

2. Click on the **Animal Eggs** button.

3. Click on the **Animal Eggs** button.



External Parts

What are the external parts of an animal? How do they help the animal survive?

1. Click on the **External Parts** button.

2. Click on the **External Parts** button.

3. Click on the **External Parts** button.



Animal Communication

How do animals communicate? What are the different ways they communicate?

1. Click on the **Animal Communication** button.

2. Click on the **Animal Communication** button.

3. Click on the **Animal Communication** button.



How do animals communicate?

1. Click on the **How do animals communicate?** button.

2. Click on the **How do animals communicate?** button.

3. Click on the **How do animals communicate?** button.



Tomato Plants

How do tomato plants grow? What are the different parts of a tomato plant?

1. Click on the **Tomato Plants** button.

2. Click on the **Tomato Plants** button.

3. Click on the **Tomato Plants** button.



Matching Mothers and Babies

How do mothers and babies match? What are the different ways they match?

1. Click on the **Matching Mothers and Babies** button.

2. Click on the **Matching Mothers and Babies** button.

3. Click on the **Matching Mothers and Babies** button.



PLTW Shaughnessy Teacher

Teacher

1. Click on the **PLTW Shaughnessy Teacher** button.

2. Click on the **PLTW Shaughnessy Teacher** button.

3. Click on the **PLTW Shaughnessy Teacher** button.



PLTW Shaughnessy Teacher

Teacher

1. Click on the **PLTW Shaughnessy Teacher** button.

2. Click on the **PLTW Shaughnessy Teacher** button.

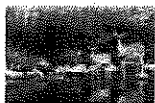
3. Click on the **PLTW Shaughnessy Teacher** button.

 卷 1 第 1 期 2015 年 1 月

Figure 1. The effect of the concentration of the H_2O_2 solution on the amount of the released H_2O from the H_2O_2 -loaded hydrogel. The amount of the released H_2O was measured by the weight difference of the hydrogel before and after the release. The concentration of the H_2O_2 solution was 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, and 1.0 wt. %.

$$x^2 = \frac{1}{2} \left(\frac{1}{2} \right) = \frac{1}{4} \quad \text{so} \quad x = \pm \sqrt{\frac{1}{4}} = \pm \frac{1}{2} \quad \text{or} \quad x = \frac{1}{2} \quad \text{or} \quad x = -\frac{1}{2}$$

22



Comparing Babies and Parents

Source: U.S. Department of Education, Office of Education Statistics, and the National Center for Education Statistics, *2003-2004 School Year*.

1. The first step is to identify the main idea of the passage. This is usually found in the first sentence.

[illegible]

1. The first group of authors (e.g., [1, 2]) has shown that the use of a single, common, and simple model for the entire system is not only possible but also convenient. This approach is based on the assumption that the system is a single, unified whole, and its behavior can be described by a single, unified model. This approach is based on the assumption that the system is a single, unified whole, and its behavior can be described by a single, unified model.

 Springer

^a $\chi^2 = 10.1$, $df = 1$, $p = 0.002$. $\chi^2 = 10.1$, $df = 1$, $p = 0.002$. $\chi^2 = 10.1$, $df = 1$, $p = 0.002$.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

234



Activity 1 Nature

1. What are the three different types of questions?
 a. Closed, open, and leading, and compound and OR
 b. Closed is the **T**wo word response
 c. Open is the **O**pen ended question, which is usually answered with more than
 a two word response when you ask them

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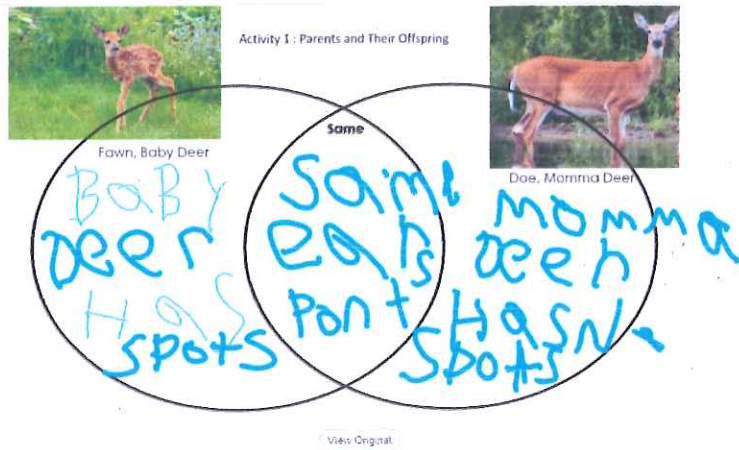
Figure 1 is a line graph showing the relationship between the number of subjects (N) and the number of trials (T) for three different conditions: 'No feedback', 'Feedback', and 'No feedback + Feedback'. The x-axis is labeled 'Number of subjects (N)' and ranges from 0 to 10. The y-axis is labeled 'Number of trials (T)' and ranges from 0 to 10. The 'No feedback' condition shows a linear increase from (0,0) to (10,10). The 'Feedback' condition shows a linear increase from (0,0) to (10,10) with a steeper slope than 'No feedback'. The 'No feedback + Feedback' condition shows a linear increase from (0,0) to (10,10) with a slope between the other two conditions.

■ 天 下 萬 物 皆 有 其 理 也

$$f_1 = \frac{1}{\sqrt{\pi}} e^{-x^2}, \quad f_2 = \frac{1}{\sqrt{\pi}} e^{-x^2} + \frac{x}{\sqrt{\pi}}, \quad f_3 = \frac{1}{\sqrt{\pi}} e^{-x^2} - \frac{x^2}{\sqrt{\pi}},$$
$$x = \frac{1}{2} \left(\frac{1}{2} + \frac{1}{2} \right) = \frac{1}{2}$$

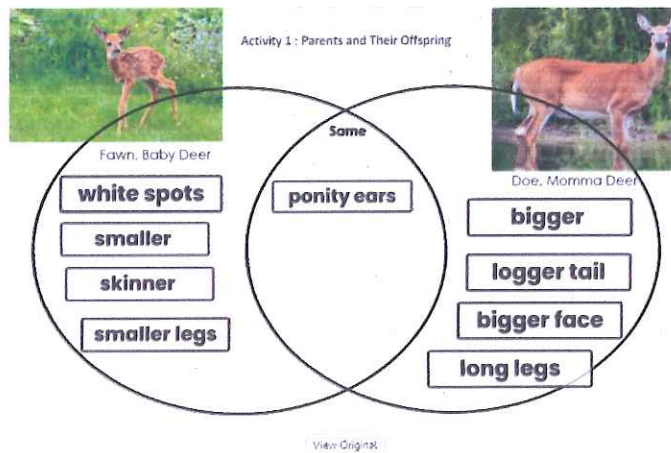
43

In response to: Comparing Babies and Parents



February 9, 2021, 9:01 AM

In response to: Comparing Babies and Parents



February 9, 2021, 9:03 AM

In response to: Matching Mothers and Babies

How are the animals alike? How are they different?

The mom is different than the baby because she is bigger with bigger ears. She is black.



The dogs are the same because they have four legs, a tail and they are both dogs.

February 16, 2021, 9:59 AM

Designs Inspired by Nature

Student Work Samples

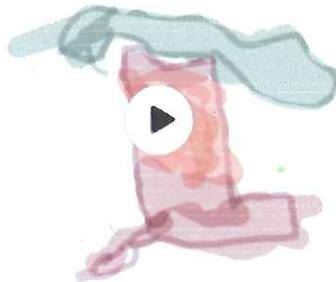
In response to: Activity 1 Nature



February 2, 2021, 9:05 AM

Like Comment

In response to: Activity 1 Nature



February 2, 2021, 9:05 AM

In response to: Activity 1 Nature



February 2, 2021, 9:05 AM

Like Comment

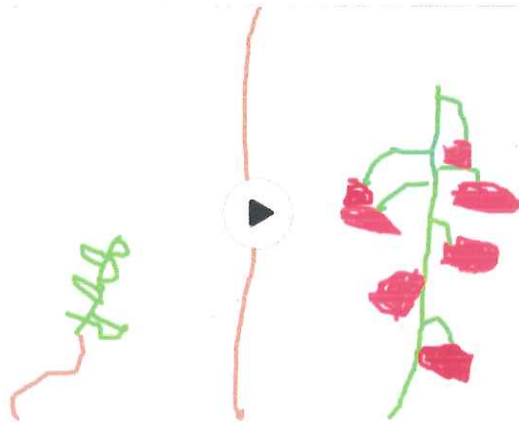
In response to: Tomato Plants



February 23, 2021 7:54 PM

Like Comment

In response to: Tomato Plants



February 23, 2021 8:42 AM

In response to: How do animals communicate?



March 2, 2021 8:04 AM

[In response to: How do animals communicate?](#)



March 2, 2021 9:01 AM