

Adaptations for Successful Reproduction

Grade: 7th | Seed Standard Utah 7.4.2: NGSS MS-LS1-4 | Lesson time: 90 min

Lesson Level Performance Expectations

- **7.4.2 Obtain, evaluate, and communicate information** about specific animal and plant **adaptations** and **structures** that affect the **probability of successful reproduction**.
 - Examples of adaptations could include nest building to protect young from the cold, herding of animals to protect young from predators, vocalization of animals and colorful plumage to attract mates for breeding, bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury. (LS1.B)

What Students Will Figure Out

- Students will figure out that successful reproduction depends on the adaptations of the structures and functions of animals through obtaining, evaluating, and communicating information.

Lesson Snapshot:

Students will research how an organism's adaptations lead to successful reproduction. Students will differentiate between behavioral and structural adaptations. Students will evaluate sources to determine between pseudoscience and accurate information. The opportunity to learn from others' research will help students communicate the adaptations and successful reproduction of their organism.

Phenomenon

Are there organisms that can survive and successfully reproduce in any environment on Earth?

- Students will gather information to investigate their own definition of adaptations.



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SCIENCE AND ENGINEERING PRACTICES	DISCIPLINARY CORE IDEAS	CROSSCUTTING CONCEPTS
<p>Obtaining, Evaluating, and Communicating Information: Students obtain, evaluate, and communicate information to summarize adaptations that contribute to reproductive success in organisms.</p> <p>Students do this Science and Engineering Practice (SEP) by:</p> <ul style="list-style-type: none"> ● Read and comprehend grade-appropriate complex texts and/or other reliable media to summarize and obtain scientific and technical ideas and describe how they are supported by evidence. ● Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. ● Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts. 	<p>Obtain, evaluate, and communicate information about specific animal and plant adaptations and structures that affect the probability of successful reproduction.</p> <p>Examples of adaptations could include nest building to protect young from the cold, herding of animals to protect young from predators, vocalization of animals and colorful plumage to attract mates for breeding, bright flowers attracting butterflies that transfer pollen, flower nectar and odors that attract insects that transfer pollen, and hard shells on nuts that squirrels bury. (LS1.B)</p> <p>(LS1.B): Growth and Development of Organisms</p> <p>Students know and apply the Science Disciplinary Core Idea (DCI) of LS1.B Growth and Development in Organisms in their thinking and reasoning to communicate.</p> <ul style="list-style-type: none"> ● Animals engage in characteristic behaviors that increase the odds of reproduction. ● Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. 	<p>Structure and Function: Structures or behaviors in animals and plants can be used to describe how their function depends on their shapes and relationships among its parts.</p> <p>Students think and connect through the Crosscutting Concept (CCC) to reason that:</p> <ul style="list-style-type: none"> ● Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.



Materials

Student Materials	Teacher Materials	Optional Resources
<p>Student worksheet</p> <p>Elk article</p>	<p>Teacher Presentation Slides</p> <p>Adaptation Website: https://www.texasgateway.org/resource/organisms-adaptations</p> <p>Pseudoscience website: https://zapatopi.net/treeoctopus/</p>	<p>Depending on student choice:</p> <ul style="list-style-type: none"> - Markers - Poster paper - Colored pencils - Glue - Tape <p>Device to make student product:</p> <ul style="list-style-type: none"> - Slideshow - Newscast - Movie - Song

Lesson Preparation

MATERIAL PREPARATION

Previous Knowledge: LS1B Previous Grades

- (K-2) Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring survive.
- (3-5) Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

Material Set-Up:

- Technology set up as needed for slideshow
- Worksheet and rubric available online for digital classrooms or hard copies



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Supports students will need:

- Online research helps to find credible sources.
- Make sure students are paired with others who can support each other.

Experience the Phenomenon

What Students Are Doing

Students will discuss in their groups how they think organisms can successfully live in the different environments shown and if they are capable of living in every environment on Earth.

Students will learn about adaptations (structural and behavioral) and how they help organisms survive and reproduce in their environment.

Students will learn how to evaluate sources of information by comparing reliable and unreliable sources.

<i>Teacher Guidance</i>	<i>Teacher Prompts:</i>	<i>Listen For:</i>
	<p>Slide 2: SEP: Determine students’ prior knowledge of the definition of obtain, evaluate, and communicate. CCC: Structure and function: Assess students’ prior knowledge of adaptations that might need further clarification in the lesson.</p>	Misconception: Adapt (to a warm or cold climate) vs Adaptations that structures are inherited. A student can’t go to a cold environment and ‘grow fur.’
<p>Phenomena: Slide 3: Are there organisms that can survive and successfully reproduce in any environment on the Earth?</p>	<p>Slides 3 & 4: Pictures of biomes - What are the unique characteristics of each one? Review: Types of Biomes</p> <ul style="list-style-type: none">- Aquatic	



	<ul style="list-style-type: none"> - Grassland - Forest - Desert - Tundra 	
<p>Slide 4: The teacher assigns each group a number. Think-Pair-Share: Discuss with your partner what traits an organism needs to survive in that environment. (5 min)</p> <p>Call on groups to share what they have discovered in their group.</p>	<p>Slide 4: Suggested teacher prompts:</p> <ul style="list-style-type: none"> - How do organisms get food? - How do organisms survive and reproduce in a habitat/environment? - How many organisms live there? - How do they reproduce? - What helps them to survive? - Are there organisms that can live anywhere? - What if your organism was put in a different environment? 	<p>Listen for discussions on adaptations for survival in the environment the group picked.</p>
<p>Slide 5: Give students 5 minutes to explore (https://www.texasgateway.org/resource/organisms-adaptations).</p> <p>Explicit expectations on the website for worksheet:</p> <ul style="list-style-type: none"> - Students will define “adaptation” and find specific examples of adaptations. (Questions 1 and 2 on worksheet) - Differentiate between structural and behavioral adaptations. (Question 3 on worksheet) 	<p>Slide 5: Remind students to use the “+” on the website to find the behavioral and structural adaptations</p> <p>Explicit clarification for this section when finished looking at the website:</p> <ul style="list-style-type: none"> - Define “adaptation” by giving a specific example - Define “behavior adaptation” - Define “structure (physical) adaptation” 	<p>Listen for:</p> <ul style="list-style-type: none"> - Camel eyelashes - Giraffe neck - Polar bear claws - Burrowing - Migrating for reproduction



	Ask students to give specific examples of adaptations given on the website	
<p>Slide 6: Check for understanding Definition of adaptation and differentiate between structural and behavioral.</p> <p>Adaptations: Something an organism has or does to survive and reproduce in its environment.</p> <p>Structure/Physical Adaptations are body structures that help an organism find and consume food and water, protect itself, cope with challenging environments, and reproduce.</p> <p>Behavioral Adaptations are actions an organism takes to survive.</p>	<p>Slide 6: Have students share what they learned for each definition: Students can share examples of:</p> <ul style="list-style-type: none"> - Structural adaptation: (Cactus on slide: spines protect the water storage) - Behavioral adaptation: (nest-building behavior) - Some characteristics fit in both: (rattlesnake: structure of the rattle; behavior adaptations know when to shake and warn predators.) 	Students should demonstrate an understanding of adaptations before moving on to the research.
<p>Slide 7: Visit an unreliable source If students have seen this before, ask them not to give away the “secret” (the website is a hoax).</p> <p>Give students 2 minutes to look at the website. Northwest Tree Octopus</p>	<p>Slide 7: Can you identify any adaptations of the Tree Octopus?</p>	Students may or may not catch on to the fact that this website is a hoax. They might start to say things about the habitat, predators, and sightings.
<p>Slide 8: Is the website reliable? Discuss what makes a website reliable.</p>	<p>Slide 8: Is the website reliable? Discuss what makes a website reliable.</p> <ul style="list-style-type: none"> - What does the URL look like? - What does the website look like? - Is the website educating? - Look at the URL, especially the end. 	



	- Does prior knowledge support the website?	
Slide 9: Follow up on reliable websites.	Slide 9: Follow up on reliable websites.	
Slide 10: Example of what the final project should look like; refer to the worksheet for rubric and expectations.	Slide 10: Review the final project example, worksheet rubric, and expectations. <ul style="list-style-type: none"> - Scan article (quick read) - Notice the subheadings (formatting) - What do you think the article is trying to teach you? - Notice the sources that are cited. 	
Slide 11: Demonstrate how to use citations in student projects. Worksheet #4: citations sample	Slide 11: Demonstrate how to use citations in student projects.	

Investigate the Phenomenon

What Students Are Doing

In this section, students will research an organism and create a presentation of their choice.



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Teacher Guidance	Teacher Prompts:	Listen For:
<p>Slide 12: Students are assigned a partner and will choose which organism they want to investigate. Teachers should make sure there aren't duplicate organisms. Have students pick an organism that they are unfamiliar with.</p> <p>Set a timer and give the students 20 minutes to research and create their presentations.</p>	<p>Slides 12 & 13 Explicitly state expectations: (Rubric)</p> <ol style="list-style-type: none"> 1. Common name 2. Scientific name 3. Habitat (where the organism lives) 4. Adaptations 5. Pictures included <p>Make sure to review the rubric.</p> <p>The teacher demonstrates the table, emphasizing that students must select whether adaptation is behavioral or structural.</p>	<ul style="list-style-type: none"> - Student discussion as they are finding information. - Watch that students aren't getting frustrated or confused. - Encourage students to look at the rubric. - Adaptations are for specific organisms in their environments. - Check for reliable websites.
<p>Slide 13: Leave the slide up for students to reference the rubric while researching.</p>		
<p>Slide 17: Students who finish their research project early can view these videos while waiting for other groups to finish for the final portion of the lesson.</p>		

Model the Phenomenon

What Students Are Doing

Students alternate between communicating what they found while researching organism's adaptations, listening to students present, and documenting their findings.



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Teacher Guidance	Teacher Prompts:	Listen For:
Students revisit the phenomenon and answer the guiding question, “Are there organisms that can survive and successfully reproduce in any environment on the Earth?” using what they have learned about adaptations through the lesson.		
<p>Slide 14: Students visit groups and obtain and share information.</p> <p>Encourage students to communicate everything they learned about the organism.</p> <p>If the listener still needs information, the listener can ask questions.</p>	<p>Slide 14:</p> <p>The teacher decides how to set up a rotation. Teachers may want to stress that students visit at least one plant and one animal.</p>	<p>Students share project details with other groups, not just answers.</p> <p>Students identify physical or behavioral adaptations.</p>
<p>Slide 15: Students will observe the two different plants and determine what type of environment they would belong in based on the structures.</p>	<p>What parts of the plant do you recognize? What is their role in the plant’s survival?</p>	
<p>Slide 16: Wrap up: Return to the original question –</p> <p>Are there organisms that can survive and successfully reproduce in any environment on Earth?</p> <p>Students will answer #8 on the worksheet</p>	<p>Sentence starters:</p> <ul style="list-style-type: none"> - I think some organisms can survive and reproduce because..... - I think there are no organisms that can survive and reproduce because..... <p>Make sure to include specific examples:</p> <ul style="list-style-type: none"> - Structural function - Behavior function <p>Students can share their answers for #8</p>	<p>Students connect the adaptation to the environment of the organism.</p> <p>Encourage students to communicate everything they learned about the organism.</p> <p>If the listener still needs information, the listener can ask questions.</p>



	Tardigrades will survive in any environment, but they can't reproduce in every environment.	
Slide 17: Videos linked on the slide can be an extension for those who are finished or to end the lesson.	Ask students: What are the adaptations we see in the videos?	

Link to Lesson Folder: <https://byu.box.com/s/0fkfeoahkqlnh7fcdgmfo9d76qzjdu11>

This lesson was created by Julie Castellon, Han Hermansen, Trampas Williams, Denver Smit, & Brice Reeves



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