

PLANT ADAPTATIONS

Unit Overview: Students will be introduced to plant adaptations and biomes through in-depth classroom investigations, field explorations and observations. Students will answer essential questions and utilize scientific explanation.

Grade Levels: 3-12

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Desired Results

Established goals:

Standard: 3. Interdependent Relationships in Ecosystems

- 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.
- 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.

Standard: 3. Inheritance and Variation of Traits: Life Cycles and Traits

- 3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.
- 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.

Standard: 4. Structure, Function, and Information Processing

- 4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Standard: 5. Matter and Energy in Organisms and Ecosystems

- 5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.

Standard: MS. Growth, Development, and Reproduction of Organisms

- MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.
- MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.

PLANT ADAPTATIONS

<p>Standard: MS.Natural Selection and Adaptations</p> <ul style="list-style-type: none"> MS-LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. <p>Standard: HS.Natural Selection and Evolution</p> <ul style="list-style-type: none"> HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations. HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. 	
<p>Understanding(s):</p> <p>Students will understand that...</p> <ul style="list-style-type: none"> The earth is comprised of 10 biomes that are home to a diversity of plants and animals. Over time, plants have developed physical traits that allow them to survive in a specific biome. Many plants and animals would no longer exist if they did not adapt to changing environments. All plants need air, water, nutrients and sunlight to grow, but some require less to survive. 	<p>Essential Question(s):</p> <ul style="list-style-type: none"> What is an adaptation? What is a biome? How is it different than an ecosystem? What physical traits have helped the study plants adapt to their specific biome? How have these traits been influenced by the environment? What are some adaptations of plants living in Maine?
<p>Students will know...</p> <ul style="list-style-type: none"> The names of the 10 biomes and the types of plants that grow there. How a specific adaptation helps a plant to survive. The claim, evidence, reasoning method of scientific explanation. 	<p>Students will be able to...</p> <ul style="list-style-type: none"> Identify plant adaptations in the Gardens, at school and/or home. Identify a coniferous tree from a deciduous one. Observe/record/collect evidence in the field in order to make a claim.

PLANT ADAPTATIONS

Assessment Evidence	
<p>Performance Tasks:</p> <ul style="list-style-type: none"> Given live plants and climate information, students will make observations to determine the specific adaptations of these plants and will state claims to support their reasoning. Go on an exploratory walk in the Gardens to find and record names of plants that possess similar adaptations of plants studied in the classroom. Using deductive reasoning, students will make claims as to what biome these plants could grow best in. 	<p>Other Evidence:</p> <ul style="list-style-type: none"> Drawing of a biome and the plants that live there. Oral and/or written responses to the Essential Questions. Plant adaptations data collection worksheet. Data sheet with recorded plants and their adaptations from the Gardens. Claim, evidence and reasoning worksheet. Biome and plants worksheet. Data sheet with recorded plant adaptations at school or home.

Learning Plan
<p>Learning Activities:</p> <ul style="list-style-type: none"> Visit the websites below to learn more about biomes and plant adaptations. Draw a biome and the plants that live there. Rotate through indoor biome stations to determine plant adaptations. Go on an exploratory walk in the Gardens. Pairs of students will find plants with similar adaptations of those studied in the classroom. Have students make a claim based on evidence as to what biome these found plants could grow best in. Review the essential questions with the group. Match up the plants to the biome they can be found in. Record observations of plant adaptations found at school or home.

PLANT ADAPTATIONS

Web Resources:

<http://www.mbgnet.net/bioplants/adapt.html>

<https://askbiologist.asu.edu/explore/biomes>

<http://www.cotf.edu/ete/modules/msese/earthsysflr/biomes.html>

<http://studyjams.scholastic.com/studyjams/jams/science/plants/plantadaptations.htm>