

"Our mission is to prepare each student to be a successful and responsible member of society."

North Smithfield School District

Fifth Grade Science Curriculum

North Smithfield Scope and Sequence SCIENCE Curriculum: K-12

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Environments Unit Design - Grade 4

All living things depend on the conditions in their environment. The study of the relationships between one organism and its environment builds knowledge of all organisms. With this knowledge comes an awareness of limits. Changes in an environment can be hard on organisms. Such knowledge is important because humans can change environments. To do so without awareness of possible consequences can lead to disasters. The **Environments Module** consists of six investigations that introduce students to these basic concepts in environmental biology.

RI Statements of Enduring Knowledge - (Established Goals):

LS 1 - All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, and species).

LS2 - Matter cycles and energy flows through an ecosystem.

LS3 - Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).

Related Rhode Island GSE's (Understandings)	RI Assessment Targets High emphasis targets**
<p>LS1 (5-6) – 1 Students demonstrate understanding of biodiversity by... 1a recognizing that organisms have different features and <u>behaviors for meeting their needs to survive</u> (e.g., fish have gills for respiration, mammals have lungs, bears hibernate).</p> <p>LS1 (5-6)-2 Students demonstrate an understanding of structure and function survival requirements by... 2a describing structures or behaviors that help organisms survive in their environment (e.g., defense, obtaining nutrients, reproduction, and eliminating waste).</p>	<p>LS1 (5-8) – INQ + SAE –1** <i>Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.</i> Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p> <p>LS1 (5-8) – SAE + FAF –2** <i>Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).</i> Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p>

<p align="center">Related Rhode Island GSE's (Understandings)</p>	<p align="center">RI Assessment Targets High emphasis targets**</p>
<p>LS2 (5-6) –5 Students demonstrate an understanding of equilibrium in an ecosystem by ... 5a <u>identifying and defining an ecosystem and the variety of relationships within it (e.g., predator/prey, consumer/producer/decomposer, host/parasite, catastrophic events).</u></p> <p>LS2 (3-4)–6 Students demonstrate an understanding of food webs in an ecosystem by ... 6b using information about organisms to <u>design a habitat and explain how the habitat provides for the needs of the organisms that live there</u> 6c <u>explaining the way that plants and animals in that habitat depend on each other.</u></p> <p>LS2 (5-6)-7 Students demonstrate an understanding of recycling in an ecosystem by ...</p> <p>7b completing a basic food web for a given ecosystem.</p> <p>LS3 (3-4) –7 Students demonstrate an understanding of equilibrium in an ecosystem by ... 7a <u>explaining what plants or animals might do if their environment changes</u> (e.g., changing food supply or habitat due to fire, human impact, sudden weather-related changes). 7b <u>explaining how the balance of the ecosystem</u> can be disturbed (e.g., how does overpopulation of a species affect the rest of the ecosystem).</p>	<p>LS2 (5-8) INQ+SAE -5 <i>Using data and observations, predict outcomes when abiotic/biotic factors are changed in an ecosystem.</i> Science Stories, pp. 38-41, 43-45</p> <p>LS2 (K-4) SAE –6** <i>Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).</i> Science Stories, pp. 38-41</p> <p>LS2 (5-8) SAE-7 <i>Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but not carbon cycle or nitrogen cycle).</i> Science Stories, pp. 38-41</p> <p>LS3 (K-4) SAE –7 <i>Using information (data or scenario), explain how changes in the environment can cause organisms to respond (e.g., survive there and reproduce, move away, die).</i> Investigation 3, parts 1, 2, and 3</p>

<p style="text-align: center;">Related Rhode Island GSE's (Understandings)</p>	<p style="text-align: center;">RI Assessment Targets High emphasis targets**</p>
<p>LS3 (5-6) -9 Students demonstrate an understanding of Natural Selection/evolution by ... 9a <u>explaining how a population's or species' traits affect their ability to survive over time.</u> 9b <u>researching or reporting on possible causes for the extinction of an animal or plant.</u></p>	<p>LS3 (5-8) POC-9 <i>Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.</i> Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p>

Investigation-Time (45min. periods)	Focus Questions (Essential Questions)	Big Ideas (Understandings)
<p>1.1 Setting Up Terrariums -(2)</p>	<p>What environmental factors affect the growth of seeds?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment.
<p>1.2 Recording Changes- (ongoing)</p>	<p>How does the environment in the terrarium change over time?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i> such as amount of water, air, space, and proper temperature affect organisms. Organisms also affect their environment. • Plants and animals are living and have <i>basic needs</i>. Both plants and animals need water, air, space, and food; plants also need light.
<p>2.1 Making Animal Runways-(3)</p>	<p>What type of environment do isopods and beetles prefer?</p>	<p>Purpose: to record observations of beetles and isopods. What to look for:</p> <ul style="list-style-type: none"> • <i>Observations are recorded, including similarities and differences.</i> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated. <p>Purpose: to provide a procedure for constructing a runway. What to look for:</p> <ul style="list-style-type: none"> • <i>Students suggest setting up an environment in the runway that is uniform (variables controlled) except for the amount of water (the experimental variable).</i> • <i>The amount of water varies from wet at one end to dry at the other.</i> • <i>Bugs and beetles are able to roam freely among the wet to dry conditions (no barriers set up).</i> • <i>Time is specified. For example, make observations every 10 minutes for an hour.</i> • <i>Students suggest a way to organize the data they will collect.</i>
<p>2.2 Responding To Moisture -(1)</p>	<p>How much moisture do isopods and beetles prefer?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated. • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that, an organism appears to choose over other conditions.)

Investigation-Time (45min. periods)	Focus Questions (Essential Questions)	Big Ideas (Understandings)
<p>2.3 Responding To Light-(1)</p>	<p>How do isopods and beetles respond to different amounts of light?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated. • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that an organism appears to choose over other conditions.)
<p>2.4 Designing An Animal Investigation-(2)</p>	<p>How do we design an investigation that involves animals?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated. • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment. • Every organism has a <i>range of tolerance</i> form, environmental factors which include an optimum condition.
<p>3.1 Setting Up The Experiment-(2)</p>	<p>What are the optimal water conditions for each of four plants: corn, wheat, barley and peas?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated.
<p>3.2 Observing Plants At 5 And 8 Days-(8/ongoing)</p>	<p>What changes in the plants have taken place over time?</p>	<ul style="list-style-type: none"> • Students appropriately organize observations/data in a variety of forms: <i>charts, graphs, and diagrams</i>; or evaluate those of others.
<p>3.3 Observing Plants At 11 Or More Days-(ongoing)</p>	<p>What changes in the plants take place over time?</p>	<ul style="list-style-type: none"> • Students appropriately organize observations/data in a variety of forms: <i>charts, graphs, and diagrams</i>; or evaluate those of others. • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that an organism appears to choose over other conditions.)

Investigation-Time (45min. periods)	Focus Questions (Essential Questions)	Big Ideas (Understandings)
<p>4.1 Goldfish Aquariums-(2)</p>	<p>What are the environmental factors to consider when setting up a goldfish aquarium?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment. • Plants and animals are living and have <i>basic needs</i>. Both plants and animals need water, air, space, and food; plants also need light.
<p>4.2 Acid In Water-(1)</p>	<p>Do living organisms affect the quality of aquatic environments?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment. • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated.
<p>4.3 New Organisms-(ongoing)</p>	<p>What other organisms might live in the same environment as the goldfish?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment.
<p>5.1 Setting Up The Experiment-(2)</p>	<p>How can we find out if salinity has an effect on brine shrimp hatching? What is the range of salinity in which brine shrimp eggs can hatch?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated.
<p>5.2 Determining The Range Of Tolerance-(ongoing)</p>	<p>What is the optimum environment for hatching brine shrimp eggs?</p>	<ul style="list-style-type: none"> • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that an organism appears to choose over other conditions.) • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment.

<p>5.3 Determining Viability-(1)</p>	<p>Will brine shrimp eggs hatch when removed from salt environments outside their range of tolerance into environments within their range of tolerance?</p>	<ul style="list-style-type: none"> • <i>Environmental factors</i>, such as amount of water, air, space, and proper temperature, affect organisms. Organisms also affect their environment. • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that an organism appears to choose over other, conditions.)
<p>Investigation-Time (45min. periods)</p>	<p>Focus Questions (Essential Questions)</p>	<p>Big Ideas (Understandings)</p>
<p>6.1 Setting Up The Experiment-(2)</p>	<p>What is the salt tolerance of several common farm crops?</p>	<ul style="list-style-type: none"> • Students can identify <i>variables</i> and/or write or evaluate appropriate <i>procedures</i> given a question that can be investigated.
<p>6.2 Observing Plants-(ongoing)</p>	<p>What changes in the plants can be observed over time?</p>	<ul style="list-style-type: none"> • Every organism has a <i>range of tolerance</i> for environmental factors which includes an optimum condition. (A preferred environment is a set of environmental conditions that an organism appears to choose over other conditions.)

Landforms Unit Design - Grade 5

The **Landforms Module** consists of five investigations that introduce students to these fundamental concepts in earth science: change takes place when things interact; all things change over time; patterns of interaction and change are useful in explaining landforms. Students also learn about some of the tools and techniques used by cartographers and use them to depict landforms.

RI Statements of Enduring Knowledge - (Established Goals):

ESS 1 The Earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

Related Rhode Island GSE's (Understandings)	RI Assessment Targets Assessment Evidence
<p>ESS1 (5-6)–1 Students demonstrate an understanding of processes and change over time within earth systems by ... 1a identifying and describing the layers of the earth.</p>	<p>ESS1 (5-8) INQ+ POC –1 <i>Use geological evidence provided to support the idea that the Earth's crust/lithosphere is composed of plates that move.</i> Science Stories, pp. 22-23</p> <p>ESS1 (5-8) SAE–2 <i>Explain the processes that cause the cycling of water into and out of the atmosphere and their connections to our planet's weather patterns.</i> Investigation 2.1, 2.2</p> <p>ESS1 (5-8) POC –3 <i>Explain how earth events (abruptly and over time) can bring about changes in Earth's surface: landforms, ocean floor, rock features, or climate.</i> Investigation 2.1, 2.2 Investigation 2.1, 2.2 Investigation 5.1-5.3</p>
<p>ESS1 (5-6)–2 Students demonstrate an understanding of processes and change over time within earth systems by ... 2a diagramming, labeling and explaining the processes of the water cycle including evaporation, precipitation, and run-off, condensation, transpiration, and groundwater.</p>	
<p>ESS1 (7-8)–3 Students demonstrate an understanding of processes and change over time within earth systems by ... 3a evaluating slow processes (e.g. weathering, erosion, mountain building, sea floor spreading) to determine how the earth has changed and will continue to change over time. 3b evaluating fast processes (e.g. erosion, volcanoes and earthquakes) to determine how the earth has changed and will continue to change over time. 3c investigating the effect of flowing water on landforms (e.g. stream table, local environment).</p>	

<p>ESS1 (3-4) –4 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>4a investigating local landforms and how wind, water, or ice have shaped and reshaped them (e.g. severe weather).</p> <p>4b using or building models to simulate the effects of how wind and water shape and reshape the land (e.g., erosion, sedimentation, deposition, glaciation).</p> <p>4c identifying sudden and gradual changes that affect the Earth (e.g. sudden change = flood; gradual change = erosion caused by oceans).</p>	<p>ESS1 (K-4) INQ+SAE –4 Explain how wind, water, or ice shape and reshape the earth</p> <p>Investigation 3.1-3.3</p> <p>Investigation 3.1-3.3</p> <p>Investigation 3.1-3.3</p>
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Words in **bold** are important for science vocabulary development, and should be used for word walls.

Investigation-Time	Investigation	Focus Questions (Essential Questions)	Big Ideas (Understandings)
1-(2)	Schoolyard Models	<ul style="list-style-type: none"> How do models and maps help us show representations of the earth? 	<ul style="list-style-type: none"> Models represent objects that are very large or processes that occur over a long period of time. Models and maps are ways of representing landforms and human structures. Maps can be made from models
2-(2)	Stream Tables	<ul style="list-style-type: none"> How does water shape landforms? What are erosion and deposition? What are some landforms that result from running water? 	<ul style="list-style-type: none"> Water is an important agent in shaping landforms The wearing away of earth is erosion; the settling of eroded material is deposition. Landforms that result from running water include canyons, deltas, and alluvial fans.
3-(2)	Go With the Flow	<ul style="list-style-type: none"> How does the flow of the land affect erosion and deposition? What happens to the rate of erosion and deposition during flooding? How do humans affect the processes of erosion and deposition? 	<ul style="list-style-type: none"> The slope of the land over which a river flows affects the processes of erosion and deposition. During flooding, the rate of erosion and deposition increases. Humans affect the processes of erosion and deposition.

4-(3)	Build a Mountain	<ul style="list-style-type: none"> • What are topographical maps? • How do topographic maps show elevation? • How do topographic maps represent landforms? 	<ul style="list-style-type: none"> • Topographic maps are two- dimensional representations of three-dimensional surfaces. • Topographic maps show contour lines, which represent points of equal elevation. • Topographic maps use symbols and color to represent landforms.
5-(3)	Bird's-Eye View	<ul style="list-style-type: none"> • What are cartographers? • How are landform maps generated? 	<ul style="list-style-type: none"> • Cartographers use aerial photographs as one tool in constructing topographic maps. • Landform maps can be generated from aerial photographs.