4th Grade - Life Science - Environments

Content Area: **Science**
Course(s):
Time Period: **Trimester 1**
Length: **3-4 weeks**
Status: **Published**

Course Pacing Guide

Unit	MP/Trimester	Weeks
Investigation 1 - Environmental Factors	1, 2, or 3 (teachers rotate)	3
Investigation 2 - Ecosystems	1, 2, or 3 (teachers rotate)	3
Investigation 3 - Brine Shrimp Hatching	1, 2, or 3 (teachers rotate)	3
Investigation 4 - Range of Tolerance	1, 2, or 3 (teachers rotate)	3

Unit Overview

The Environments Module has four investigations that focus on the concepts that organisms have structures and behaviors, including sensory receptors, that serve functions in growth, survival and reproduction, and living organisms depend on one another and on their environment for their survival and the survival of populations.

Students design investigations to study preferred environments, range of tolerance, and optimum conditions for growth and survival of specific organisms. They conduct controlled experiments by incrementally changing specific environmental conditions to determine the range of tolerance for early growth of seeds and hatching of brine shrimp, and use these data to develop and use models to understand the impact of changes to the environment. They graph and interpret data from multiple trials of experiments and build explanations from evidence.

Enduring Understandings

- Plants and animals have structures and behaviors that function in growth, survival, and reproduction.
- Producers make their own food.
- Animals obtain food from eating plants or eating other animals.
- An ecosystem is the interactions of organisms with one another and the abiotic environment.
- Organisms have ranges of tolerance for environmental factors.
- Organisms interact in feeding relationships in ecosystems (food chains and food webs).
- Individuals of the same kind differ in their characteristics; differences may give individuals an advantage in surviving and reproducing in changing environmental conditions.
- Fossils provide evidence of organisms that lived long ago and the nature of their environments.

Essential Questions

- How do mealworm structures and behaviors help them grow and survive?
- What moisture conditions do isopods prefer?
- What light conditions do isopods prefer?
- What are the characteristics of animals living in the leaf-litter environment?
- What are the environmental factors in an aquatic system?
- What are the roles of organisms in a food chain?
- How does food affect a population in its home range?
- How do animals use their sense of hearing?
- How can we find out if salinity affects brine shrimp hatching?
- How does salinity affect the hatching of brine shrimp eggs?
- Does changing the environment allow the brine shrimp eggs to hatch?
- What are some benefits of having variation within a population?
- How much water is needed for early growth of different kinds of plants?
- What is the salt intolerance of several common farm crops?
- How does mapping the plants in the schoolyard help us to investigate environmental factors?
- What are some examples of plant adaptations?

New Jersey Student Learning Standards (No CCS)

4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
4-LS1-2	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
4-LS1-1.7	Engaging in Argument from Evidence
4-LS1-1.7.1	Construct an argument with evidence, data, and/or a model.
4-LS1-1.LS1.A.1	Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.
4-LS1-2.LS1.D.1	Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions.

Interdisciplinary Connections

ELA/Literacy

RI 1: Refer to details/examples when explaining what the text says and when drawing inferences from text.

RI 2: Determine the main idea of a text and explain how it is supported by key details; summarize the text.

RI 3: Explain procedures or concepts in a scientific text.

RI 4: Determine the meaning of general academic domain-specific words or phrases.

RI 5: Describe the overall structure of information in a text.

RI 6: Compare and contrast a firsthand and secondhand account of the same topic.

RI 7: Interpret information presented visually, and explain how the information contributes to an understanding of the text.

RI 8: Explain how an author uses reasons and evidence to support particular points in a text.

RI 9: Integrate information from two texts on the same topic.

W 2: Write informative/explanatory text.

W 5: Strengthen writing by revising.

W 8: Gather relevant information from experiences and print, and categorize the information.

W 9: Draw evidence from informational texts to support reflection.

SL 1: Engage in collaborative discussions.

SL 2: Paraphrase information presented orally.

SL 3: Identify the reasons and evidence a speaker provides.

SL 4: Report on a text in an organized manner, using appropriate facts and relevant details.

SL 5: Add visual displays to presentations.

L 4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases.

L 5: Demonstrate understanding of word relationships.

Math

4.G.A.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded across the line into matching parts. Identify line symmetric

figures and draw lines of symmetry.

Technology Standards

TECH.8.1.5	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.5.A.2	Format a document using a word processing application to enhance text and include graphics, symbols and/or pictures.
TECH.8.1.5.A.3	Use a graphic organizer to organize information about problem or issue.
TECH.8.1.5.A.CS2	Select and use applications effectively and productively.

21st Century Themes/Careers

Digital media will be used incorporated in project presentations. This module will develop students' abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students' understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations.

Instructional Strategies & Learning Activities

- Establish prior knowledge
- Present new material in small steps
- Think Aloud/modeling
- Guided Practice
- State the objective
- Use graphic organizers/anchor charts
- Concept sorting
- Check for understanding
- Provide feedback
- Student-led discussion strategies
- Cooperative learning
- Tiered instructional activities
- Differentiation
- Small group instruction

Differentiated Instruction

- Curriculum Map
- Inquiry/Problem-Based Learning
- Learning preferences integration (visual, auditory, kinesthetic)
- Sentence & Discussion Stems
- Tiered Learning Targets
- Learning through play
- Relationship-Building & Team-Building
- Student Data Inventories
- Mastery Learning (feedback toward goal)
- Game-Based Learning
- Grouping
- Rubrics
- Jigsaws
- Learning Through Workstations
- Concept Attainment
- Flipped Classroom
- Assessment Design & Backwards Planning
- Student Interest & Inventory Data
- i-Checks as provided by FOSS curriculum
- EL Notes as outlined in FOSS Teacher Manual

Formative Assessments

- Notebook Entries
- Revisions to Written Responses to Focus Questions

Summative Assessment

- Written Responses to Focus Questions per Investigation/Part
- Performance Assessments

Benchmark Assessments

- Investigation I-Checks

- Surveys

Resources & Technology

The following resources are available on the Teacher Module on the FOSS webpage.

- Word Wall Cards
- Streaming Videos
- Teaching Slides (Smart Notebook, ActivInspire, etc.)
- List of Recommended Books
- List of Recommended Websites
- Online Activities: Virtual Terrarium, Virtual Aquarium, Food Webs, Trout Range of Tolerance, and Analyzing Environmental Experiments

BOE Approved Texts

- FOSS Environments Investigations Guide - Teacher Manual
- FOSS Environments - Student Textbook

Closure

- Snowstorm - Students write down what they learned on a piece of scratch paper and wad it up. Given a signal, they throw their paper snowballs in the air. Then each learner picks up a nearby response and reads it aloud.
- Gallery Walk - On chart paper, small groups of students write and draw what they learned. After the completed works are attached to the classroom walls, others students affix post-its to the posters to extend on the ideas, add questions.
- Sequence It - create timelines of major events discussed
- Low-Stakes Quizzes - Give a short quiz using technologies like Kahoot or a Google form.
- Have students write down three quiz questions (to ask at the beginning of the next class).
- Question Stems - Have students write questions about the lesson on cards, using question stems framed around Bloom's Taxonomy. Have students exchange cards and answer the question they have acquired.
- Have students dramatize a real-life application of a skill.
- Ask a question. Give students ten seconds to confer with peers before you call on a random student to answer. Repeat.
- Have kids orally describe a concept, procedure, or skill in terms so simple that a child in first grade would get it.
- Direct kids to raise their hands if they can answer your questions. Classmates agree (thumbs up) or disagree (thumbs down) with the response.
- Kids write notes to peers describing what they learned from them during class discussions.
- Ask students to summarize the main idea in under 60 seconds to another student acting as a well-

known personality who works in your discipline. After summarizing, students should identify why the famous person might find the idea significant.

- Ask students to write what they learned, and any lingering questions on an "exit ticket". Before they leave class, have them put their exit tickets in a folder or bin labeled either "Got It," "More Practice, Please," or "I Need Some Help!"

ELL

- Alternate Responses
- Advance Notes
- Extended Time
- Teacher Modeling
- Simplified Written and Verbal Instructions
- Frequent Breaks
- E-Dictionaires
- Google Translate

Special Education

- Shorten assignments to focus on mastery of key concepts.
- Substitute alternatives for written assignments (clay models, posters, panoramas, collections, etc.)
- Specify and list exactly what the student will need to learn to pass.
- Provide a computer for written work.
- Seat the student close to the teacher or a positive role model.
- Provide an unobstructed view of the chalkboard, teacher, movie screen, etc.
- Keep extra supplies of classroom materials (pencils, books) on hand.
- Give directions in small steps and in as few words as possible.
- Number and sequence the steps in a task.
- Have student repeat the directions for a task.
- Provide visual aids.
- Go over directions orally.
- Provide a vocabulary list with definitions.
- Permit as much time as needed to answer Focus Questions.
- Have text material read to the student, and allow oral responses.
- Allow use of notes and textbooks to answer Focus Questions.
- Show a model of the end product of directions (e.g., a completed math problem or finished quiz).
- Stand near the student when giving directions or presenting a lesson.
- Permit a student to revise written responses for a better grade.
- Provide graphic organizers to record data throughout investigations and experiments.
- Provide sentence starters to organize written responses to Focus Questions.
- Highlight lines to assist student penmanship and line spacing.

504

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials
- behavior management support
- verbal testing
- occupational or physical therapy

At Risk

- Use of mnemonics
- Have student restate information
- Provision of notes or outlines
- Concrete examples
- Peer or scribe note-taking
- Lab and math sheets with highlighted instructions
- Verbal and visual cues regarding directions and staying on task
- Adjusted assignment timelines
- Immediate feedback
- Work-in-progress check
- Pace long-term projects
- Film or video supplements in place of reading text
- Cue/model expected behavior

Gifted and Talented

Focus on effort and practice

Offer the Most Difficult First

Offer choice

Speak to Student Interests

Allow G/T students to work together

Encourage risk taking