

Big Idea: Matter in Ecosystems (Module 4) & Plant AND Animal Needs (Module 3)**Inquiry Questions**

Science:

- How does matter flow in an ecosystem? (Mod 4 – Lesson 1)
- What is the relationship between living and nonliving things in an ecosystem? (Mod 4 – Lesson 2)
- How is matter cycled through ecosystems? (Mod 4 – Lesson 3)
- How do plants use energy (Mod 3 – Lesson 3)

Technology:

- How has technology effected environments over time?

Engineering:

- What do environments need in order to support organisms?

Mathematics:

- How does the population of consumers vs. producers affect an environment?
- How does the population of consumers vs. producers change over time?

Social Studies:

- How are the branches and other parts of our government like the parts of an ecosystem?
- Is our economy like an ecosystem?

Content Area Grade Level Standards**Science**

5.LS.2: Observe and classify common Indiana organisms as producers, consumers, decomposers, or predator and prey based on their relationships and interactions with other organisms in their ecosystem. (Mod 4 – Lesson 1 & supplement for Indiana connections) {Science Handbook p. 8-103}

5.LS.1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (Mod 4 – Lesson 1 & Mod 3 – Lesson 3) {Science Handbook 98-103}

5.LS.3: 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. (Science Handbook with series & Supplemental resources) {Science Handbook p. 47, p. 112-113 & p. 117-118}

Technology

1.C Things that are found in nature differ from things that are human-made in how they are produced and used.

2.F A subsystem is a system that operates as a part of another system.

5.B Waste must be appropriately recycled or disposed of to prevent unnecessary harm to the environment.

5.C The use of technology affects the environment in good and bad ways.

13.E Examine the trade-offs of using a product or system and decide when it could be used.

15.C Artificial ecosystems are human-made environments that are designed to function as a unit and are comprised of humans, plants, and animals.

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15.D Most agricultural waste can be recycled.

15.E Many processes used in agriculture require different procedures, products, or systems.

Engineering

11.D Identify and collect information about everyday problems that can be solved by technology, and generate ideas and requirements for solving a problem.

19.C Processing systems convert natural materials into products.

19.D Manufacturing processes include designing products, gathering resources, and using tools to separate, form, and combine materials in order to produce products.

Mathematics

5.NF.1. Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators.

5.NF.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers.

5.NF.3. Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NF.6. Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem.

5.NBT.2. Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

5.NBT.3. Read, write, and compare decimals to thousandths.

5.G.2. Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Social Studies

5.1.14 Explain why the United States Constitution was created in 1787 and how it established a stronger union among the original 13 states by making it the supreme law of the land. Identify people who were involved in its development.

5.2.7 Describe the three branches of the United States government, their functions and their relationships.

5.4.55.4.5 Explain how education and training, specialization and investment in capital resources* increase productivity*.

5.4.7 Predict the effect of changes in supply* and demand* on price.

5.4.8 Analyze how the causes and effects of changes in price of certain goods* and services* had significant influence on events in United States history

ELA**Reading: Informational Text**

CCSS.ELA-Literacy.RI.4.1 Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-Literacy.RI.4.2 Determine the main idea of a text and explain how it is supported by key details; summarize the text.

CCSS.ELA-Literacy.RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

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CCSS.ELA-Literacy.RI.4.4 Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area*.

CCSS.ELA-Literacy.RI.4.5 Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text.

CCSS.ELA-Literacy.RI.4.6 Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.

CCSS.ELA-Literacy.RI.4.7 Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

CCSS.ELA-Literacy.RI.4.8 Explain how an author uses reasons and evidence to support particular points in a text.

CCSS.ELA-Literacy.RI.4.9 Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.

CCSS.ELA-Literacy.RI.4.10 By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

WRITING

CCSS.ELA-Literacy.W.4.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

- W.4.2a Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
- W.4.2b Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
- W.4.2c Link ideas within categories of information using words and phrases (e.g., *another, for example, also, because*).
- W.4.2d Use precise language and domain-specific vocabulary to inform about or explain the topic.
- W.4.2e Provide a concluding statement or section related to the information or explanation presented.

CCSS.ELA-Literacy.W.4.7 Conduct short research projects that build knowledge through investigation of different aspects of a topic.

CCSS.ELA-Literacy.W.4.8 Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.

CCSS.ELA-Literacy.W.4.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

CCSS.ELA-Literacy.W.4.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences

Science Process Standards

Science Process Standards

Nature of Science

- Make predictions and formulate testable questions
- Design a fair test.
- Plan and carry out investigations—often over a period of several lessons—as a class, in small groups or independently.
- Perform investigations using appropriate tools and technologies that will extend the senses.
- Use measurement skills and apply appropriate units when collecting data.
- Test predictions with multiple trials.
- Keep accurate records in a notebook during investigations and communicate findings to others using graphs, charts, maps and models through oral and written reports.
- Identify simple patterns in data and propose explanations to account for the patterns.
- Compare the results of an investigation with the prediction.

Design Process

- Identify a need or problem to be solved.
- Brainstorm potential solutions.
- Document the design throughout the entire design process.
- Select a solution to the need or problem.
- Select the most appropriate materials to develop a solution that will meet the need.
- Create the solution through a prototype.
- Test and evaluate how well the solution meets the goal.
- Evaluate and test the design using measurement.
- Present evidence by using mathematical representations (e.g. graphs, data tables)
- Communicate the solution (including evidence using mathematical representations (graphs, data tables), drawings or prototypes.
- Communicate how to improve the solution.

Standards for Mathematical Practice

Mathematical Practices

- MP.1. Make sense of problems and persevere in solving them.
- MP.2. Reason abstractly and quantitatively.
- MP. 3 Construct viable arguments and critique the reasoning of others.
- MP.4. Model with mathematics.
- MP.5. Use appropriate tools strategically.
- MP.6. Attend to precision.
- MP.7 Look for and make use of structure.
- MP. 8 Look for and express regularity in repeated reasoning.

Plan of Work

Common Misconceptions

Flies and many bugs are pests and have no value.
 It's always good when the prey gets away from the predator. (i.e. bunny escaping the fox)
 The President holds all the power and makes all the laws.

Suggested Activities

- Students will simulate how predator and prey relationships affect each other. (Module 4 – Lesson 1)
- Students will be introduced to plant tropisms, or the response of a plant toward or away from a stimulus. (Module 3 – Lesson 3)
- Students create an original, balanced ecosystem. Animals and plants should be original and form a life cycle.
- Students use a graphic organizer to represent the parts of an ecosystem/food web and the parts of our government.

Suggested Vocabulary

Mod 4 – Lesson 1

Biotic factor
 Abiotic factor
 Niche
 Food chain
 Food web
 Consumer
 Producer
 Decomposer

Mod 3 – Lesson 3

Plant tropism

Resources

Read The Sign of the Beaver
<http://www.readwritethink.org/classroom-resources/student-interactives/trading-card-creator-30056.html>

Assessment

Type of Assessment

Example

Observation

Students observe and record the ecosystem in which they live.

Oral Questioning

Exit Slip

Students show their knowledge of Science vocabulary. (consumer, producer, niche, habitat, etc.)

Journal

Graphic Organizers

Students create a food web showing their knowledge of ecosystems.

Self-Assessment

Writing Prompt

Presentation

STEM Integrated Concepts: Life Science | 5th Grade

<u>Plan of Work</u>	
<input checked="" type="checkbox"/> Electronic media	Use readwritethink.org to have students create trading cards.
<input type="checkbox"/> Think Pair Share	
<input type="checkbox"/> Whiteboards	
<input checked="" type="checkbox"/> Experiment/projects	Students create an ecosystem.
<input type="checkbox"/> Quiz	
<input type="checkbox"/>	
<input type="checkbox"/>	
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