MP2-Matter and Energy in Organisms and Ecosystems

Content Area: **Science**
Course(s): **Science 5**
Time Period: **Marking Period 2**
Length: **MP 2**
Status: **Published**

Essential Questions

- From where do living things get their energy and what do they do with it?
- How does the sun (or the lack of sun) affect all living things?
- What is the effect on a food web when one member's role is changed or deleted?
- What are the different roles in an ecosystem and what factors allow a population to maintain or have its population threatened?

Big Ideas

- Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion.
- Plants acquire material for growth chiefly from air, water, and process matter and obtain energy from sunlight, which is used to maintain conditions necessary for survival.
- Energy can be "produced," "used," or "released" by converting stored energy.
- Plants capture energy from sunlight, which can later be used as fuel or food. The food of almost any animal can be traced back to plants.
- Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.
- Matter cycles between the air and soil and among organisms as they live and die.

Climate Change

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

- Activity: Students will create a visual model that demonstrates how matter and energy moves through different components of an ecosystem.

Cross-Curricular Integration

Integration Area: Language Arts

W.SE.5.6 Gather relevant information from multiple valid and reliable print and digital sources; summarize or paraphrase information in notes and finished work, making note of any similarities and differences among ideas presented; and provide a list of sources.

Activity:

Students will gather information on a biome and research and fill out questions relating to it

Social Justice

See Social Studies Appendix C

Book 1: Beautifully Me by Nabela Noor (Wellness Week)

Book 2: The Black Book of Colors by Menena Cottin

Science and Society

Florence Bascom

First Female Geologist

STEM/STEAM

INTERDISCIPLINARY PROJECT

Students will be working on a project exploring a specific ecosystem, looking for producers, consumers, and decomposers and exploring their interactions with the environment.
Students will be challenged to research the different parts of the ecosystem to demonstrate their understanding of the reactions within the ecosystem.

Students will use their knowledge of their ecosystem to write a paragraph about the interactions in their ecosystem and if there are any environmental problems within their environment. Students will peer edit other's paragraph
Teaching in Stations: students work on activities related to interactions in their ecosystem within the unit lessons

Project Based Learning: Students will create a diorama, poster, or slides to teach others about their ecosystem

Visual Brainstorming: Students will be labeling food webs that happen within their ecosystem

Experimentation: Students will be working on hands on activities within science lab to further deepen their understanding of their ecosystem

Reflection/Redesign: Students will read others' paragraphs and give suggestions. The students will fix their paragraph with what they learned from other students

Creating real world connections: Students are looking into real world environmental problems within their ecosystem

Promoting Empathy: Students are looking into real world environmental problems within their ecosystem and coming up with ways that humans can help their ecosystem
During the project, students will be learning about different ecosystems throughout the world. These ecosystems impact the culture of the surrounding people in various ways. Students will look into how the ecosystem creates differences around the world such as what kind of food the people eat and what kind of resources come from their ecosystem.

CSDT Technology Integration

8.1.5.DA.1: Collect, organize, and display data in order to highlight relationships or support a claim.

Activity:

Students will collect data on the varying environmental impact of farm animals using spreadsheet. They will then manage the farm using a set number of resources. Finally students will analyze the data to make informed decisions when creating a solution. Students may use graphs created within the database to support their analysis.

Science and Engineering Practices

Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Make predictions about what would happen if a variable changes.
- Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.

Engaging in Argument from Evidence

- Distinguish among facts, reasoned judgment based on research findings, and speculation in an

explanation.

Obtaining, Evaluating, and Communicating Information

- 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.
- Compare and/or combine across complex texts and/or other reliable media to support the engagement in other scientific and/or engineering practices.
- Communicate scientific and/or technical information orally and/or in written formats, including various forms of media and may include tables, diagrams, and charts.

Asking Questions and Defining Problems

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

Enduring Understandings

Energy

5-PS3-1 Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

From Molecules to Organisms: Structures and Processes

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

Ecosystems: Interactions, Energy, and Dynamics

5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Student Learning Standards

ELA/Literacy

RI.5.1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text. *(5-LS1-1)*

RI.5.7 Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. *(5-PS3-1), (5- LS2-1)*

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. (5-LS1-1)

W.5.1 Write opinion pieces on topics or texts, supporting a point of view with reasons and

information. (5-LS1-1)

SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. *(5-PS3-1),(5-LS2-1)*

Mathematics

MP.2 Reason abstractly and quantitatively. *(5-LS1-1), (5-LS2-1)*

MP.4 Model with mathematics. *(5-LS1-1), (5-LS2-1)*

MP.5 Use appropriate tools strategically. *(5-LS1-1)*

5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems. *(5-LS1-1)*

Focus Areas

Knowledge

- The sun is the primary source of energy for both plants and animals.
- Plants get the materials they need for growth from the air and water
- Food that animals consume provides energy for body growth, body repair, motion, and warmth.
- The process of photosynthesis is a chemical process that converts the energy of the sun into food for plants and animals
- All food webs rely on the sun for its energy source and producers to create their own food.
- Energy and mass are transferred from one organism to the next as it is eaten.
- Decomposers take dead material and recycle it back into usable material.
- Ecosystems are very fragile and require a perfect balance of predator and prey.

Skills

- Describe/chart the flow of energy from the sun, through plants, and animals.
- Explain that without the sun's energy animal growth and body repair would not be possible.
- Identify the properties of the sun and how they affect both plants and animals.
- Explain how plants convert energy from the sun into food for plants and animals.
- Create a food web.
- Explain the importance of producers, consumers and decomposers in an ecosystem.
- Observe and analyze factors that aid decomposition.
- Describe the flow of energy and mass through a food web.
- Make conclusions about an ecosystem's chances for survival based on factors such as overpopulation or overhunting.

Understanding

- Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

- Support an argument that plants get the materials they need for growth chiefly from air and water.
- Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Resources

Primary Resrouce

Scott Foresman Interactive Science, Pearson, 2016

- Chapter 4- Ecosystems: Lesson 1

Leveled Readers

- *Changing Forms of Energy*
- *How Energy Changes*

Scientific Inquiry

Core

- Where does food energy come from?
- What do plants need to grow?
- How does matter get reused in and ecosystem?

Supplemental

- What is a local ecosystem? p.144
- What do some molds need to grow? p.158
- Which materials break down fastest in the soil? p. 174