Grade 5 Unit 1
Ecosystems: Interactions, Energy, and Dynamics
End of September/October - Mid November/MP 1

Unit Summary:

- The unit on ecology helps students develop the idea that plants, animals, and fungi form a system of interdependent parts, with each part dependent on the other parts for its material nourishment. By the end of the unit, students will be able to conclude that organic matter is cycling through the living world.
- Understandings to include:
  - Food chains, predators, prey, herbivores, carnivores
  - Matter cycle, food chain
  - Matter cycle, decomposition
  - Matter cycle, nutrients
  - Flow of energy necessary to support all life

Concepts	Vocabulary
● Matter is transported into, out of, and within systems. ● Plants acquire their material for growth chiefly from air and water, and the sun. ● An ecosystem can be described in terms of its components and their interactions. ● The food of almost any kind of 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. ● Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as decomposers. ● Decomposition eventually restores (recycles) some materials back to the soil. ● Organisms can survive only in environments in which their particular needs are met.	plants, plant growth, material / matter (Air and Water), energy (sunlight), plant, animals, predators, prey, herbivores, carnivores, decomposers (fungi and bacteria), environment, matter (e.g. air, soil, water), ecosystem, animals' food, function (e.g. body repair, growth, motion, body warmth)

Stage 1 – Desired Results (Also see Disciplinary Core Ideas Below)

Performance Expectations: (PE) (Established Goals / Content Standards)

- **●5-LS1-1: Support an argument that plants get the materials they need for growth chiefly from air and water.**
- ○ **Clarification Statement:** Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.
- **● 5-LS1-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.**
- ○ **Clarification Statement:** Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.
- ○ **Assessment Boundary:** Assessment does not include molecular explanations
- **● 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.
- ○ **Clarification Statement:** Examples of models could include diagrams, and flowcharts.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence ● Support an argument with evidence, data, or a model. (5-LS1-1) **Developing and Using Models** ● Develop a model to describe phenomena. (5-S2-1) ● Use models to describe phenomena. (5-PS3-1)	**LS1.C: Organization for Matter and Energy Flow in Organisms** ● Plants acquire their material for growth chiefly from air and water. (5-LS1-1) **LS2.A: Interdependent Relationships in Ecosystems** ● The food of almost any kind of 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. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)	**Energy and Matter** ● Matter is transported into, out of, and within systems. (5-LS1-1) Grade 5 - Science Curricular Framework Developing and Using Models ● Develop a model to describe phenomena. (5-S2-1) ● Use models to describe phenomena. (5-PS3-1) chiefly from air and water. (5-LS1-1) **LS2.A: Interdependent Relationships in Ecosystems** ● The food of almost any kind of 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. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. (5-LS2-1)

	LS2.B: Cycles of Matter and Energy Transfer in Ecosystems ● Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water from the environment, and release waste matter (gas, liquid, or solid) back into the environment. (5-LS2-1) **PS3.D: Energy in Chemical Processes and Everyday Life** ● The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water). (5-PS3-1) LS1.C: Organization for Matter and Energy Flow in Organisms ● Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)	**LS2.B: Cycles of Matter and Energy Transfer in Ecosystems** ● Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and ● Energy can be transferred in various ways and between objects. (5-PS3-1) Systems and System Models ● A system can be described in terms of its components and their interactions. (5-LS2-1) - - - - - - - - - - - - - - - - - Connections to the Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena ● Science explanations describe the mechanisms for natural events. (5-LS2-1)

Enduring Understandings (What are the big ideas?)	**Essential Questions**
Students will understand: ● Matter never disappears & energy continues to flow through the ecosystem	● How do organisms live, grow, respond to their environment? ● How and why do organisms interact with their environment and what are the effects of these interactions?

• The interactions of organisms within an ecosystem	

Stage 2 – Model Assessments

Summative Performance Task(s)

- Students will model the relationships that exist in an ecosystem (paper, slideshow, diorama, etc.) to include at least two producers, two consumers, and one decomposer.
    - Students must also explain how energy & matter moves through their models.

Audience:

- Peers/ teacher

Criteria:

- Rubric, observation, self reflection

Formative Evidence: Through what other evidence will students demonstrate achievement of the desired results?

- (Suggested) 2-4 question comprehension checks
- Teacher observation/Assessment of student success in experiment
- Class Discussion/ Anecdotal notes
- (possible) Mystery Science end-of-mystery assessment
- Analyze and construct a food chain or web

Stage 3 – Learning Plan Resources and Activities

Suggested Resources for Planning:

- **Mystery Science**
- **NewsELA**
- **NJCTL.org**
- **thewonderofscience.com**
- **other free online resources**
- **https://www.getepic.com/ (free)**
- **Super Science**
- **What Eats What? Website http://www.whateats.com/**
- **Food Chain Game: Food Chain Game**
- **Food Chain Game (additional): https://www.brainpop.com/games/foodchaingame/**
- **Scholastic**
- **Food Web/Chain video - https://www.youtube.com/watch?v=FFIoV2J-eKI**
- **Scholastic Study Jams (several activities) https://www.scholastic.com/teachers/activities/teaching-content/ecosystems-11-studyjams-interactive-science-activities/**
- **Tower Garden**

Learning Activities:

- **Tower Garden lessons**
    a. **https://www.towergarden.com/content/dam/towergarden/resources/lesson-plans/tower-garden-nonfiction-passage-page-G4-5.pdf**
    b. **https://www.towergarden.com/content/dam/towergarden/resources/lesson-plans/tower-garden-science-journal-page-G4-5.pdf**
    c. **https://www.towergarden.com/content/dam/towergarden/resources/lesson-plans/grades-5**

-and-up-plant-leaves.pdf

- Phenomena based learning
- Mystery Science mysteries:
    - **Web of Life (Ecosystems and the Food Web)**
        - **Mystery: Food Chains, Predators, Herbivores & Carnivores Why Would a Hawk Move to NYC (predator/prey**
        - **Mystery: Matter Cycle, Food Chain What Do Plants Eat?**
        - **Mystery: Decomposers & Matter Cycle Where Do Fallen Leaves Go?**
        - **Mystery: Decomposers, Nutrients, & Matter Cycle Do Worms Really Eat Dirt?**
        - **Mystery: Ecosystems and Matter Cycle Why Do You Have to Clean a Fish Tank but Not a Pond?**
        - **Mystery: Flow of Energy Why Did the Dinosaurs Go Extinct?**

- creating food chains and webs
- creating and monitoring mold terrariums
- fish tanks to stimulate pond ecosystem, design an ecosystem
- Scholastic activities: https://www.scholastic.com/teachers/activities/teaching-content/ecosystems-11-studyjams-interactive-science-activities/
- Ecosystem Slideshow Ecosystem Study
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Suggested Methods: (The following methods anchor learning with a purpose, mitigating the "why do I need to know this" questions.)

- Phenomena based learning
- Problem Based Learning (PBL)
- Inquiry Based Learning
- Case studies
- Engaging in Argument w/ evidence

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