

KNME K-5 LESSON PLAN TEMPLATE
APS @Home
APS Curriculum and Instruction TLN
Sandia Mountain Natural History Center

Title of Lesson: Review and Final Project	Submitted by: Vince Case & Steven Henley
Content Area: Science, grade 4 & 5	
Materials Needed: Outdoor access, plastic container, drawing paper, writing paper, pencil, markers, crayons, colored pencils, video camera (materials depend on what the student decides to do for the project)	
Handouts Attached: Project Instructions	
Standard Addressed: NGSS 5-LS2 Ecosystems: Interactions, Energy & Dynamics (see attached NGSS standards sheet for full information); 5-PS3-1: Energy; 5-ESS2-1: Earth's Systems	
Skill to be Maintained: Review of ecosystems, interconnected parts, energy & matter flow, observations	
Essential Question: How do ecosystems function and how are all of its parts interconnected? How do matter and energy flow through an ecosystem?	
Academic Vocabulary: Ecosystems, Interconnections, Energy, Matter	
<p>Basic Lesson Description and Procedure:</p> <ol style="list-style-type: none"> 1. Students watch the video from the SMNHC. 2. Students review what we've learned so far in the first 7 videos – ecosystems, biotic & abiotic factors, parts of & interrelationships within ecosystems, scat, skulls, leaves, change over time, decomposers & soil structure. 3. Students reconsider the essential concepts addressed throughout the 7 lessons – ecosystems, interconnected parts, energy, & matter. 4. Students are introduced to the final project – they observe collection of parts of an ecosystem, they review these parts (abiotic, producers, consumers, decomposers), they see a model & exemplar of a potential project, they learn about what the project entails, and they are given questions to consider. 5. Students are encouraged to be creative and have fun with their projects and asked to share their projects via social media or email. 	
Procedures: See attached project directions	
Lesson Conclusion/Potential Practice at Home: Students share their projects with their families and others they live with.	
Accommodations-Modifications: Just about any grade level can do this lesson and activity	

Final Project Description: Make a model of an ecosystem that demonstrates how matter and energy flow through the different parts of an ecosystem.

Standard alignment: This project is directly tied to the performance standard for NGSS 5-LS-2-1 – *develop a model to describe the movement of matter among plants, animals, decomposers, and the environment (see standard below).*

Directions:

1. Part I – Identify the parts of an ecosystem
 - a. Parts = Abiotic, Producers, Consumers (or evidence), Decomposers (or dead things with decomposers on them)
 - b. This can be done by collecting the parts outside, drawing the different parts, or if in video, by pointing out the parts verbally.

2. Part II – Explain...
 - a. What do the living things need to survive?
 - b. How is *energy* moving through the ecosystem?
 - c. How is *matter* moving through the ecosystem?

3. Part III – Describe...
 - a. What would happen to the ecosystem if you removed something?
 - b. Do this for 3 different things.

4. Be creative & have fun!
 - a. In the lesson video, we created a diorama of an ecosystem and verbally explained how the ecosystem functions and how energy and matter move through an ecosystem, and described what happens when something gets removed.
 - b. Students are to be creative and develop and design their own ecosystem model in a way that works for them. They can...
 - i. Draw pictures of an ecosystem.
 - ii. Collect objects to represent different parts of an ecosystem.
 - iii. Create a video of them showing how an ecosystem works in a natural area.
 - iv. Complete the project inside if needed.
 - v. Take photographs of items and design a collage.
 - vi. The options are endless and limited only by student imagination!

5. Share projects with adult permission to our Facebook or Instagram pages or via email.

5-LS2 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:

- 5-LS2-1. 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.]

The performance expectations above were developed using [the following elements from the NRC document *A Framework for K-12 Science Education*](#):

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Developing and Using Models Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> Develop a model to describe phenomena. (5-LS2-1) <p>Connections to the Nature of Science</p> <p>Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena</p> <ul style="list-style-type: none"> Science explanations describe the mechanisms for natural events. (5-LS2-1) 	<p>LS2.A: Interdependent Relationships in Ecosystems</p> <ul style="list-style-type: none"> 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) <p>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems</p> <ul style="list-style-type: none"> 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) 	<p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (5-LS2-1)

Connections to other DCIs in fifth grade:

5.ESS2.A (5-LS2-1); 5.PS1.A (5-LS2-1)

Articulation of DCIs across grade-levels:

2.PS1.A (5-LS2-1); 2.LS4.D (5-LS2-1); 4.ESS2.E (5-LS2-1); MS.PS3.D (5-LS2-1); MS.LS1.C (5-LS2-1); MS.LS2.A (5-LS2-1); MS.LS2.B (5-LS2-1)

Common Core State Standards Connections:

ELA/Literacy -

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-LS2-1)

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-LS2-1)

Mathematics -

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

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

Students who demonstrate understanding can:

5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun. [Clarification Statement: Examples of models could include diagrams, and flow charts.]

The performance expectation above was developed using the following elements from the NRC document A Framework for K-12 Science Education:

Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena.

Disciplinary Core Ideas

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).

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)

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects.

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels:

K.LS1.C ; 2.LS2.A ; 4.PS3.A ; 4.PS3.B ; 4.PS3.D ; MS.PS3.D ; MS.PS4.B ; MS.LS1.C ; MS.LS2.B

Common Core State Standards Connections:

ELA/Literacy -

- 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)
- 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)

Students who demonstrate understanding can:

- 5-ESS2-1.** **Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.** [Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [Assessment Boundary: Assessment is limited to the interactions of two systems at a time.]

The performance expectation above was developed using the following elements from the NRC document *A Framework for K-12 Science Education*:

Science and Engineering Practices

Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle.

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Earth’s major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth’s surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions.

Connections to other DCIs in fifth grade: N/A

Articulation of DCIs across grade-levels:

2.ESS2.A ; 3.ESS2.D ; 4.ESS2.A ; MS.ESS2.A ; MS.ESS2.C ; MS.ESS2.D

Common Core State Standards Connections:

ELA/Literacy -

- 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-ESS2-1)
- 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-ESS2-1)

Mathematics -

- MP.2** Reason abstractly and quantitatively. (5-ESS2-1)
- MP.4** Model with mathematics. (5-ESS2-1)
- 5.G.A.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. (5-ESS2-1)