Composting and Vermiculture

Overview: Students will explore the energy cycle and the use of decomposers feeding on different ingredients to create compost and how composting is important to reduce trash in our environment. Students will also explore what happens in a worm composting bin by observing how nature recycles, turning food matter into rich organic soil.

Lesson Characteristics:
Use the table below for lesson planning purposes:

Grade	5
Time Required	30 min - 1 hour
Key Science Practices	
Key Concepts/Terms	Compost, Energy Cycle, Decompose, Vermiculture
Setting	Inside
Materials	Composting/Vermiculture video

Next Generation Science Standards:

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions	5-PS3.D: Energy in Chemical Processes and Everyday Life	Cause and Effect
Engaging in Argument from Evidence	5-LS1.C: Organization for Matter and Energy Flow in Organisms	Influence of Engineering, Technology, and Science on Society and the Natural World
Planning and carrying out investigations.	5-LS2.A: Interdependent Relationships in Ecosystems	System and System Models
	5-LS2.B: Cycles of Matter and Energy Transfer in	

	Ecosystems	

Learning Objectives

Students will…

...identify the proper ingredients for decomposition and a successful compost pile

...identify what materials could ruin a successful compost pile

...describe how worms create compost via vermiculture

Background Information:

Energy Cycle

See the energy cycle Appendix Page.

What is compost?

Compost is a mixture that consists largely of decayed organic matter and is used in fertilizing and conditioning land.

How do humans create compost?

Organic (once living) materials are combined under conditions favorable for decomposition: moisture, heat (room temperature or above) and air. This can be done on various scales from quite small to very large. Many gardeners have compost bins or areas in their yard.

Why should we compost?

Backyard composting is a way to recycle food scraps such as apple cores and vegetable peels and yard waste such as grass clippings and weeds. This reduces the amount of material sent to the landfill and recycles organic matter for improving soils.

What is Vermicomposting?

Vermicomposting is using worms (usually Red Wigglers) to assist in breaking down food scraps into organic compost you can use to enrich the soil.

Vocabulary:

Term	**Definition**
Biodegrade/ Decompose	To break down physically, chemically, and biologically
Compost	The mixture that consists largely of decayed organic matter and is used for fertilizing and conditioning land

Consumer	An organism that consumes other organisms to gain energy
Decomposer	An organism that helps to break down organic material down physically, chemically and biologically
Energy Cycle	The constant exchange of energy from producers to consumers to decomposers, which return nutrients to the soil for producer use in a food chain/web
Organic Matter	Matter that came from living things
Producer	An organism that can make its own food (usually a photosynthetic organisms)
Recycle	The salvage and reprocessing of used materials such as paper, metal, glass, or organic matter.

Procedure:

Follow the steps in the table below to conduct the activity.

Sentences in bold are suggestions for what an educator might say to students.

Items in italics are possible student answers to questions.

Step	Action
5E's: Engage	Learning Cycle: Invitation
1	Prior to watching the video, prompt the students with the following questions: **What is compost?** *Compost is the decomposing of organic matter that is used as fertilizers on land and in gardens.* ***How does compost relate to the energy cycle?*** *With the energy cycle consisting of producers (things that produce their own food like plants through photosynthesis), consumers (organisms that eat other things), and decomposers (organisms that break things down like worms) is all part of the composting process.* **Why is composting important?** *It reduces the amount of waste going into the landfill and recycles food scraps, grass clippings through the process of decomposition so that soil can be created and used as fertilizers on land/gardens.*
5 E's: Explore	Learning Cycle: Exploration
3	Have students watch the Alice Ferguson Foundation composting/vermiculture video.
5 E's: Explain	Learning Cycle: Concept Invention
4	**Think about the video we just watched: What is needed to make a good compost pile?** *Compost needs Carbon (browns, ex dry leaves, cow manure), Nitrogen (greens, ex. vegetable scraps from kitchen, grass clippings), air, water, microorganisms like earthworms, sowbugs, bacteria, and fungi to break down the materials. Given the right conditions compost will be created in 4-6 months if taken care of properly.* **Just like baking a cake composting calls for a specific recipe of ingredients to make it work.**
5	**How do decomposers (like worms) help the composting process?** *Worms are used to break down organic matter that is added to compost piles. They eat vegetable scraps, lawn clippings, coffee grounds etc that are added to make a composting pile. Worm composting can be down at home using a small colored bin, shredded newspaper, Red Wiggler worms, and vegetable scraps, coffee grinds or tea bags.*
5 E's: Elaborate	Learning Cycle: Application
6	**How does compost relate to the energy cycle?** *The energy cycle consists of producers (things that produce their own food like plants through photosynthesis), consumers (organisms that eat other things), and*

	decomposers (organisms that break things down like worms) is all part of the composting process.
7	
5 E's: Evaluate	Learning Cycle: Reflection
8	Have students complete the composting and vermiculture worksheet after watching the video. (*Optional*) Have students write a summary of what they learned about composting and vermiculture and/or describe a vermicomposting system they could set up at home.
Extension	
	Create a vermicomposting system in your classroom.