

School Recycling Club SHIP

(Supporting Home Instruction Program)



Lesson Plan 9

- Grade Level: 4-6
- Lesson: III.C.1.—How Can We Reduce Waste? Composting - Mini Compost
- Source: *3 R's of the Common Core*
- Activity/Craft: The Perfect Compost Recipe (<https://www.almanac.com/video/perfect-compost-recipe-how-get-your-compost-heap-cooking#>)
- Video Link: How Do Earthworms Turn Garbage Into Compost? (<https://www.youtube.com/watch?v=2Pa1FwmKZcQ>)
- Video Link 2: Compost for Kids (<https://www.youtube.com/watch?v=qHYZRaepeMw>)

Lesson Matrix Grades 4-6

3R's of the Common Core

Lesson	Leading Question	Objective	Common Core Alignments	Skills
4-6 Litter Search I.A.1	What kind of trash is found around the school?	Develop awareness of variety, sources and amount of litter Classify litter elements	Grade 4 CC.L.4.6 CC.SL.4.1 CC.4.MD.4	Communicating results Gathering information Graphing data Investigating
			Grade 6 CC.L.6.6 CC.SL.6.1 CC.6.SP.4	
4-6 Lunch Bags I.A.2	How much of your lunch do you eat and how much do you throw away?	Measure lunch waste Categorize content of lunch waste Identify ways to reduce solid waste	Grade 4 CC.SL.4.1 CC.SL.4.4 CC.4.OA.3	Analyzing Applying mathematical concepts Collaborating Collecting data
			Grade 6 CC.SL.6.2 CC.SL.6.5 CC.6.NS.3	
4-6 The Story of... I.A.3	What kind of container is best for the environment?	Understand resources that make up packaging Determine ways to reuse or recycle packaging	Grade 4 CC.SL.4.2 CC.SL.4.4 CC.W.4.8	Communicating information Designing Evaluating Gathering information
			Grade 6 CC.SL.6.2 CC.SL.6.5 CC.W.6.8	
4-6 What Kind of Waste Am I? I.B.1	Name one thing we throw away that didn't come from the earth.	Understand the characteristics of waste	Grade 4 CC.L.4.3a CC.L.4.6 CC.SL.4.1c	Designing Developing models Identifying Questioning
			Grade 6 CC.L.6.3a CC.L.6.6 CC.SL.6.1c	

Lesson	Leading Question	Objective	Common Core Alignments	Skills
4-6 The Lorax I.B.2	What are some of the consequences of our throw-away habits?	Explore the impact of humans on natural systems Draw conclusions about the environmental impact of human behaviors	Grade 4 CC.RI.4.3 CC.SL.4.2 CC.SL.4.6 CC.W.4.4 Grade 6 CC.RI.6.3 CC.SL.6.3 CC.SL.6.4 CC.W.6.4	Communicating solutions Interpreting Problem solving Researching
			Grade 5 CC.RI.5.3 CC.SL.5.3 CC.W.5.3 CC.W.5.4	
4-6 Then and Now I.C.1	How have our lifestyles changed in the past one hundred years? How have these changes affected our waste stream?	Describe ways in which changing domestic habits have intensified human impact on the environment	Grade 4 CC.SL.4.1 CC.SL.4.3 CC.W.4.4 CC.W.4.7 Grade 6 CC.SL.6.3 CC.W.6.4 CC.W.6.8	Interviewing Inventing Investigating Synthesizing
			Grade 5 CC.SL.5.2 CC.SL.5.3 CC.W.5.4 CC.W.5.8	
4-6 Hauling it Away II.A.1	How much does waste disposal cost?	Understand that trash must be disposed of, that disposal options are limited, that managing trash can be problematic	Grade 4 CC.SL.4.3 CC.SL.4.4 CC.W.4.2 CC.4.OA.3 Grade 6 CC.SL.6.3 CC.SL.6.5 CC.W.6.2 CC.6.NS.3	Applying mathematical concepts Communicating information Interviewing Questioning
			Grade 5 CC.SL.5.3 CC.SL.5.4 CC.W.5.2 CC.5.NBT.5	

Lesson Matrix Grade 4-6

3R's of the Common Core

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Lesson	Leading Question	Objective	Common Core Alignments	Skills
4-6 Plastic Litter II.A.2	Is plastic litter a problem?	Recognize the environmental hazards of plastic litter	Grade 4 CC.L.4.6 CC.RI.4.2 CC.SL.4.2 CC.W.4.3	Analyzing Carrying out investigations Explaining Observing
			Grade 6 CC.L.6.6 CC.RST.6-8.3 CC.RST.6-8.9 CC.W.6.3	
4-6 Landfills II.B.1	Do we take our trash to a sanitary landfill or an open dump?	Understand how sanitary landfills are made and are operated Understand the pollution problems associated with sanitary landfills	Grade 4 CC.RI.4.7 CC.SL.4.1c CC.W.4.4	Designing Gathering information Observing Questioning
			Grade 5 CC.RI.5.7 CC.SL.5.1c CC.W.5.4	
4-6 Investigating Incineration II.B.2	Is burning a good way to get rid of trash?	Consider advantages and disadvantages of incineration	Grade 4 CC.RI.4.5 CC.SL.4.1c CC.SL.4.3 CC.W.4.4	Analyzing Defining problems Evaluating Questioning
			Grade 5 CC.RI.5.5 CC.SL.5.1c CC.SL.5.3 CC.W.5.4	
4-6 Solid Waste Bulletin Board II.C.1	What can I do with this piece of solid waste?	Categorize solid waste items into reusable, recyclable, recoverable or able to be revised	Grade 4 CC.L.4.6 CC.SL.4.4 CC.W.4.4	Applying ideas to solve problems Designing Developing models Evaluating
			Grade 6 CC.L.6.6 CC.SL.6.4 CC.W.6.4	

Lesson	Leading Question	Objective	Common Core Alignments	Skills
4-6 Pondering Packaging III.A.1	What problems does packaging pose?	Examine examples of over or conglomerate packaging Assess the negative impact of overpackaging Brainstorm alternatives to overpackaging	Grade 4 CC.L.4.6 CC.RI.4.8 CC.SL.4.1c CC.W.4.4	Designing Developing models Interpreting Problem solving
			Grade 6 CC.L.6.6 CC.RI.6.8 CC.SL.6.1c CC.SL.6.6 CC.W.6.4	
4-6 Wise Use of Paper III.A.2	How much paper do you think you use? Do you need to use all of it?	Understand how much paper is wasted Know how to conserve paper	Grade 4 CC.SL.4.1 CC.W.4.4 CC.4.MD.4	Collaborating Collecting data Investigating Researching
			Grade 5 CC.SL.5.1 CC.W.5.7 CC.5.MD.2	
4-6 New Things From Old III.A.3	Why did our grandparents make patchwork quilts?	Understand that materials can be reused to make useful objects	Grade 6 CC.SL.6.1 CC.W.6.7 CC.6.SP.2	Collaborating Designing Interviewing Sharing research and writing
			Grade 5 CC.RI.5.7 CC.RL.5.2 CC.SL.5.5 CC.W.5.7	
			Grade 4 CC.SL.4.4 CC.RI.4.7 CC.RL.4.2	
			Grade 6 CC.SL.6.6 CC.RI.6.7 CC.RL.6.2 CC.W.6.7	

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Lesson	Leading Question	Objective	Common Core Alignments	Skills
4-6 Where From, Where To? III.B.1	Where do things we use come from and where do they go to?	Trace lifecycle of objects from source, to consumer, and back again	Grade 4 CC.SL.4.1c CC.SL.4.5 CC.W.4.4	Analyzing Applying ideas to solve problems Communicating information Researching
			Grade 6 CC.SL.6.1d CC.SL.6.5 CC.W.6.4	
4-6 Papermaking III.B.2	Why should we recycle paper?	Learn how paper is recycled Make recycled paper	Grade 4 CC.L.4.6 CC.RI.4.3 CC.SL.4.2 CC.W.4.4 CC.4.MD.4	Applying mathematical concepts Collecting data Designing Researching
			Grade 5 CC.L.5.6 CC.RI.5.3 CC.SL.5.2 CC.5.MD.2 CC.5.NBT.7	
4-6 Where to Recycle III.B.3	What is recyclable and where can we take our recyclables?	Gather information about where materials can be recycled	Grade 6 CC.RI.6.4 CC.RST.6-8.3 CC.SL.6.2 CC.6.RP.3c CC.6.SP.2	Collaborating Communicating information Gathering information Sharing research and writing
			Grade 5 CC.SL.5.1 CC.W.5.1b CC.W.5.6	
4-6 Mini-Compost III.C.1	What do you do with your food scraps?	Learn about recycling organic matter	Grade 4 CC.RI.4.1 CC.W.4.4 CC.4.NBT.3	Graphing data Investigating Observing Predicting
			Grade 6 CC.RI.6.2 CC.W.6.4 CC.6.SP.2	

How Can We Recycle Organic Matter?



Concept

Organic waste can be recycled to enrich soil for growing more organic matter.

Objective

Students will learn about recycling organic matter.

Method

Students will build a model compost pile in a classroom terrarium.

Materials

Aquarium, organic wastes, soil (not potting soil), thermometer, trowel or large spoon, 1-2 dozen red earthworms

Subject

Science, Language Arts, Mathematics

Skills

Graphing data, investigating, observing, predicting

Vocabulary

Decomposition, humus, microorganisms, aerate

Time

One class period to a full year

Resources

"The Wild World of Compost", *National Geographic*; Mary Appelhof, *Worms Eat My Garbage*; Pat Hughey, *Scavengers and Decomposers*

3R's of the Common Core

Parallel Activities

K-3, Take Me Out to the Compost

7-8, Making Good Compost

9-12, Microorganisms

9-12, Effective Fertilizers

Information:

Composting

Resources:

Environmental Education and Educational Resources, Green Consumption, Consumerism and Sustainable Development

Background

When we mention 'recycling,' we often think of recycling glass bottles, aluminum cans and newspapers. But another 30% of the household garbage we throw out can also be recycled. These recyclables are food scraps, leaves, grass clippings and other biodegradable organic wastes. Organic wastes can be recycled by composting. Simply stated, composting creates optimal conditions for decomposition to occur. Decomposition is the biochemical process by which bacteria, fungi and other microscopic organisms break organic "wastes" into nutrients that can be used by plants and animals.

Decomposition occurs in nature whenever a leaf falls to the ground or an animal dies. It is essential for the continuation of life on earth. The result of decomposition in a compost pile is a nutrient-rich humus that is excellent for improving soil quality and plant growth.

Leading Question

What do you do with your food scraps?

Procedure

1. Assemble a variety of organic wastes including with following: manure and green grass clippings, sawdust, hair, wood ash, leaves, kitchen food scraps, etc. Avoid meat scraps, dairy products, fats and oils which inhibit decomposition, cause odors and can attract pests. Chop the organic wastes into small pieces. You can leave some large pieces of the same materials to compare rates of decomposition between large and small items. Why might there be a difference?
2. Read Necessary Components of a Compost Pile. Turn and Talk: Ask students to provide a summary of the text to a classmate. Students should highlight or underline key information in the text that show evidence of one or two main ideas. Create a compost by alternating layers of the materials as follows (amounts are approximate): one inch of soil, two inches of organic waste, sprinkle of manure or green grass clippings, sprinkle of water. Repeat.
3. Cover with an inch of soil. Water the pile enough to make it moist but not soggy. It should feel like a damp sponge (It feels moist, but you can't squeeze water out of it).
4. Add the earthworms and observe their behavior. In notebooks ask students:
 - a. to make predictions about what each believes will happen in one day, one week, one month, etc.
 - b. to date and post their observations, inferences and conclusions.

Common Core Alignments

GRADE 4

CC.RI.4.1

Reading Informational Text:
Key Ideas & Details

CC.W.4.4

Writing:
Production & Distribution of Writing

CC.4.NBT.3

Mathematics:
Number & Operations in Base Ten

GRADE 5

CC.RI.5.2

Reading Informational Text:
Key Ideas & Details

CC.W.5.4

Writing:
Production & Distribution of Writing

CC.5.OA.1

Mathematics:
Operations & Algebraic Thinking

GRADE 6

CC.RI.6.2

Reading Informational Text:
Key Ideas & Details

CC.W.6.4

Writing:
Production & Distribution of Writing

CC.6.SP.2

Mathematics:
Statistics & Probability

Classroom Activities

- Place the compost pile where it will be at room temperature (not in direct sun). Gently mix the compost once a week to aerate it. Use a thermometer to test the temperature of the pile. (For consistency do it at the same location and depth at the same time each day.) Students will date and post their conclusions in their notebooks. Students should have two columns: the first column is the actual temperature measurement to the nearest degree and the second column is the temperature rounded to the nearest five or ten degrees.
- After the first week of measurements, calculate the following: a. sum, b. average (center), c. range (spread)
- Make a graph of results, analyze the data and draw conclusions. Determine the overall shape of the graph. Is it symmetrical or is it skewed left or right?
- Convert fahrenheit temperatures to celsius, using the following formula:
$$T_c = \text{celsius}$$
$$T_f = \text{fahrenheit}$$
$$T_c = (T_f - 32) \times 5/9$$
- Discuss composting. How does it reduce the amount of waste you would have thrown out? What do you think happens to organic wastes that end up in the landfill? Is the landfill a gigantic natural compost pile, or are there problems with placing large amounts of organic material in landfills?

Evaluation

Students will identify the ingredients of a compost pile.

Classroom Activities

- Construct a compost pile at home to use for the family garden or a vermi-compost bin in the classroom for disposing of daily snacks.
- Begin a school garden. Use the soil you've made to plant some flowers or vegetables.

Necessary Components of a Compost Pile

SOIL: Contains microorganisms that help decomposition.

ORGANIC WASTES: such as leaves, food scraps and grass clippings. Wastes should be varied, including materials with both carbon and nitrogen. By alternating layers of high-carbon and high-nitrogen materials, you can create good environmental conditions for decomposition to occur.

NITROGEN: many of the organisms responsible for decomposition need nitrogen, thus nitrogen is necessary for rapid and thorough decomposition. Nitrogen is found naturally in many organic wastes, such as manure and green grass clippings, as well as in many commercial fertilizers.

WORMS: they eat the waste, helping to break it down; make droppings, which enrich the soil; tunnel through and aerate the waste, facilitating decomposition and eventually die and become part of the compost.

WATER: necessary for normal functioning of life. Too much water in a compost pile may make it soggy and slow decomposition by reducing needed oxygen.

AIR: the biological activity of fungi, bacteria, small insects and other organisms results in decomposition. Most biological processes require adequate amounts of oxygen.

TIME: decomposition takes time. To speed up decomposition, aerate your pile every few days; otherwise, just leave it and wait.

HEAT: heat is produced by chemical reactions resulting from increased biological activity that occurs during decomposition. Heat helps sanitize compost by killing certain organisms, such as weed seeds, pathogens and harmful insect larvae.

MASS: In order to generate enough heat for optimal decomposition the pile must contain at least one cubic meter of organic material. Thus, the temperatures generated in an aquarium compost pile may be different from those generated in one that is larger.

