MODULE 2

BREAK IT DOWN

OBJECTIVES

- Students create a composter, analyze decomposition and observe and compile data over time.
- Students communicate processes of ecosystems; including solar energy, producers, consumers, decomposers and heat energy.
- Students interpret processes of ecosystems with their parents and younger students.

SBI ALIGNMENT

Science S1, B1, Grades 3-4 Indicators 1, 2, 3, 4
S2, B1, Grades 3-4 Indicators 1, 2
S5, B2, Grades 3-4 Indicators 3
S6, B2, Grades 3-4 Indicators 1, 2, 3
S7, B1, Grades 3-4 Indicators 1
S1, B3, Grade 5 Indicators 1
S6, B2, Grade 5 Indicators 1
S7, B1, Grade 5 Indicators 1

Math S3, B2, Grade 3-5 Indicators 1
S4, B2, Grade 3-5 Indicators 2

OVERVIEW

Respecting and living in **harmony** with the environment is essential for the well-being and future of our planet. Disposing of waste in a landfill is unique to the human species. In nature, one organism's waste products are used by another organism through the continual recycling of matter between the biological world and the physical world (atmosphere, land, water). Learning about the process of composting is a great way to start understanding these natural processes. Composting is an easy way to divert biodegradable waste such as grass clippings and food waste from the landfill while giving it a second life by creating a robust and rich product to be used in gardening projects and yards. For additional information, review the Composting 101 and Energy Flow & Materials Cycle Resources found at the end of this Module. To sum it up...in nature, there is no waste.

LESSONS

1. **My Own Composter** (60 min.)
2. **Processes of Ecosystems** (30 min.)
3. **Poster Design or Digital Presentation** (60 min.)
4. **Buddy Class** (30 min.)
5. **Trashology Labwork: Our Family Can Compost**

Try This! Sack lunch

1. My Own Composter

Materials & Preparation

- ❒ 1-2 cups of compost sample
- ❒ Two 2-liter plastic bottles per student/team, one with lid
- ❒ One rubber band per student/team
- ❒ One 4"x4" piece of mesh fabric (such as panty hose) per student/team
- ❒ One handful of soil per student/team
- ❒ Green material: grass clippings, green leaves, fresh fruit/vegetables (twice as much as brown)
- ❒ Brown material: dried leaves, dead grass, shredded newspaper
- ❒ Clear packing tape
- ❒ Permanent markers
- ❒ Hobby/utility knife
- ❒ Scissors
- ❒ Spray bottle of water
- ❒ Nature's Cycle Log sheet (provided at the end of the module); one for each student
- ❒ Mini-Composter Diagram sheet (provided at the end of the module, page 2.10)

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1 Ask students to explain composting. When plants and animals make waste or die, nature busily gets to recycling the matter they are made out of back to the basic elements by decomposing (rotting/ decay) the material. Microscopic organisms (bacteria and fungi) do the final work of decomposing resulting in important plant nutrients such as phosphate, nitrate and sulfate (fertilizer). We make use of the natural process of decomposition by using a compost pile. Compost piles are made up of yard waste such as leaves and grass and kitchen vegetable and fruit scraps (no meat, cheese, or dairy products). By providing a great environment, we can let nature do the rest and reward us with a lot of compost (what's left over after decomposition) that can fertilize and enhance the soil quality in our yards and gardens. Explain that people can set up a compost pile in their backyard or send yard waste to a commercial composting program.

2 Watch the Hop To It! Composting video (http://bit.ly/dFsrVW)

3 Discuss the different ways to compost and the benefits of mulching grass and leaves with a mulching lawnmower, backyard composting, and commercial composting. Discuss how backyard compost piles consist of items such as coffee grounds, egg shells, vegetables, fruits and yard waste. While most commercial composting can accept all types of yard waste, food, paper products, bones, meat and milk cartons.

4 Explain to students they are going to make a mini-composter so they can observe how composting works. Students can create the mini-composters as individuals, small teams or as a classroom. They will be able to observe different organic matter in the decomposition process under various conditions.

5 Note: Educators may want to complete a test mini-composter before engaging in the activity.

6 Note: Educators may want to pre-cut all bottles.

7 Use the Mini-Composter Diagram sheet in this Module or draw the illustration on the board to help students construct their mini-composters. Using a permanent marker, have students label and mark both bottles as shown in the Diagram sheet. Bottle A is marked at least 1½ inches below the shoulder of the bottle and 1/3 of the way down the bottle (at least 3 inches above the indentations at the bottom of the bottle). Bottle B is marked 1/2-inch above the very bottom.

8 On bottle A start the cut with the hobby/utility knife and have students finish the cuts with scissors. Use the hobby/utility knife to cut bottle B (have adults cut bottle B, not students).

9 Have students fold the mesh into fourths, place it over the lid of bottle B and secure with rubber band.

10 Have student place the top of bottle B in the bottom part of bottle A (A3). This is where the compost

tea will collect. Compost tea is a nutritious liquid that can be used to feed plants. Make sure space is left between the two bottles. Use clear packing tape to adhere the two bottles together (B1 and A3).

11 Have students fill the mini-composter with one part brown material, two parts green material, and a small handful of soil (provides microorganisms which feed on the green material).

12 Have students moisten the material with the spray bottle until a small amount of compost tea begins to drip through the mesh.

13 Have students add additional green material and keep the material moist (as a well wrung out sponge). The water is necessary for the decomposition process to take place.

14 Have students place piece A1 (with lid) over B1. Piece A1 helps contain moisture in the mini-composter. Have student remove A1 periodically and gently shake the mini-composter. This introduces additional oxygen into the composter which is necessary for decomposition.

15 Students should observe the composters over time. Ask students to complete the Nature's Cycle Log to form hypotheses on what and when they think the decomposition will happen.

16 Have students weigh their composters and record the weight on the Nature's Cycle Log form.

17 The decomposition process can take up to three weeks, so be prepared to have the composters in the classroom for an extended time period. Have students observe, record and track changes to the composters on the Nature's Cycle Log.

18 Place composters in different locations throughout the classroom to see how different environmental factors affect decomposition.

19 As composters begin to break down the organic material, discuss the process and what is happening. Use the Composting 101 Resource in this Module for additional information on composting and the decomposition process.

Try This!

Get students thinking about composting. Share a brown paper sack lunch or a school lunch. Include items that can be composted both in backyard composters and commercial composters. For example, banana peels, apple cores and grapes can be composted in backyard composters. While milk cartons, paper napkins, sandwich crusts, luncheon meats and cookies are composted at commercial sites. The students should discover that many items commonly thrown away can be composted instead of thrown away in a landfill.

2. Processes of Ecosystems

Materials & Preparation

❒ Energy Flow & Materials Cycle sheet (provided at the end of the module, page 2.14); one for each student and/or use a digital presentation

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1 Ask students to explain composting.

2 Explain the Earth's natural cycle to students. Hand out the Energy Flow & Materials Cycle sheet to students and/or display the graphic for students.

Step 1
Scavengers and the weather help tear or dissolve apart the body or waste material into smaller pieces.

Step 2
Microorganisms (microbes) break down the organic matter into molecules such as nitrate, sulfate and phosphate.

Without microbes, there could be no other life as it is through them that nitrogen from the air and sulfate and phosphate from rocks are converted into a chemical form that plants can use as fertilizer. Animals and plants can only get these important building blocks after microbes have made them into fertilizer-like chemicals that plants can absorb.

Step 3
Plants absorb the "fertilizers" helping them grow and in turn provide the conduit of these important elements to animals when they eat plants.

Step 4
Consumers eat plants and other consumers, generating waste products such as urine and feces.

Step 5
Plants make food by taking in the carbon dioxide (CO_2) along with water (H_2O) and sunlight and these are re-combined into high energy containing sugar through the process of photosynthesis.

Step 6
Both plant and animals need energy to function and some of the sugar made is broken apart in all the cells in a body 24/7 through a complex series of chemical reactions, releasing energy to be used by the body. Carbon dioxide is released during this process. (When you breathe out, you are breathing out carbon dioxide.) Plants in turn take in this carbon dioxide for photosynthesis.

Step 6
Plants and animals die and the process of recycling matter continues.

3 Discuss nature's natural cycle with students. Ask the students if they can relate decomposition to how their bodies digest the food they eat.

4 Explain how nature's natural cycle is an on-going loop where nothing is wasted. Waste in nature always becomes food for something else in the cycle.

3. Poster Design or Digital Presentation

Materials & Preparation

- ❒ Notebook paper; few sheets per student
- ❒ Clipboard; one per student
- ❒ Poster paper; one for each student or computer with a digital presentation program
- ❒ Processes of Ecosystems Poster Student Scoring sheet (provided at the end of the module, page 2.17); half-sheet for each student
- ❒ Processes of Ecosystems Poster Teacher Scoring sheet (provided at the end of the module, page 2.18); half-sheet per each student

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1. Depending on the weather, have students go outside and explore the environment. Students should locate a place where they can observe nature. Have them take notes and sketch what they observe on pieces of paper using a clipboard.
2. Explain to students they will be creating Processes of Ecosystems posters. The posters are to highlight the processes in the Earth's natural cycles which include the Sun, producers, consumers, decomposers, nutrients and heat. Students can work individually or in pairs/small teams.
3. Distribute and go over the Processes of Ecosystems Poster Scoring Guide. Clearly establish expectations concerning the poster design from the beginning.
4. Provide paper to the students or have them obtain their own. Give the students time to create their posters and have them share with their classmates when they are completed.

4. Buddy Class

Materials & Preparation

- ❒ Processes of Ecosystems posters by students

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1. Working with younger students is a great experience for both older and younger students to learn and gain social skills. Identify a buddy class and share the literature tie-in list with the buddy class educator so students can be exposed to the topic of composting, Earth's ecosystems and environmental education.
2. Pair each student with a buddy.
3. Once students have completed their posters, have them share the posters with their buddy class student partner. Explain their 'job' is to teach the younger students about composting.

5. Trashology Labwork: Our Family Can Compost

Materials & Preparation

- ❒ Processes of Ecosystems posters by students
- ❒ Our Family Can Compost sheet (provided at the end of the module, page 2.19); one for each student

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1 Have students share their Processes of Ecosystems posters with their parents. Encourage students to discuss the poster and the benefits of composting with them.

2 Have students complete the Our Family Can Compost sheet with their parents. The goal is to engage the family in meaningful conversations about how easy composting is in hopes they might set up a composter. Not only are composters good for the environment, but establishing a home compost pile reduces expenses by eliminating the need for bags and paying for a hauling service and produces a rich, robust compost that can be used in the garden and yard.

EXTENSION ACTIVITIES

Vermicomposting—An inexpensive and hands-on way for students to see first-hand how worms help decompose and break down organic material into "humus," which is used for fertilizer.

School Composting Pile—A variety of different types of composting piles can be constructed or simply started in the school yard. Compost piles provide an opportunity for students to reconnect with nature, lessen waste to the landfill, experience decomposition and enhance school gardens to add to the beauty and health of plants.

Cafeteria/Kitchen Composting—Implementing a commercial composting program in the school can divert large amounts of kitchen and cafeteria waste from the landfill. The Kansas Department of Health and Environment offers waste reduction grants to implement a school-wide composting/recycling program.

LITERATURE TIE-INS

Bial, Raymond. *A Handful of Dirt*

Dahl, Roald. *James and the Giant Peach*

French, Vivan. *Yucky Worms*

Glaser, Linda. *Wonderful Worms*

Koontz, Robin. *Composting: Nature's Recyclers*

Pfeffer, Wendy. *Wiggling Worms* at Work

Portman, Michelle Eva. *Compost, By Gosh!*

Siddals, Mary McKenna. *Compost Stew*

RESOURCES

Eco Troubadour—Stan Slaughter (www.eco-troubadour.com)

Johnson County Environmental Department (www.jocorecycles.org)

Missouri Organic (www.missouriorganic.com)

Worms Eat My Garbage: How to Set Up and Maintain a Worm Composting System by Mary Appelhof (http://www.wormwoman.com/acatalog/Wormwoman_catalog_Worms_Eat_My_Garbage_3.html)
Worms Eat Our Garbage: Classroom Activities for a Better Environment by Mary Appelhof

EarthWorks (www.LX.org/earthWorksMain.aspx)

Missouri Organic (www.missouriorganic.com)

Missouri Organic (www.missouriorganic.com)

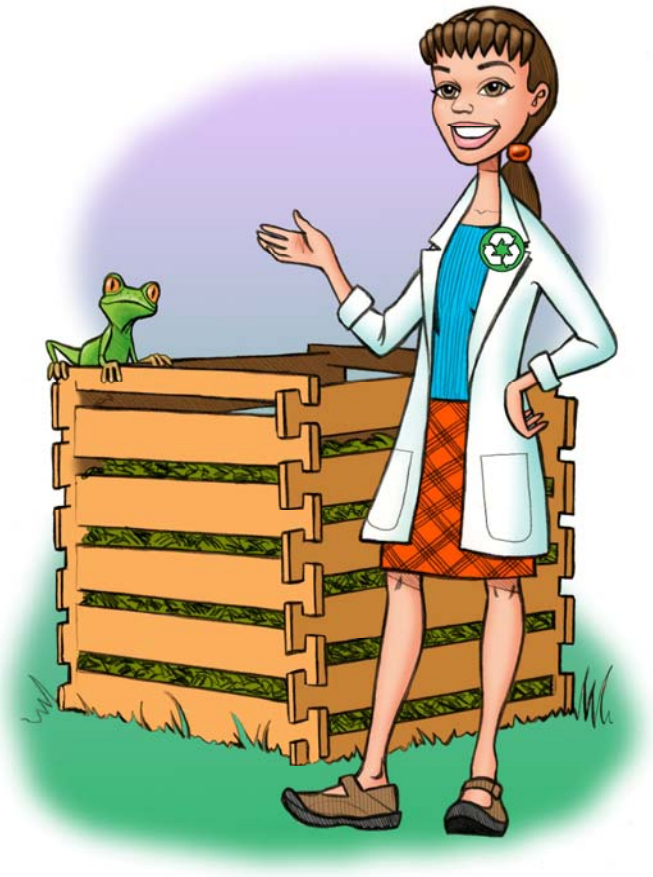
Kansas Department of Health and Environment (www.kdheks.gov)

"Rot 'n Roll" CD by Eco Troubadour Stan Slaughter (www.eco-trobadour.com)

"Burning Love" by Eco Elvis (www.ecoelvis.com)

BREAK IT DOWN

VOCABULARY



Compost—The end result of the composting process (decomposition) and is the decomposed organic material from yard waste and kitchen vegetable and fruit scraps that have been put in a compost pile. The plant waste used in compost piles should be a mixture of brown waste such as twigs and dead leaves and green waste such as grass and vegetable scraps. Compost is a rich, robust material high in fertilizer value and can be used on gardens and yards to enrich and enhance the soil.

Consumer—An organism that obtains energy by feeding on other organisms and their remains through ingestion. Usually, consumers are classified as primary consumers (herbivores-plant eaters), and secondary consumers (carnivores-animal eaters).

Decomposer—Microorganisms which are the last step in the decomposition of plant and animal waste and return the waste back to minerals such as phosphate and nitrate. These are plant fertilizers, so in turn plants absorb these nutrients, continuing the recycling of matter that occurs continuously in nature.

Energy Flow—The flow of energy from the Sun through an ecosystem according to the laws of thermodynamics. The Earth needs a continuous supply of Energy and for most life, the source is the Sun. Energy cannot be created or destroyed. The form changes as it goes from light energy to chemical energy in the form of sugar through photosynthesis. Ultimately, the energy that was captured through photosynthesis returns to the atmosphere as heat energy.

Food Chain—The transfer of food energy from organisms in one nutritional level to those in another. Who eats who. For example, a rabbit feeds on a green plant, then a snake eats the rabbit, and then a coyote eats the snake.

Food Web—The complex and interlocking series of food chains.

Natural Resources—The raw materials supplied by the Earth and its processes. Natural resources include nutrients, minerals, water, plants, animals, oil, natural gas and coal.

Nonrenewable Resources—Substances such as petroleum oil, coal, natural gas and metals such as copper, aluminum and gold. Once oil or coal is burned for fuel, it is gone. As fuel, the elements making it up are released as gases such as carbon dioxide into the atmosphere. No more oil or coal is being made on Earth. Metals are mined from the Earth, and there is a finite amount. As with all matter, recycling is the natural way of maintaining the resources on Earth in balance between the physical world and the biological world. Dumping nonrenewable resources in a landfill is a non-sustainable way of managing our resources.

BREAK IT DOWN | Vocabulary (continued)

Organic Matter (Organic Material)—These terms can be used interchangeably and is any matter which can be decomposed (decayed) by microorganisms. This includes the organic portion of plants and animals as well as petroleum oil. It includes the refined products we make from plants such as sugar and vegetable oil. Petroleum oil is also organic matter as its origin is plant and animal matter. Organic matter can also include plastic, which is organic, but due to the structure of the molecules making up the plastic it is resistant to decomposition and can take centuries to decompose. The term organic matter/material have multiple definitions, depending on the context within which they are used.

When talking about soils and organic matter in soil, it is usually referring to both the decayed, decaying and end-product of decay (humus and is pronounced “hew-muss”) that is in the soil as opposed to tree branches and leaves on top of the soil that have yet to start decomposing. The end-product of composting is called “compost” and is the same as humus. Both humus and compost are subject to very little further decomposition, but are rich in plant nutrients and help hold moisture in soil.

The term organic material can also be used to refer to the leaf litter, grass, twigs and branches which fall to the ground or the vegetable scraps in compost bins that have yet to decompose. Once they have rotted, it is referred as organic matter rather than material as it becomes an integral part of the soil.

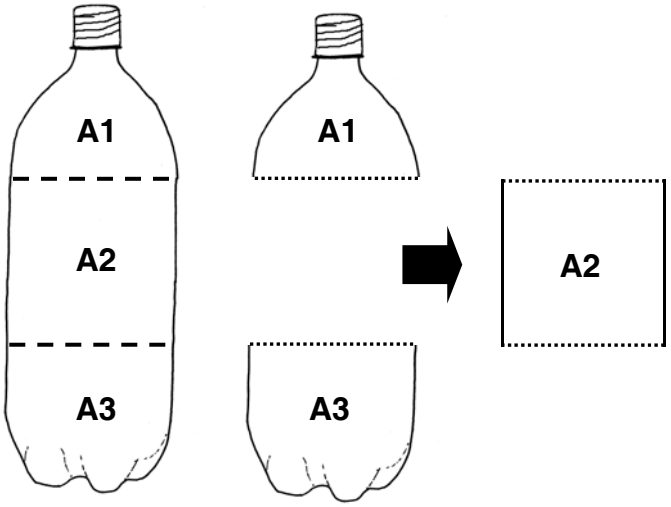
Producer—Green plants which make sugar through the process of photosynthesis. Sugar is made up of carbon, hydrogen and oxygen which came from carbon dioxide and water. This process not only captures the energy of sunlight in the sugar, but also provides the basic building blocks for the matter that organisms are made out of—carbon, oxygen and hydrogen.

Raw Materials—The material from which other things are made. For example, petroleum oil is the raw material for making plastics. Bauxite is the ore from which aluminum is extracted. Sugar cane is grown and then sugar is extracted from it.

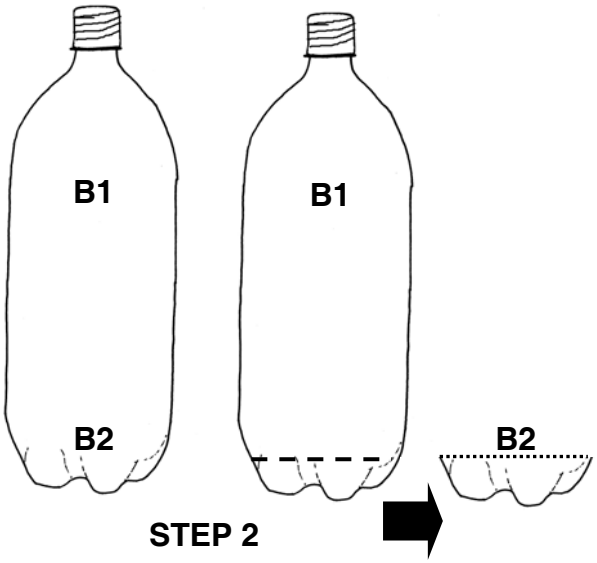
Renewable Resources—These resources fall into two categories. 1) Living resources (plants and animals) that can grow more of themselves, and 2) resources which essentially never run out which includes wind, sun and falling water. Another name for resources which essentially never run out is “perpetual” resources. Humans have little impact on perpetual resources. We do have a big impact on renewable resources. For example, we can overharvest fish out of lake so there are no more. There are many examples of where humans have directly caused the extinction of plants and animals.

Vermicomposting—A composting method that utilizes earthworms which eat the garbage. The worm’s waste (called "castings" or worm manure) is an organic material very rich in plant nutrients. The castings look like fine-textured soil. For those with limited yard space for full-size composting, vermicomposting can be done indoors.

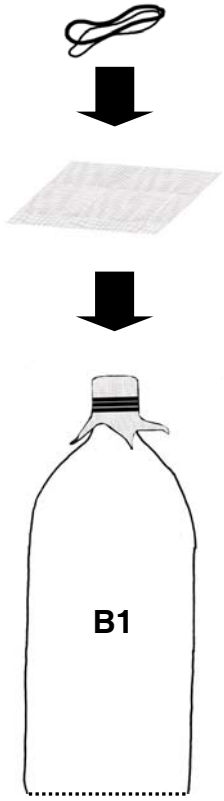
MINI-COMPOSTER DIAGRAM



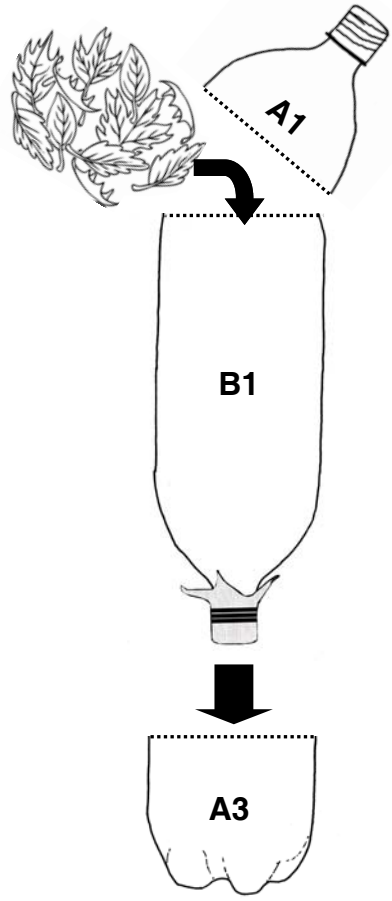
STEP 1



STEP 2



STEP 3



STEP 4

STEP 5

NATURE'S CYCLE LOG

Name _____

Identify and list the items and amounts of organic materials in your mini-composter.

Describe what you think will happen to the organic materials over time.

INITIAL WEIGHT

Record your observations below. What has changed? How have the conditions of the mini-composter affected the decomposition of the organic materials?

Week 1

Weight

Week 2

Weight

Week 3

Weight

Week 4

Weight

COMPOSTING 101 RESOURCE

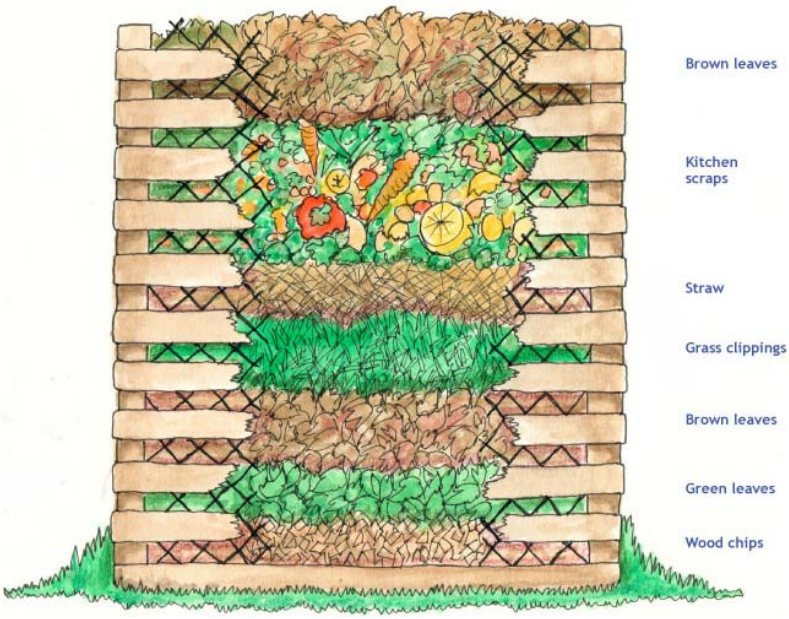
Here are some benefits of composting:

- Reduces amount of waste going to the landfill
- Produces a soil supplement that returns organic matter to the soil
- Reduces cost of hauling waste and bags
- Reduces pollution from waste hauling vehicles
- Feeds gardens with nutritious organic material

Compost is the natural recycling/decomposition system and is simply the breakdown of organic materials resulting in an organic soil-like material. Composted material becomes a natural fertilizer for use by plants and an organic material important in maintaining the health of soil and helping it to retain moisture. A compost pile is similar to other living things in several ways; a healthy compost pile needs food, water, and air to function properly.

Food

Nutrition for a compost pile is in the form of two main groups: Brown material (e.g. dry leaves, straw, sawdust etc.) and Green material (e.g. fresh grass clippings, fruit and vegetable trimmings, coffee grounds, etc.). Just as some things disturb the health of the human body, there are items that should not go in compost piles because they upset the natural processes. Items such as meat and animal products, pet waste, dairy products, and fats, grease, or oils should NOT be put in compost piles. When starting a compost pile, think "lasagna" as you add materials to the pile. Place materials in alternating layers of browns and greens. A good rule of thumb is to use two parts browns to one part greens. As your compost bin grows in volume, you will turn your "lasagna" into a "mixed salad" by mixing up the compost pile, which will speed up the decomposition process.



Source: Landscape for Life™

COMPOSTING 101 RESOURCE (continued)

Water

Giving a compost pile a good drink is important and easy. Water needs to be evenly added to the pile to moisten the materials to the consistency of a wrung-out sponge – moist but not soggy. During prolonged heat and dry conditions, additional water may be needed.

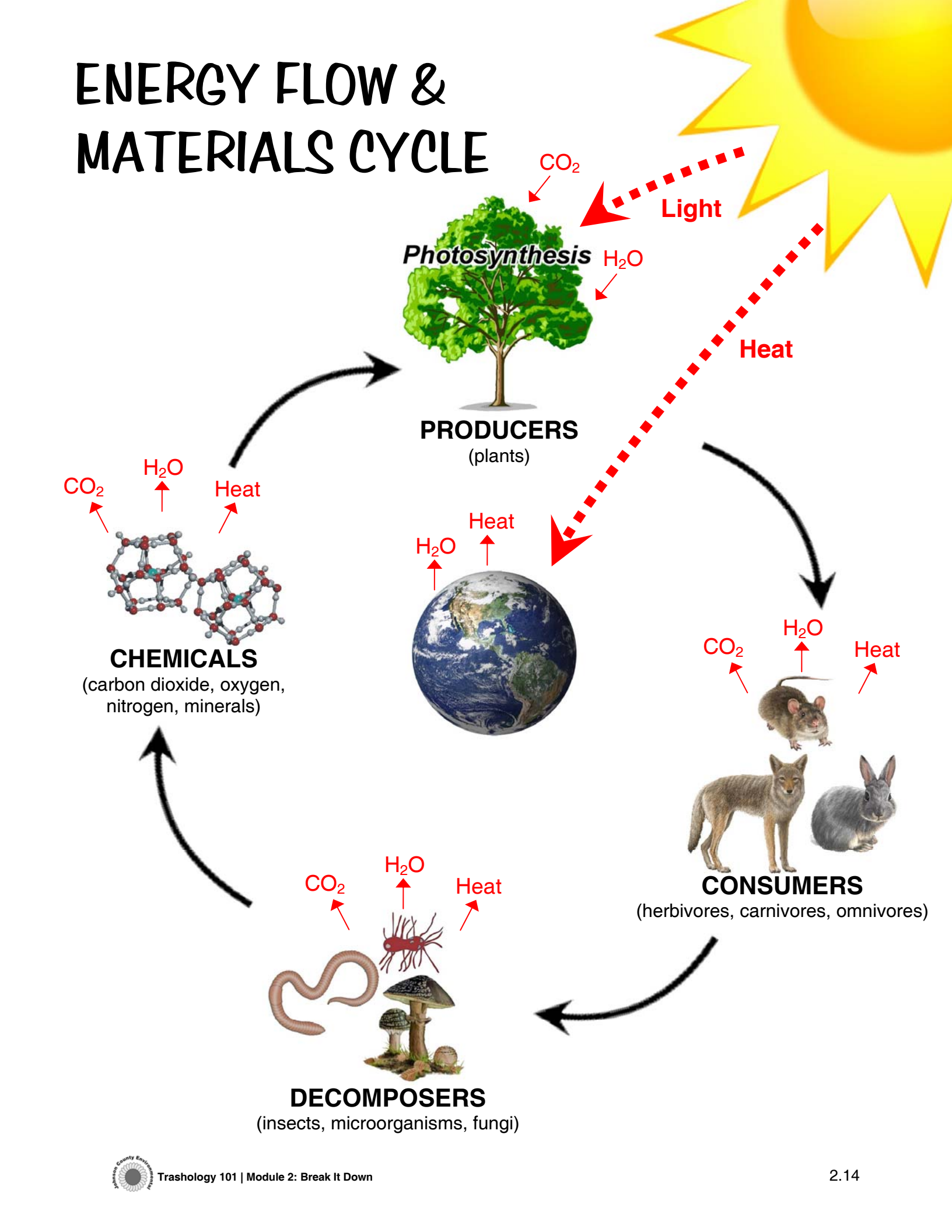
Air

The compost pile needs to "breathe." Oxygen is introduced in the small spaces of the materials during construction of the pile. Mixing the pile once in a while and getting additional oxygen into the compost speeds up the decomposition process. If the pile is not mixed, the compost will simply mature at a slower pace.

Remember, compost piles are living ecosystems and will become home to earthworms, pillbugs, centipedes, beetles and other small insects as it matures. Compost can be used on gardens, lawns, around trees as soil amendment, mulch or top dressing.

Resources:
www.johnson.ksu.edu/DesktopModules/ViewDocument.aspx?DocumentID=29687

ENERGY FLOW & MATERIALS CYCLE



ENERGY FLOW & MATERIALS CYCLE RESOURCE

Here is a more detailed explanation of the Energy Flow & Materials Cycle diagram.

The Earth's natural ecosystem has created an amazing cycle of energy/life where energy flows through the ecosystem and matter is continuously recycled. There are five key ingredients for life as we know it:

1. Continual source of energy
2. Amenable temperature for the life forms on Earth
3. Water in a liquid form
4. A sheltering and non-toxic atmosphere
5. The right assortment of matter (elements) that life forms are made

All plants and animals need energy and almost all depend on the energy coming from the Sun, but can't use it directly. It must be converted into a useable form of energy. Green plants are chemical manufacturers that provide the conduit of energy to the majority of life on Earth through photosynthesis.

The Sun generates energy in the form of heat and light (solar energy). It seems like the Sun produces a lot of energy which one might then believe there is an infinite amount to be processed through photosynthesis, but that is not the case.

- About 42% of the heat is absorbed by the earth and its oceans, helping keep the temperature not too hot or cold.
- Another 23% evaporates water, driving the water cycle and about 34% is reflected back out into space. The gases in our atmosphere also trap the heat energy that radiates off of the Earth and the oceans, as well as the reflected heat through the greenhouse effect which helps maintain an amenable temperature for life.
- Much of the light energy, especially ultraviolet light, is blocked by the sheltering ozone shield in the layer of the atmosphere called the stratosphere. This is very important, as most life on Earth could not survive the amount of ultraviolet light generated by the Sun.
- Light energy that does reach the Earth is captured by green plants in the process called photosynthesis, but only about 0.1% to 0.3% of the sunlight reaching the Earth fuels life.

"Photo" means light and "synthesis" means to make something. Green plants take in carbon dioxide (CO_2) which is made up of carbon and oxygen from the atmosphere and water (H_2O) which is made up of hydrogen and oxygen from the soil and atmosphere. Through photosynthesis, the molecules of carbon dioxide and water are broken apart. The carbon, oxygen and hydrogen elements are then recombined into a high energy organic chemical – sugar! Not all the oxygen is used and this is released by the plants into the atmosphere, and you and all the animals on Earth breathe it!

Green plants are called "producers" because they produce food in the form of sugar. Animals and plants are made up of many other elements besides carbon, oxygen and hydrogen. Some other important elements include sulphur, nitrogen, phosphorus and calcium plus many more.

The hydrogen, carbon and oxygen of the sugar molecule are held together by energy from the Sun which

ENERGY FLOW & MATERIALS CYCLE RESOURCE (continued)

has gone through a very complex series of chemical reactions. Sugar has three functions:

1. Some of the sugar is used to make the cells which plants and animals are made out of (carbon, oxygen, hydrogen).
2. Some of the sugar is "burned" in each and every cell by combining the oxygen you breathe in with the sugar to release energy so the animal and plant can function. The waste products from this reaction include carbon dioxide, which we breathe out and water and energy. Energy not used for bodily functions, is released as heat, helping warm our bodies. This process of burning sugar is called cellular respiration. Carbon dioxide, in turn, is taken in by green plants for photosynthesis. Carbon dioxide in the atmosphere is important in that it traps heat (the greenhouse effect) and helps keep the Earth an amenable temperature.
3. Some of the sugar is stored as fat to be used later.

Animals are called "consumers" as they eat (consume) food, but cannot make it. An animal makes more of itself because it has eaten plants or animals that ate plants and uses the chemicals from them to grow. At some point, animals and plants produce waste or eventually die. The matter making up their bodies and waste is "decomposed." Animals and plants are composed of many parts. Decomposed means to take apart.

Along each step of the way along the food chain, only about 10% of the energy consumed is incorporated into the next organism that eats the previous which is why we need a continuous supply of energy. This is because, 1) not all parts can be digested and becomes a waste product (feces and urine) and isn't available for the next animal that eats it; and 2) part of the food eaten, once converted to sugar is burned in each cell to release energy for bodily functions and then ultimately is released as heat from the body and is not available for the next animal that eats it. Now, the energy contained in the waste products and the body when the animal or plant dies, is then decomposed by microbes including bacteria and fungi. Neither of these organisms have mouths, they secrete digestive juices to liquify the waste/dead body and then absorb this for their food. Yum!

ENERGY FLOW & MATERIALS CYCLE POSTER STUDENT SCORING GUIDE

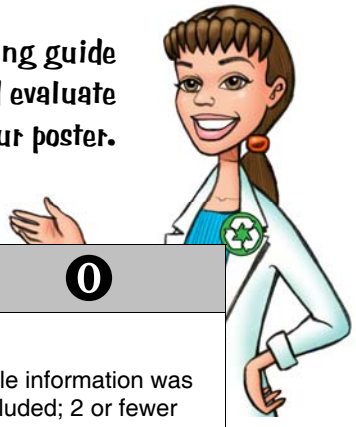
Use this scoring guide to create and evaluate your poster.

Name _____

	3	2	1	0
Content	Exemplary information presented including: sun, photosynthesis, producers, consumers, decomposers, chemicals and heat/ energy.	Good information was included; 4 of content pieces were represented	Adequate information was included; 3 content pieces were represented	Little information was included; 2 or fewer content pieces were represented
Poster Design	Well-designed poster with exemplary information and attractive graphics	Adequately designed poster with good information and nice graphics	Poster was incomplete and/or haphazardly designed	Poster was not finished
Presentation	Exemplary communication skills, good eye contact, strong voice and confident presentation	Adequate communication skills, eye contact and nice command of the presentation	Lacking effective communication skills and little eye contact	More communication skills practice needed
Work with Buddy	Thoughtful interaction; teaching and listening occurred	Good interaction; listening occurred	Some interaction; listening occurred	Little interaction and/ or inappropriate behavior displayed

ENERGY FLOW & MATERIALS CYCLE POSTER STUDENT SCORING GUIDE

Use this scoring guide to create and evaluate your poster.



Name _____

	3	2	1	0
Content	Exemplary information presented including: sun, photosynthesis, producers, consumers, decomposers, chemicals and heat/ energy.	Good information was included; 4 of content pieces were represented	Adequate information was included; 3 content pieces were represented	Little information was included; 2 or fewer content pieces were represented
Poster Design	Well-designed poster with exemplary information and attractive graphics	Adequately designed poster with good information and nice graphics	Poster was incomplete and/or haphazardly designed	Poster was not finished
Presentation	Exemplary communication skills, good eye contact, strong voice and confident presentation	Adequate communication skills, eye contact and nice command of the presentation	Lacking effective communication skills and little eye contact	More communication skills practice needed
Work with Buddy	Thoughtful interaction; teaching and listening occurred	Good interaction; listening occurred	Some interaction; listening occurred	Little interaction and/ or inappropriate behavior displayed

ENERGY FLOW & MATERIALS CYCLE POSTER
TEACHER SCORING GUIDE

Student Name _____

	3	2	1	0
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Name _____

OUR FAMILY CAN COMPOST

Composting is the natural recycling system of decomposition, which converts organic material into a dark soil-like material called **compost**. In nature, soil organisms (decomposers) digest organic material such as leaves, dead plants, and animals. There are many different ways to manage a composter, but successful composting means providing the conditions in which the decomposer organisms will flourish. They need food, air, water, and a habitable temperature. A healthy compost pile has a mix of high-carbon "**brown/dry**" materials and nitrogen-rich "**green/wet**" materials.

In the spaces below, identify items found in your home, garden, or yard that can serve as components for a backyard composter.

Brown/Dry _____

_____

_____

_____

Green/Wet _____

_____

_____

_____

Discuss how a backyard composter works (what's happening with the materials you put in) and then write a short paragraph describing the process.