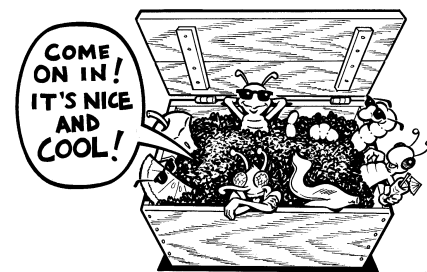


Compost Critters



OBJECTIVES:

Students will:

1. identify and describe some common compost critters.



STANDARDS: Science



SKILLS: Analysis, classification, description, problem solving



SETTING: Classroom



TIME: 40 minutes



VOCABULARY:

Compost
Consumers
Decomposers
Invertebrates
Organic waste
Producers

Introduction

Overview:

In this lesson, students will sort through compost in groups. They will identify different types of compost critters that they observe and share what they have found with the class.

Teacher Background:

There are many different animals that help break down organic materials into compost. These animals are networked together through a complex food web. Microscopic bacteria and fungi are the primary consumers in the compost pile. Bacteria are responsible for the majority of decomposition that occurs in compost. Other primary consumers are worms, mites, snails, slugs, springtails, collembolas and pill bugs. Eating these primary consumers are the secondary consumers, which can include other animals such as beetles, flatworms and ants. At the top of the compost food chain can be larger beetles, ants, spiders and centipedes.

Without decomposers, all life would stop because new plants would not have the nutrients needed to grow. Decomposers in a compost pile turn waste and plant debris into a rich soil amendment.

Organic material in a basic compost pile can be categorized as green or brown materials. Green materials include food waste such as vegetables, egg shells and old fruit. Fresh plant debris is also a green material. Brown materials include dry leaves and paper, which can be an important food source in a compost bin.

Other organic waste such as dryer lint, cotton fabrics and even hair can be added to a compost pile.

Materials:

Students:

- "Compost Critters" worksheet (one per group)
- "Compost Critters Information Page" (one per student)
- Compost (at two stages of decomposition, e.g., new and aged)
- Popsicle sticks
- Newspaper
- Magnifying glasses, if available (one per group)

Teacher:

- "Web of Life in Nature" overhead
- "Food Chain in a Worm Bin" overhead
- Rubric overhead
- Rubrics (one per student)

Preparation:

Be prepared to arrange students in groups of four.

Classroom compost bins may not contain all the compost critters listed on the information pages. Obtain compost from an active compost pile or bin (not bagged compost). If you have problems obtaining active compost, go to www.StopWaste.Org or call 1-877-786-7927.

Review the "Compost Critter Information Pages" prior to the lesson to learn more about the role of decomposers in a compost bin or pile.



ACTIVITY

Discussion

1. Discuss with the students the importance of decomposers. Without them, all life would stop because new plants would not have the nutrients needed to grow. Decomposers turn organic waste and plant debris into a rich soil amendment.
2. Ask students to describe different kinds of animals or invertebrates they have seen in or around soil.
3. Tell students that in nature and in the worm bin, there are producers, consumers, and decomposers that make up the web of life. Put up the overhead "Web of Life in Nature." Show them that producers (plants) get energy from the sun and produce food such as plants and trees for other animals. They are the primary source of food and energy entering a food chain. Consumers eat plants and each other. Decomposers such as worms break down nonliving organisms or organic material and turn it into rich soil for plants and trees to grow.
4. Review the role of producers and consumers in a compost bin using the overhead "Food Chain in a Worm Bin."
5. Ask the students what they think the producers are in a worm bin (the food waste we put in) and point out that just like in nature, plants are the primary source of food and energy in a food chain in the compost bin.
6. Tell the students that they will examine compost at two stages of decomposition and identify the animals/invertebrates they see. They will also classify the organisms as producers and consumers.
7. Have the class discuss how the compost critters should be handled (e.g., respect, be careful, etc.). Write the rules for handling on the board.
8. Show an overhead of the lesson rubric, and review the expectations for this lesson.
4. Explain that the students will be learning about different kinds of decomposers by using their worksheet and handout to identify organisms commonly found in compost.
5. Place a pile of compost at the front of the classroom and ask a representative from each group to collect some compost on a piece of newspaper along with a popsicle stick for each person in the group.
6. The students should identify the animals they observe in the compost by circling the ones they see on their "Compost Critter Information Page."
7. Once they identify a compost critter, they should read about it.
8. Next, have the groups look at the critters circled on the information page and have them classify each type as a producer or first-, second-, or third-level consumer on their worksheet.
9. Ask the students to share a few examples of compost critters they observed in their compost.
10. Ask each student to hand in their completed worksheet.

Procedure

1. Arrange students in groups of four.
2. Pass out the "Compost Critters" worksheet to each group.
3. Pass out "Compost Critters Information Page" to each group.

Wrap-Up

1. Lead a discussion about which compost critters are first-, second-, or third-level consumers and producers. Which group found the largest amount of different types of compost critters? Ask students to share examples of items they found.
2. Ask the students to explain how each of the compost critters is important and what its role is in a compost bin.

Final Assessment Idea

Have students select two or three critters they identified and using their own words write a description and the role of each critter.



RESOURCES

Teacher Materials:

California State Content Standards

The standards below represent broad academic concepts. This lesson provides connections to these academic concepts through hands-on activities and exploration. This lesson is not designed for a student to master the concepts presented in the standards. Additional lessons in the classroom that build on this lesson or the standard(s) ensure that students will have the opportunity to master these concepts.

SCIENCE	CONTENT STANDARDS
Grade 4	Life Science 2.b. Students know producers and consumers (herbivores, carnivores, omnivores and decomposers) are related in food chains and food webs and may compete with each other for resources in an ecosystem. 2.c. Students know decomposers, including many fungi, insects and micro-organisms, recycle matter from dead plants and animals. 3.a. Students know ecosystems can be characterized by their living and nonliving components.
Grade 5	Physical Science 1.h. Students know living organisms and most materials are composed of just a few elements. Investigation and Experimentation 6.a. Students will classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.





Teacher

Compost Critters Rubric

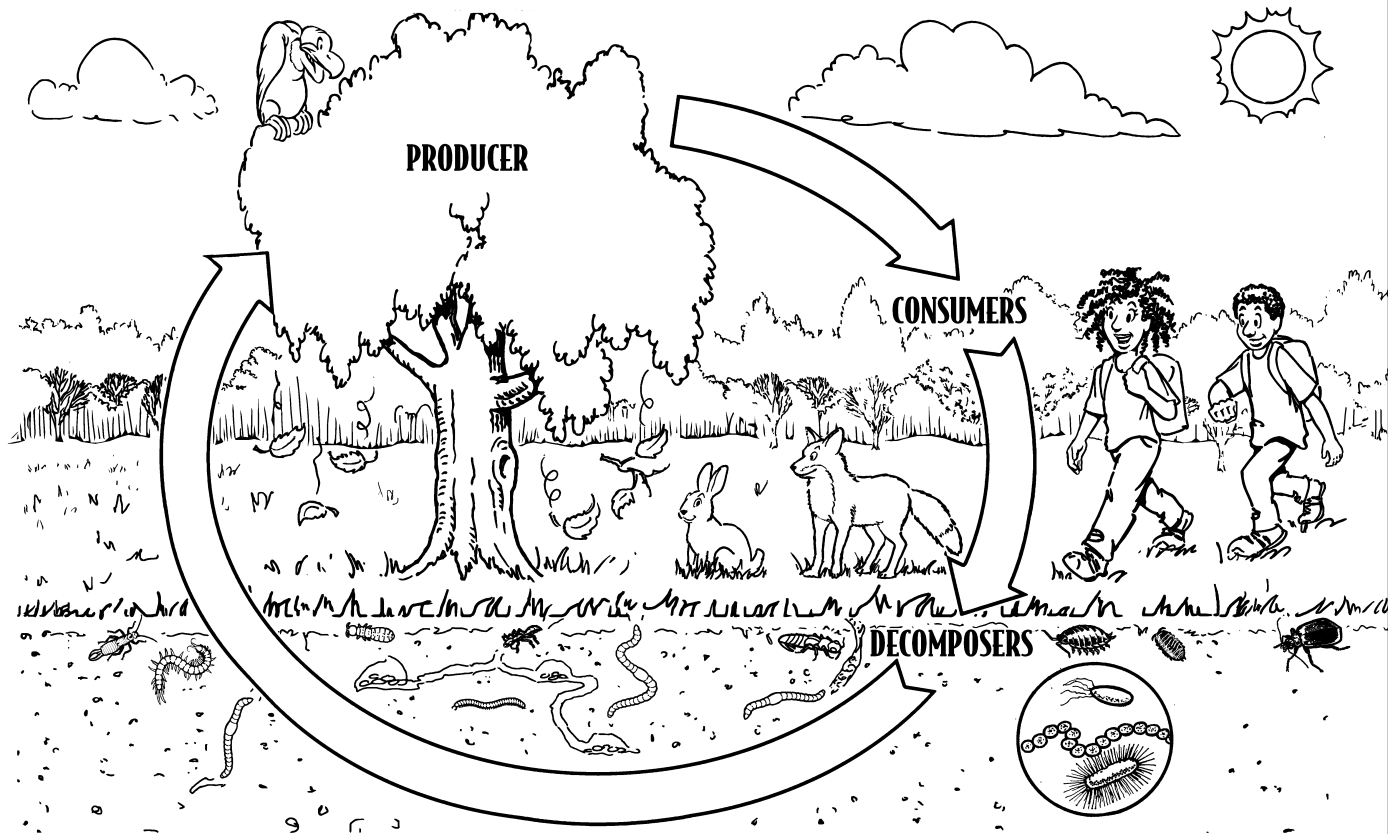
A rubric is a scoring tool that defines the criteria by which a student's work will be evaluated. This rubric is provided to assist you in setting expectations for students and assessing their performance and engagement during the lesson based on specific tasks. Ideally, a rubric is developed with the cooperation of the students. Two blank rows have been provided for you and your class to develop and add your own assessment criteria.

CATEGORY	4	3	2	1
Identify compost critters	Group identifies most of the compost critters.	Group identifies some of the compost critters.	Group identifies a few compost critters.	Group fails to identify any compost critters.
Classify and describe the role of each compost critter	Student is able to classify and describe each identified compost critter.	Student has difficulty classifying and describing compost critters.	Student can describe very little about any compost critter.	Student does not describe any compost critters.





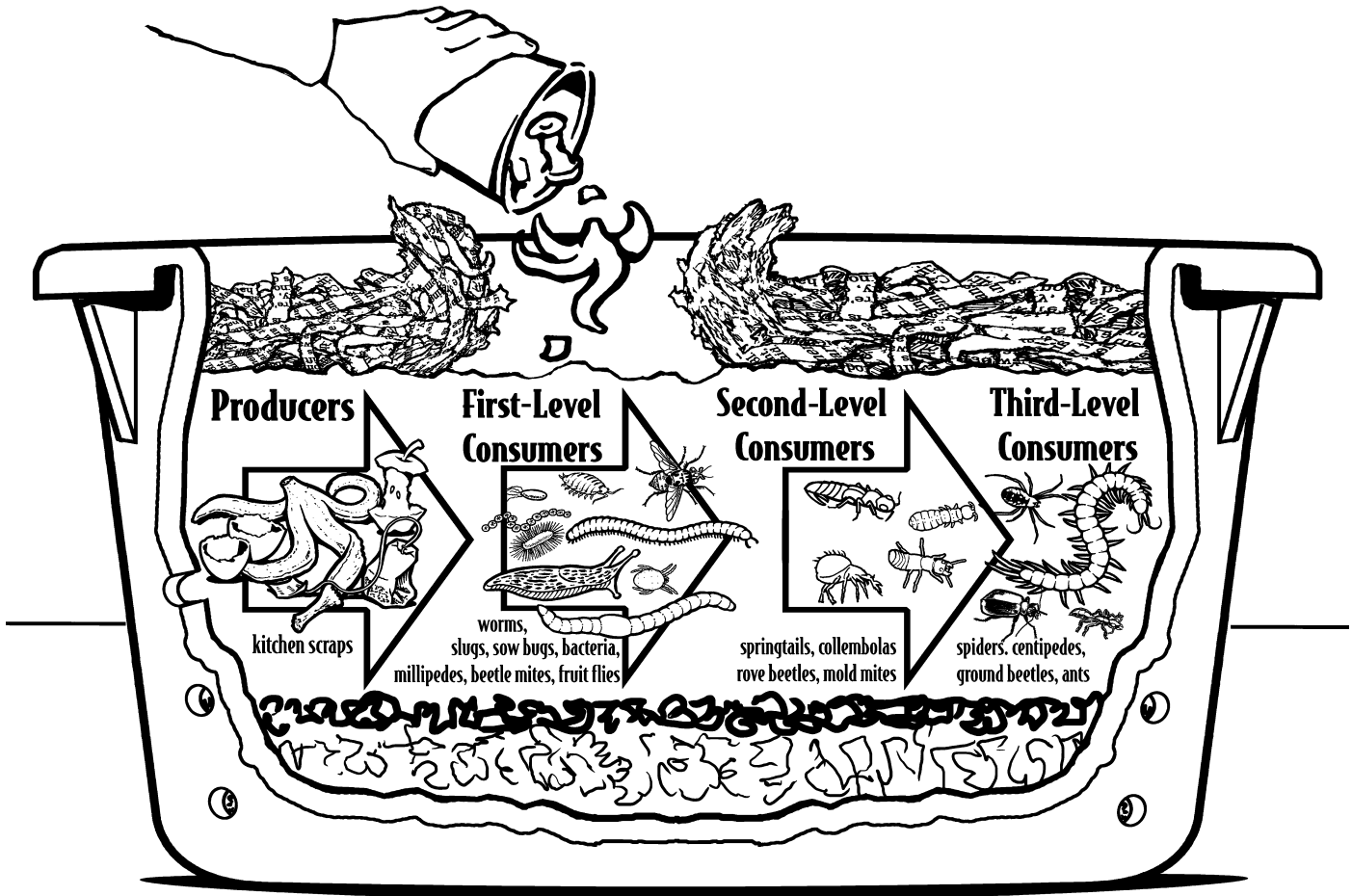
Web of Life in Nature





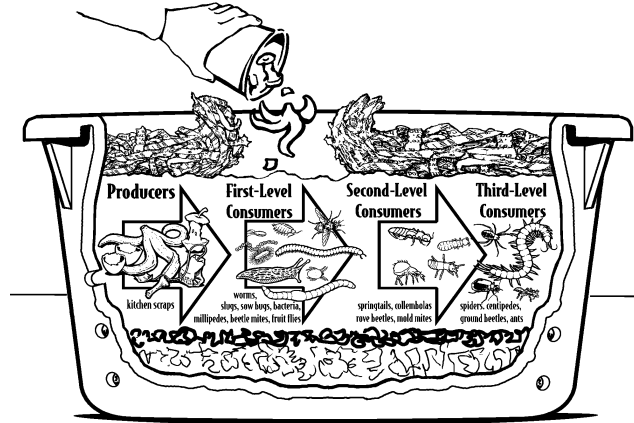
Teacher

Food Chain in a Worm Bin





Compost Critters



Directions: Write the names of producers and consumers you found in the compost and describe their role in a compost bin using the diagram above.

Producers:

1. _____
2. _____
3. _____

Role of producers in a compost bin:

- _____
- _____
- _____

First-level consumers:

1. _____
2. _____

Role of first-level consumers in a compost bin:

- _____
- _____

Second-level consumers:

1. _____
2. _____

Role of second-level consumers in a compost bin:

- _____
- _____

Third-level consumers:

1. _____
2. _____

Role of third-level consumers in a compost bin:

- _____
- _____

Name: _____

Date: _____





Student

Compost Critters Information Page

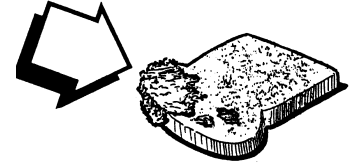
Pill Bug or Roly Poly

I am an isopod, which means I have ten pairs of legs that look very similar to each other. I eat old leaves and veggie scraps. I am about 1/2 inch long, and I roll up in a ball if I am disturbed. Some people think that I look like a little armadillo. I am a grayish, dark color.



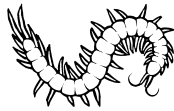
Mold

I am a fungus. I am related to mushrooms. Most of us live on old food. You might see me on old food in your home or your worm bin.



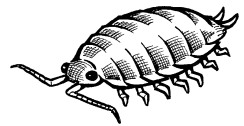
Centipede

I move quickly on my many legs. I have fifteen to 137 segments with a pair of legs on each. I am a fierce hunter. I love to eat earthworms. I use my pair of poison claws to help keep my prey from getting away. I am about one to two inches long. I am usually reddish brown.



Sow Bug

I have ten pairs of legs. That makes me an isopod like my cousin the roly poly. I eat vegetation and old leaves. My 1/2 inch body is oval and flat with flattened plates, but I can't roll into a ball like roly poly. I am related to crayfish and lobsters. I breathe with gills, so I must live in a damp, moist place. I am a dark grayish color.



Ant

I am an insect with six legs. I help to decompose by breaking materials into smaller particles. I create tunnels and move soil into clumps. Some people would rather not have me around their homes. I am black, brown, or red.



Earthworm

I am a long, thin soft-bodied animal. My body is made up of little segments. I do not have legs or eyes. I sense light, and I breathe through my skin. I eat bacteria, fungi, and other decaying materials. I like dark, moist places.



White Worm

I look like a frayed piece of thread. I am a skinny, white worm. I am 1/2 to one inch long. I am related to an earthworm. I like to eat rotting food after the other bugs get to it. You might think of me as one who likes to finish off the job.



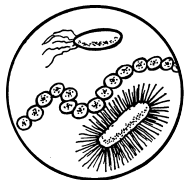
Fruit Fly

I am a very small fly. People don't like me, but I don't bite, sting, or make buzzing sounds. I don't harm earthworms either. Sometimes you will see me around a worm bin if a person forgot to bury their food. I like to lay my eggs where it's moist and warm.



Bacteria

We are so tiny that you can't even see us; we are everywhere. We are colorless and can eat almost anything. Some of us live together in groups and others don't.



Name: _____

Date: _____





Compost Critters Information Page

Slug

I have muscular disks on my undersides that are adapted for creeping and crawling. I lay egg masses that look like Jello. I eat living plant material but will make an appearance from time to time in your compost pile to eat fresh food scraps and garden trimmings.



Mite

I am tiny. It would take twenty-five of us to cover an inch-long line. My body is round and fat so it's hard to see my eight legs. I eat mold and plant materials such as soft tissues of leaves. Some of us eat manure of other organisms. I am usually white or brown.



Millipede

I have so many legs you would have a hard time counting them. My name means "thousand legs," but I don't have that many. I am very shy, and I roll up in a ball to avoid danger. I am a vegetarian and eat soft, moist, decaying plants. I am dark red in color and am 1/2 inch to one inch long.



Springtail

I am a tiny insect less than 1/16 inch long. I eat molds and decaying materials. I have a little spring that helps me jump high into the air. I am white in color.



Collembola

I am a close relative of the springtail, but I can't jump. I am tiny, less than 1/16 of an inch long. I eat molds and decaying matter. I am white in color.



Beetle

I am an insect with shiny black, tough wings and am about 1/2 inch long. I am a predator and eat slugs, snails and soft insects such as caterpillars. I live beneath stones, boards and other moist places.



Snail

Like my friend, the slug, I am a mollusk and creep around on my muscular belly. I carry on my back a spirally curved shell. I also have a broad retractable foot and a distinct head. Like slugs, I prefer to eat living material, but I will also show up in your compost pile or worm box from time to time for lunch.



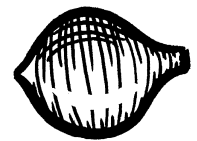
Spider

I am related to mites and have eight nifty legs. I am one of the least appreciated animals in the garden and compost bin or pile. I feed on other insects and work hard to help control pests that can damage a garden.



Worm Cocoon

You can find me in a worm bin or compost pile. Before I have hatched, I am clear and yellowish, the shape of a lemon, and 1/8 inch long. After I have hatched I turn pea green. Two or more baby worms are hatched at once.



Name: _____

Date: _____



DEFINITIONS

Vocabulary:

Compost: the process or end result of living organisms digesting and reducing organic material into a dark, rich, soil amendment.

Consumers: animals that get their food or energy from other living things, plants or animals.

Decomposers: an organism, including fungi, bacteria and invertebrates, that breaks down organic waste.

Invertebrates: animals that do not have a back bone. They are cold-blooded so they depend on the temperature of their environment to regulate their own body temperature.

Organic waste: wastes made of natural products such as food, leaves, hair, clothing fibers and yard trimmings.

Producers: plants that make their own food using energy from the sun.

