

# What Is Biodegradable?



## Introduction

### Overview:

Students will watch a video that introduces the process of decomposition in a compost bin or pile. They will classify found objects collected on school grounds as biodegradable or nonbiodegradable.



or school. Some cities are even collecting food scraps and other organic materials in curbside bins usually with plant debris or wood. These materials will get composted on a much larger municipal scale.

### Materials:

#### Students:

- Plastic or paper bags (one per group)
- “Biodegradable vs. Nonbiodegradable” worksheet

#### Teacher:

- Do the Rot Thing* video
- Examples of biodegradable and nonbiodegradable materials
- Rubric overhead
- Rubrics (one per student)

### Preparation:

Collect plastic or paper bags from home or grocery stores.

Request the *Do The Rot Thing* video from [www.StopWaste.Org](http://www.StopWaste.Org), or call the Recycling Hotline at 1-877-786-7927.

Organize students into groups of three to four (you will need an even number of groups).

### Teacher Background:

Items that we use every day are made from materials that can be classified as biodegradable or nonbiodegradable. Some of these materials such as plastics and metals are considered nonbiodegradable. These materials will not decompose or biodegrade over a short period of time and will often remain intact in the environment for many years. In contrast, biodegradable materials such as food, plant trimmings and paper will decompose under ideal conditions over a relatively short period of time.

Composting is a great way to turn biodegradable materials into compost, a rich soil amendment for plants. Air, moisture, and microbial activity in a compost bin are essential to the process of decomposition. When biodegradable materials end up in a landfill, they will remain there for many years because of a lack of air, moisture and microbial activity. One easy way to reduce waste is to compost biodegradable materials at home

### OBJECTIVES:

Students will:

1. define the differences between things that are biodegradable and nonbiodegradable.
2. identify five materials that are biodegradable and five that are nonbiodegradable.

**STANDARDS:** Science

**SKILLS:** Analysis, classification, description, problem solving

**SETTING:** Classroom and Outdoors

**TIME:** 45 minutes

### VOCABULARY:

Biodegradable  
Compost  
Decomposition  
Nonbiodegradable



## ACTIVITY

### Discussion

1. Ask students to name items that get thrown away at school and at home. Record their suggestions on the board. Explain that some of the items listed on the board are biodegradable (circle these items) such as notebook paper, leaves and food scraps, which means they can easily decay.
2. Pass around some examples of biodegradable items. Ask students whether they can share some examples of items that may not decompose or decay over time. Have students point out nonbiodegradable items on the board and underline them. Pass around some examples of nonbiodegradable items.
3. Ask students whether they use more biodegradable or more nonbiodegradable materials.
4. Have students share their ideas on how to recycle biodegradable materials. Explain that these materials can be recycled through composting.
5. Tell the students that they will learn about biodegradable materials by watching a video of things decomposing over time in a compost bin and collecting examples of biodegradable and nonbiodegradable materials outside.
6. Show an overhead of the lesson rubric, and review the expectations for this lesson.

### Procedure

1. Show the video *Do the Rot Thing*. Prepare the students to watch the video by assigning them to look for the differences between biodegradable and nonbiodegradable materials.
2. Lead students in a discussion about the video that will provide examples of the differences between biodegradable and nonbiodegradable. Review and define the concepts presented in the video.
3. Organize students into small groups. Assign half of the groups to take bags outdoors and collect items that they think are biodegradable, e.g., leaves, twigs, food scraps, etc. The other half will collect items that they think are nonbiodegradable, e.g., metals, plastics, rocks.

4. Pair up small groups (one biodegradable and one nonbiodegradable), and ask the groups to switch bags and examine the examples collected by the other group. For example, students in a group that collected nonbiodegradable items will examine biodegradable items collected by another group.
5. In groups, students will classify the items as biodegradable (organic materials from once living organisms) and nonbiodegradable (usually from nonliving origins, such as metal, rock, etc.). Some items may be moved from one collection into another if there is a group consensus.
6. As a class, discuss examples in each group that were difficult to classify.
7. Ask students how they could test objects to find out whether they are biodegradable. What evidence would they expect to observe that would indicate that the object is biodegradable? For example, what conditions are necessary for things to decompose (air, water, heat, etc.)?
8. Assign students to write a list of at least five items that are biodegradable and five items that are nonbiodegradable.

### Wrap-Up

1. Have students compare and contrast the materials shown in the video to the materials collected outside. Discuss similarities and differences.
2. Ask the students whether they think they can find materials that are biodegradable at home. Discuss ways to recycle these materials such as starting a compost bin.

### Final Assessment Idea

Have students write a description of the differences between items that are biodegradable versus those that are nonbiodegradable in their own words.



## RESOURCES

### Extensions:

Using the Internet, have students research how long it takes biodegradable waste items to decompose if placed in a landfill.

### 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	<b>Life Science</b> 2.a. Students know plants are the primary source of matter and energy entering most food chains. 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	<b>Investigation and Experimentation</b> 6.a. Students will classify objects (e.g., rocks, plants, leaves) in accordance with the appropriate criteria.





## What is biodegradable? 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
<b>Identifies biodegradable items</b>	Student identifies five or more biodegradable items.	Student identifies four biodegradable items.	Student identifies two to three biodegradable items.	Student fails to do the assignment.
<b>Identifies nonbiodegradable items</b>	Student identifies five or more nonbiodegradable items.	Student identifies four nonbiodegradable items.	Student identifies two to three nonbiodegradable items.	Student fails to do the assignment.
<b>Describes the differences between biodegradable and nonbiodegradable items</b>	Student clearly describes the differences between biodegradable and nonbiodegradable items.	Student describes some differences between biodegradable and nonbiodegradable items.	Student has difficulty describing differences between biodegradable and nonbiodegradable items.	Student fails to do the assignment.





# Biodegradable vs. Nonbiodegradable

Directions: List the items that are biodegradable and nonbiodegradable.

## BIODEGRADABLE

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

## NONBIODEGRADABLE

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

1. Describe the differences between things that are biodegradable and nonbiodegradable.

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2. Describe what would happen to a biodegradable item from your list if it began to decompose.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_



## DEFINITIONS

### **Vocabulary:**

**Biodegradable:** organic materials that can decompose or decay, such as wood, food scraps, paper and grass clippings.

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

**Decomposition:** the process of materials being digested and broken down into simpler substances, making nutrients more available to plants. Decomposition happens all the time in nature and in human-managed systems such as compost bins.

**Nonbiodegradable:** inorganic materials that do not decompose, for example, glass, metal and plastic.

