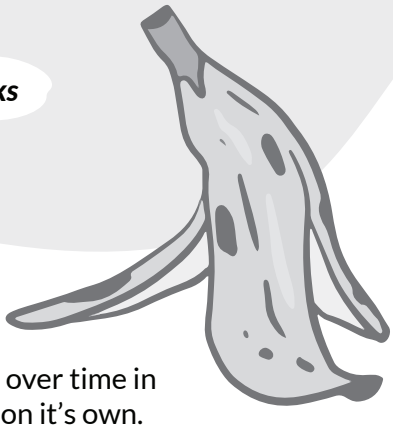
Banana Rot

Grades: K - 7 ***Set-up time: 20 mins; Experiment time: several weeks***



Lesson summary:

This is an experiment to find out how fast a banana peel rots or decomposes over time in three different environments: in a vermicompost bin, in garden soil and just on it's own.

What's the big idea?

- How effective is vermicomposting in decomposing food scraps?
- Which banana peel will decompose first?

Outcomes or purpose:

- Students will understand the role of red wiggler worms in vermicomposting and why vermicomposting is beneficial
- Students will learn about other ways that organic matter decomposes (outdoor composting and bacteria)
- Students will use educated guessing

Teacher background:

All organic matter (for example food scraps) begins to decay once it dies. In this lesson, we will look at three ways to decompose a banana peel.

The first method is vermicomposting. Vermicomposting uses worms and microorganisms such as bacteria to convert dead organic matter (food scraps) into nutrient-rich compost. The food scraps pass through the worm's digestive tract and is excreted as castings or vermicompost. Once the organic matter has completely decomposed, it looks like dark, rich, crumbly soil. Vermicompost can be used to amend soil and contains readily available nutrients to plants.

The second method is outdoor composting. This method is usually done by gathering plant material, such as leaves, grass clippings and kitchen scraps, into a pile or bin and letting it decompose as a result of the action of air, bacteria, fungi, and other microorganisms. Outdoor composters need the addition of soil from the garden which contains the necessary bacteria and microorganisms to make the composting process work. Once the compost has completely decomposed, the dark, crumbly compost is used to amend soil and slowly fertilize plants.

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Lastly, if we simply do nothing, the banana peel will still decompose. It is bacteria that decomposes organic matter like our banana peel. Bacteria are microscopic living organisms that can be found everywhere. There are many types of bacteria but beneficial bacteria help in decomposition and in fermenting foods such as kombucha, kimchi, sauerkraut or yogurt. When bacteria are exposed to light and air, many - but not all - of the bacteria will die, so decomposition is slower. In this experiment, the banana peel is placed in a warm, dark environment with little air where bacteria thrive, so the banana peel will decompose faster than one exposed to light and air.

Materials needed:

- **3 Banana peels**
- **3 large glass jars** *(pickle jars work well for this)*
- **Dark coloured cloth or paper to wrap around the jars to block light**
- **3 Coffee filters**
- **Optional: journal & pencil**
- **3 Rubber bands**
- **2 Cups of earthworms and castings**
- **2 Cups of garden soil**

Step by step instructions: Setting up the Experiment

1. Prepare the three jars by covering with paper or cloth to block light. Secure with tape or rubber bands. Label the jars if you wish.
2. Jar One: Place one banana peel in a jar. Add about 2 cups of worms and worm compost. Place a coffee filter over the opening and secure with a rubber band.
3. Jar Two: Place one banana peel in a jar. Add about 2 cups of garden soil. Place a coffee filter over the opening and secure with a rubber band.
4. Jar Three: Place one banana peel in a jar. Do not add anything to the jar. Place a coffee filter over the opening and secure with a rubber band.

Step by step instructions: Discussion

1. Invite students to guess which banana peel will rot first: in worm compost, in soil or just on its own in a jar. Students can record their guesses in their journal.
2. Talk about how vermicomposting works and why it is important.
3. Talk about how outdoor composting works and why it is important.
4. Talk about decomposition, the role of beneficial bacteria and what bacteria need to survive.

We Eat Plant Parts

5. After a week, open the jars and examine the banana peels. Discuss the differences. Which method was faster?

6. *(Optional)* Get a journal and draw the banana peel in the containers as it decomposes. Ask the students to be as detailed as possible about how the banana peel looks, feels and smells as well as how quickly each banana peel is decomposing.

Discussion questions

- Which banana peel do you think will rot first?
- What do worms do for soil and for plants?
- Why compost worms?

Expand the learning:

- What are the benefits of vermicomposting?