



## Lesson 4: Bacteria and Fungi

Time: 1hr

### **Common Core Standards**

NGSS.K.LS2.1

Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. [Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Assessment Boundary: Assessment does not include molecular explanations.]

### **Objectives:**

Teach students about the process of composting using bacteria and fungi to decompose organic materials.

### **Key words: Vocab Tree**

Bacteria; Fungi; Mold; Yeast; Mushroom; Organisms; Carbon Dioxide; Humus; Biodegradation

(Using Key words: Students can create a glossary, in books or on wall in classroom. Students are encouraged to practice using vocab in written or verbal sentences - perhaps writing example sentences and displaying them. Students could earn points for using the vocab in novel sentences each week)

### **Resources:**

- PowerPoint - Bacteria and Fungi
- Mushroom Diagram (Simple and Advanced)
- Bread
- Plastic ziplock bag

### **Activities:**

#### **Introduction**

Mold is a common fungus that grows on food and is a cause of biodegradation. Mold is one of the numerous species of microorganisms that is found in a healthy compost pile. It is much larger than bacteria and therefore can be easily seen in this experiment.

#### **Group Activity: The Fungus is Among Us!**

- Bring into the classroom a single piece of bread (you can ask students to also bring in their own, the more examples the better).

- Talk a little bit about the yeast that goes into making bread: Baker's yeast is also a single-cell microorganism found on and around the human body, commonly used as a leavening agent in baking bread and bakery products, where it converts the sugars present in the dough into carbon dioxide and ethanol (alcohol). Baker's yeast is of the species *Saccharomyces cerevisiae*, a member of the Fungi family.
- Put the piece or pieces of bread into a plastic lunch bag, seal the bag and let sit.
- Within a few days mold should appear on the bread and more will grow over time.
- Different colored molds are common: *Neurospora crassa* (new-rah-spore-ah crah-sah) produces spores that appear pink. And the *Penicillium* (pen-ih-sill-ee-um) molds, the molds that make penicillin (an important antibiotic that makes you better when you are sick!), are blue-green. Some of the colors on your bread may be the result of growing colonies of bacteria, which also sometimes grow on old food.
- Throw bread away once substantial mold has grown.

### Recap

Bacteria and fungi are very important in composting. Much like the worms we previously learned about, these tiny microorganisms eat our leftovers and turn them into new food for plants. They are a key component to the food cycle, without them we humans would not be able to survive.

### Further Activities/ Homework:

- Mushrooms come in all different sizes and colors. Have students draw and color a picture of a mushroom. Discuss the various parts of the organism including the cap, gills, pores and stalk. This will give them a little more insight into this common type of fungi.
- Have students go home and try a meal with mushrooms. They can take pictures or write a short essay about what they ate, what kind of mushrooms were included, and how they liked it.
- Repeat the same group activity but using multiple pieces of bread. Each piece of bread will be different, for example: fresh baked, organic, Wonder Bread, whole wheat, multigrain, white, or sourdough. See how these different kinds of bread grow mold. Is the mold different on the various pieces? Is there more mold on some and less on others? What could cause this variation? Generally bread with more preservatives and chemical additives will grow less mold but this is an unnatural process, we want our food to be able to mold.