Fun With Fungi (Ecosystem Recyclers)

LESSON OBJECTIVE
- Work together as a class to decompose organic material into nutrients for plants

GRADE
- 5

STANDARDS
- Life Science

TIME REQUIRED
- 45-60 minutes

VOCABULARY
- Decomposition
- Fungi
- Ecosystem
- Primary Decomposer
- Secondary Decomposer

MATERIALS
- 3-5 stuffed animals
- Handout (cut out)

RECOMMENDED ASSESSMENT
- Class model drawing

introduction

Ecosystems involve many parts that must work together to decompose and recycle materials into usable nutrients for plants to grow. In this activity, students will have to work as a team to get materials to be recycled to their class fungi and then on to their plants.

State Standards

5-LS2-1: Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.

Lesson Plan

Background Knowledge –

- *Decomposition:* the process by which dead organic substances are broken down into simpler organic or inorganic matter such as water, simple sugars, mineral salts, and carbon dioxide.
- *Fungi:* any of a group of spore-producing organisms feeding on organic matter, including molds, yeast, mushrooms, and toadstools.
- *Ecosystem:* a community of living and non-living things that share a habitat
- *Primary Decomposer:* a living thing that breaks down the remains of dead plants and animals to get energy
- *Secondary Decomposer:* a living thing that breaks down the remains of dead plants and animals with the help of bacteria

How do fungi perform decomposition? Fungi secrete enzymes that can break down complex organic compounds like carbohydrates and proteins into simpler components like sugars with the release of energy. They eat a very tiny amount of the nutrients they make, and the rest goes into the surrounding soil, air, and water.

The primary nutrients that plants need include Nitrogen (N), Phosphorus (P), and Potassium (K). Nitrogen is essential for photosynthesis and is the key component in the production of chlorophyll in a plant's cells. Phosphorus promotes root growth and is vital to photosynthesis. Potassium supports a healthy immune system and is used to open and close stomata, which is how plants breathe.

Activity –

1. Let's construct a model to describe the movement of matter between dead organic material, decomposers, and plants. Start by writing the word "plants" on the board with a circle around it. Can the students come up with what plants need

to grow (sunlight, soil/nutrients, etc.)? Write these things on the board and draw arrows from them to the plants. Where does nutrient-filled soil come from? Decomposers! Write decomposers on the board and draw an arrow pointing to soil. Where do decomposers get their food? They consume dead organic matter like plants and animals. Dead organic matter fuels fungi, which creates nutrients for the soil that allows plants to grow and keep the rest of the food chain going. We're going to model this as a class and see if we can succeed at getting nutrients for our plants.

2. Decomposition Challenge

Setup: cut out role cards, nutrient cards, and bacteria cards. Role cards will be given out as you assign roles. Nutrient cards will be given to the students who are mushrooms. Bacteria cards will be scattered around the room but within reach of some students.

All students in the classroom will have a stationary role to play. For a classroom of 20-25 students:

- Choose 1 student to be an oyster mushroom. This student is a primary decomposer. When a primary decomposer is given organic material (in this case, a stuffed animal), they can produce 2 nutrient cards to pass on to the plants.
- Choose 2 students to be morel mushrooms. These students are secondary decomposers, and while they need bacteria as well as organic material to decompose materials into nutrients, they can create 5 nutrients to pass on to plants. When they are given a stuffed animal to decompose and also given a bacteria card, they can then produce and pass on 5 nutrient cards.
- Choose 3 students to be plants (suggestion is to have students in the corners of the room be the plants). They will have to collect nutrients from the decomposers. If they manage to get at least 7 nutrients, they survive as big, beautiful plants that will go on to feed the herbivores.
- All other students will be part of a river or the wind. Split the class up into those two categories, ideally so that the class is mixed up and there is not a large cluster of water students together. They will be the primary means of delivery for organic material and nutrients created by the fungi. Water students will be able to pass items from one to another by handing them to the next person, but they cannot talk (rivers don't talk). Wind students can pass items to each other ONLY by tossing them (can crumple up the nutrients if that makes it easier to throw), but the wind does not have eyes (they can whisper but have to keep their eyes closed). If the wind tosses it and the water catches it, it can now move via water transport.

Start by placing the "dead" stuffed animals and the bacteria cards around the room and giving the fungi their nutrient cards. Wind and water students must try and get the dead animal to the fungi to be broken down into nutrients. Fungi will then release their nutrients, which the wind and water students must get to the plants. Remember that while the morel mushroom students can produce more nutrients, they must have bacteria to do it. The class wins if all plants have been given enough nutrients made by their mushrooms (can set whatever goal you want, but 7 is a good place to start).

Teacher notes: To space the activity out and give students a chance to work through their process, start with a single stuffed animal and add new ones at regular intervals (for example, every minute). Too many going at once right at the beginning may cause frustration and chaos. You can add more stuffed animals as needed or reuse the ones you have once they have been "processed" by the fungi. You may need to remind the river students to avoid talking and the wind students to keep their eyes closed. They must communicate in other ways!

3. Revisit your class model that you drew at the beginning. How did we take something dead and combine it with non-living elements to create growing plants? What is eventually going to happen to those plants (get eaten by herbivores)? Looking at our model, why are decomposers an important part of an ecosystem?

Post Activity –

Watch a 3 minute video to summarize how decomposers fit into the food chain: The Dirt on Decomposers: Crash Course Kids #7.2 https://www.youtube.com/watch?v=uB61rfeeAsM&t=188s

Discover Further

Extending the Lesson –
Have students see what else they can add to the class model. Copy the model down on a piece of paper and try to add three new elements to it. What did the students come up with?

Learn More –
The Fort Wayne Children's Zoo has 6 full-time staff dedicated to horticulture, or the practice of plant cultivation and management. Our horticulturists have to make sure our plants and trees in our exhibits get the nutrients they need to survive. Come learn more about our dozens of rainforest plants by visiting our Indonesian Dome!

Resources

Role cards, bacteria cards, nutrient cards

Fun With Fungi (Ecosystem Recyclers)


Oyster Mushroom

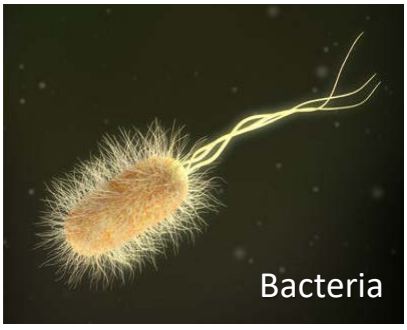

Morel Mushroom

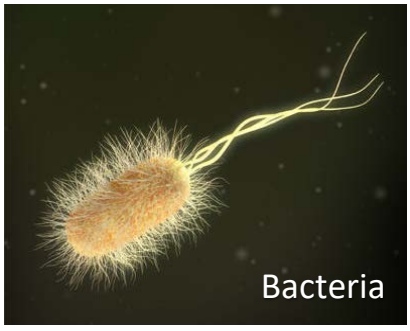

Morel Mushroom


Plant


Plant


Plant


Bacteria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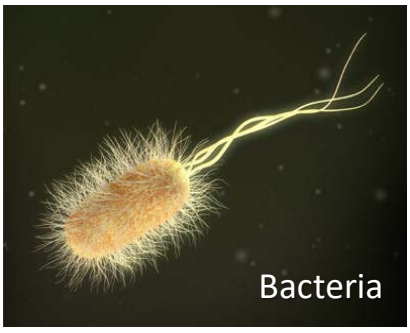
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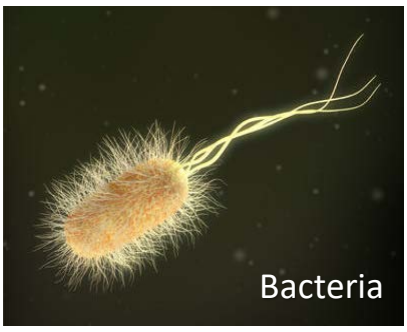
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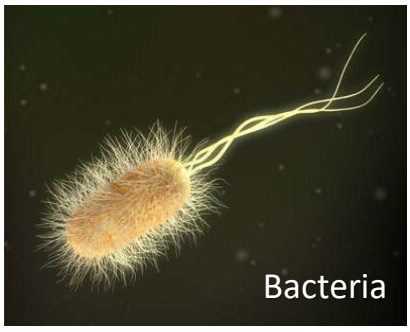
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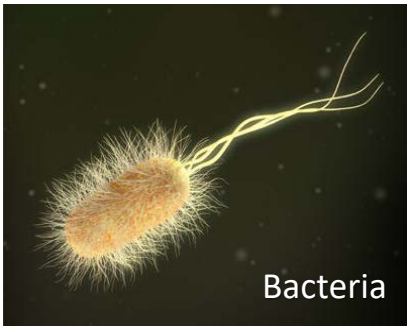
Bacteria

Connecting kids and animals, strengthening families, and inspiring people to care.

fort wayne children's ZOO

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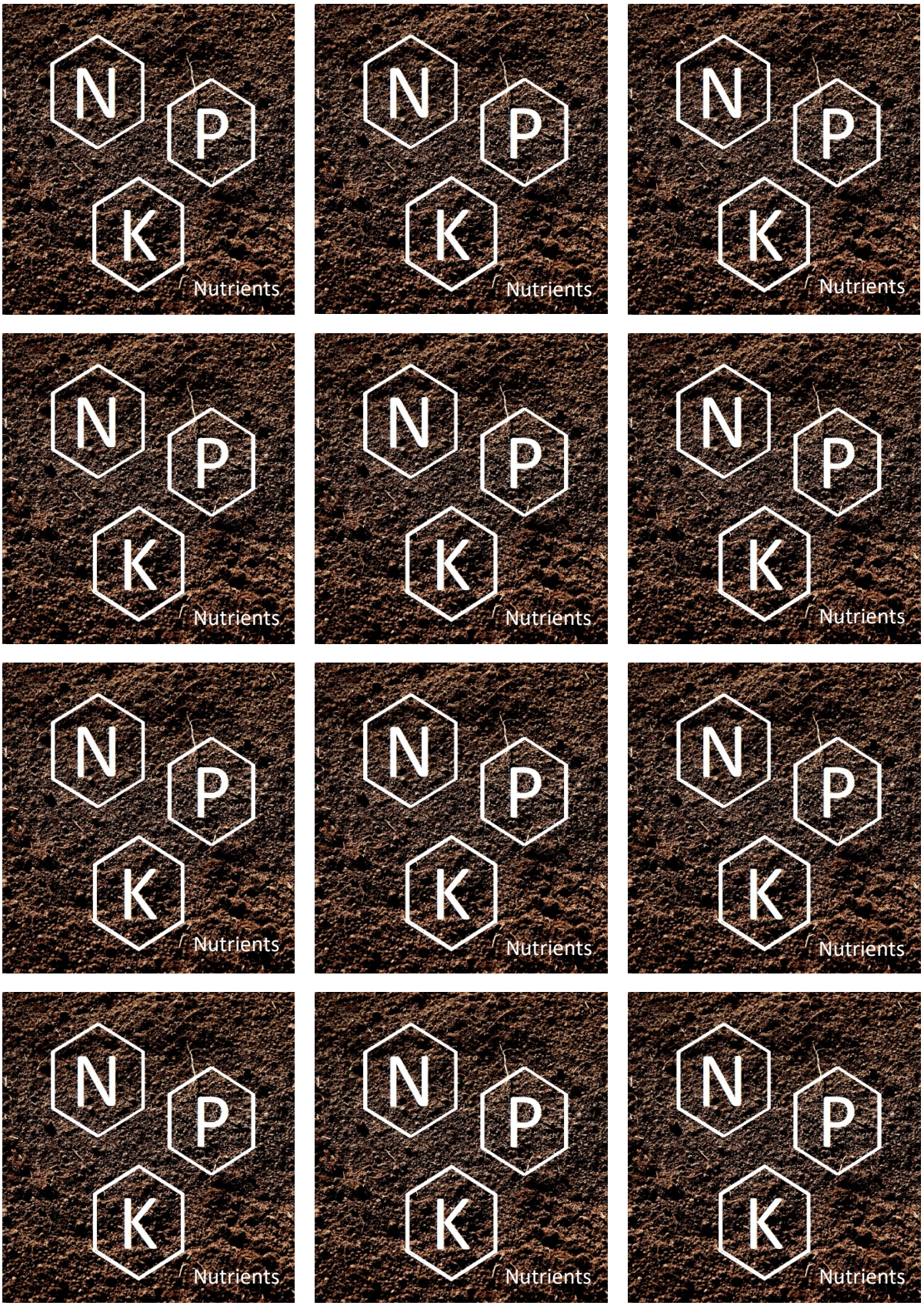

Connecting kids and animals, strengthening families, and inspiring people to care.