



Science Unit: *Decomposers and Recyclers*

Lesson 1: *The World of Fungi*

School Year: 2012/2013

Developed for: Dr. George M. Weir Elementary School, Vancouver School District

Developed by: Catriona Gordon (scientist); Amber Burma, Nancy Khan, Julie Luciani, and Dianne Minaminaye (teachers)

Grade level: Presented to grade K-3; appropriate for grades K-7 with age appropriate modifications

Duration of lesson: 1 hour and 15 minutes

Notes: Before lesson collect an assortment of fungi from the supermarket. Mature mushrooms with gills present are best. Tell students not to collect wild mushrooms. There are a number of highly poisonous wild mushrooms in B.C.

Objectives

1. Explore the world of fungi and their role as decomposers and recyclers in the ecosystem.
2. Learn the parts of a mushroom and their functions.
3. Make spore prints using available fungi.

Background Information

Fungi are very effective decomposers and are often visible in forest ecosystems. Fungi include many organisms such as mushrooms, toadstools, bracket fungi, slime molds, mildews and yeasts. Neither a plant nor animal, fungi are in a group of their own. They get their nutrition through organic matter, (often dead organic matter). Fungi release enzymes that aid in breaking down organic matter into metabolically usable products. Unlike bacteria, some fungi can penetrate dead organic matter such as the inside of a dead tree with their thread-like hyphae. This helps to speed up the rate of decomposition. Often times we do not see the major part of fungi (the mycelium) as it can be buried in soil, leaf litter or in dead organic matter such as a nurse log. However, during spring and fall, fruiting bodies may appear in the form of mushrooms. These mushrooms contain spores which when released will grow into a new fungus. Mushrooms can be short-lived and their main purpose is sexual reproduction and the dispersal of spores.

Vocabulary

Fungi: A group of organisms; feeds on organic matter and produces spores. They are neither plants nor animals but are in a category by themselves. Fungi include mushrooms, molds, mildews, yeasts and slime molds and are important decomposers.

Hyphae: Thread-like filaments, which make up the fungal mycelium.

Mycelium: A mass of hyphae which makes up the vegetative part of the fungus

Fruiting Body: The sexual stage of the fungus, it is a structure which contains the spores and allows for spore dispersal. A mushroom is a fruiting body.

Stipe: A stalk or stem of the fungus. On a mushroom it is the stem.

Cap: An umbrella-like head of a fungus or mushroom which contains the gills

Gills: Thin, plate like structures on the underside of the cap which produce spores



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- Mushroom: Fruiting body of some fungi, which have a domed cap and stalk and contain spores.
- Spores: Small reproductive structure which, once dispersed, can grow into a new fungus.
- Button: Immature mushroom.
- Mycologist: A scientist that studies fungi.

Materials

- Magnifying glasses
- Assortment of mushrooms, purchased from supermarket including Portobello, crimini, button, shitake. **Choose mushrooms that are fully mature with gills present**
- Black and white paper
- Extra ripe mushrooms to do spore prints (one per table group)
- Dissecting microscopes
- Dish to cover mushrooms for making spore prints
- Samples of other fungi, such as bread yeast, shelf fungi, slime mold (such as witches' butter), mold from the compost pile

In the Classroom

Introductory Discussion

1. Bring in an assortment of fungi and ask students what they are (polypores, shelf fungi, mushroom, mold from the compost pile, witches butter (yellow fungi growing on damp logs). Are fungi plants? Are they animals? Tell students they are neither, although they are plant-like, they do not photosynthesize or "make their own food from the sun". They often live on dead plants or animals and help to digest them and turn them back into soil or usable nutrients for other organisms. Talk about some fungi that we eat.
 - Who eats fungi? (Does anyone eat bread? Yeast in bread is a fungus.) Bread, mushrooms, soy sauce, miso, beer and wine all contain fungi.
 - Are fungi plants?
 - Are they animals?
 - What group do they belong to?
 - How do they help us?
2. Briefly describe science experiment/activity.
 - We will dissect (take apart) a mushroom and find all of its parts and their functions.
 - We will also make spore prints with mushrooms. This is a way that helps mycologists identify mushrooms
3. Briefly describe the processes of science that the students will focus on: observations, recording results, scientific drawing, predictions, and conclusions.



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4. Safety Guidelines:

- **Do not go and collect or eat wild mushrooms unless you are with a knowledgeable adult. Some mushrooms are highly poisonous.**
- **Always wash your hands after handling fungi.**
- **If any students have fungal allergies, find them an alternative activity.**

Science Activity/Experiment

Activity Title: Dissecting a mushroom and making spore prints

Purpose of Activity: To familiarize students with all parts of a mushroom and the corresponding functions and to learn how to make a spore print.

Give each student a mushroom, and allow them to find all the parts of the mushroom. After drawing and labeling, allow students to dissect their mushroom. Remove the cap first and find the gills. Then remove the stipe. Using a magnifying glass, try to locate the spores on the gills. If you have a microscope, take a piece of the gill to look closely at the fungal spores. Slice open the stipe lengthwise to locate the hyphae (string-like threads) that are inside.

In groups, hand out a piece of black or white paper. Have students remove the stipe from an intact, ripe mushroom. Gently place the cap of the mushroom face down on the paper. (Light coloured gills should be placed on black paper, while dark coloured gills should be placed on white paper). Cover the mushroom cap with a container or glass so that spores will not be blown away, and will produce a clear spore print. Leave the mushroom in place overnight (but no longer). Check the spore print the next day. Look at the spore print under the microscope to see spores en masse. Explain to students that this is another way that mycologists identify mushrooms.

Closure Discussion

1. Why are fungi good decomposers? How are they different from plants? Or animals?
2. What part of the fungus is a mushroom? Why do we only see mushrooms growing occasionally?

References

1. <http://namyco.org/education/k-12.html> Manual of Instructional Materials for Teachers and Naturalists Teaching About Fungi: Grades K-12 and College. North American Mycological Association. Accessed February 15, 2013.
2. Pascoe, Elaine. 1999. Slime, Molds and Fungi. Blackbirch Press. Woodbridge, Conn.
3. Wearing, Judy. 2010. Fungi: Mushrooms, Toadstools, Slime and Other Fungi. Crabtree Publishers. New York.
4. Arnold, Katya. 1997. Katya's Book of Mushrooms. Henry Holt. New York.