

Teacher's Guide

Natural Connections



Grade Level:
5th

GSE Reference:
S5L4: A, B

Summary:

This class will take a look at microscopic organisms and investigate their harmful and beneficial effects. Students will construct an argument that while some organisms are very small, they play an important role in our ecosystems.

Objective:

Students will properly use a microscope and prepare a slide using pond water from the CNC. They will differentiate between micro and macro organisms. They will communicate their connection with the natural world and explore other relationships between organisms.

Essential Questions

- 🌀 What are harmful and beneficial microorganisms and how do they impact humans?
- 🌀 Why should we care about microorganisms in our environment?
- 🌀 What are the natural forces that control the population of microorganisms?
- 🌀 As a student of science, what is the importance of a microscope?
- 🌀 Why do scientists create biological drawings to record their findings?
- 🌀 What other natural connections can you identify among organisms?

Vocabulary

Symbiosis – Any two different species of organisms that live together in a close relationship.

Microorganism – A living thing too small to be seen without magnification.

Macroinvertebrate – An animal without a backbone that is large enough to be seen without magnification.

Teacher Reference

Learn how to use a microscope:

<http://www.hometrainingtools.com/a/how-to-use-a-microscope-teaching-tip>

What you might find in pond water: [http://www.microscopy-uk.org.uk/index.html?](http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/pond/)
<http://www.microscopy-uk.org.uk/pond/>

Student Activities

River Clean-up: Make a connection between clean rivers and healthy creatures living in the water. Students and their families can volunteer with the Chattahoochee River Keeper on a river clean-up. <https://chattahoochee.org/>

Symbiosis: Investigate other types of relationships in nature, mutualism, commensalism and parasitism. http://www.blueworldtv.com/images/uploads/lesson-plans/Lesson_plan_webisode30Nemo.pdf

Virtual Pond Dip: Take a dip in the jar to learn about some common types of smaller pond life. <http://www.microscopy-uk.org.uk/index.html?http://www.microscopy-uk.org.uk/ponddip/>

Fun with Microbes: Here is an animated movie, games and quiz on bacteria basics. <https://www.brainpop.com/games/microbes/>

What and Where are Micro-organisms: More games and a quiz about micro-organisms <http://www.childrensuniversity.manchester.ac.uk/interactives/science/microorganisms/micro-organisms/>

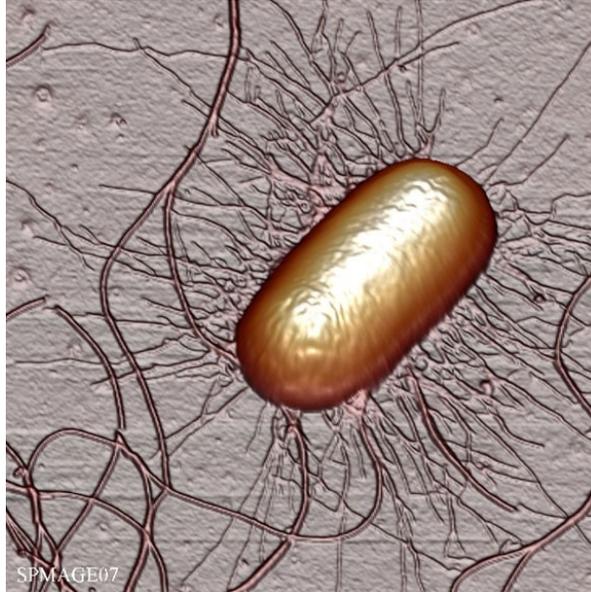
Microbe Zoo: Discover the many worlds of hidden microbes. <http://commtechlab.msu.edu/sites/dlc-me/index.html>

Outdoor Activity: E. coli and Turbidity

Take students to an outdoor area and mark off an area about the width of a hallway (the river). Introduce E. coli using the picture below. E. coli is a bacteria that is only 3 microns, or 3 one-thousandths of a millimeter long (.003 mm) – refer to a ruler if students have them. There are many kinds of E. coli, most of which are harmless and live in the intestines of healthy people and animals. E. coli has lived in your intestines since you were 2 days old! It helps with our digestion, keeps our immune system healthy, and helps us produce vitamin K (needed for blood clotting). Scientists have also figured out a way to engineer the E. coli bacteria to create diesel fuel. On the other hand, some microorganisms can be harmful. People can get ill when exposed to microorganisms from other animals, for example, by eating contaminated foods or not washing your hands.

Assign 4 students to be the E. coli and one student to be the sun. The rest of the students stand along the riverbanks. On a day with clear water, the sun can kill E. coli bacteria. Have E. coli students enter river and act out floating around the water. Let the sun try to tag each of them. E. coli are killed when tagged. They can get down on one knee. After a short time, stop the activity and ask students what fraction or percentage of the E. coli were killed by the sunlight. Define runoff and turbidity. Repeat activity with the remainder of the students playing the part of dirt particles in the water, which represents muddy water after a rain event. Is it harder for the sun to tag the E. coli with all the dirt in the water? Again, after a short time, stop the activity and ask students what fraction or percentage of the E. coli were killed by the sunlight. Discuss the relationship between runoff, animal waste, and E. coli in terms of a watershed. Ask students why we should care about this. In this part of Georgia, we get our drinking water from the Chattahoochee River. Do you want more or less turbidity in your water source?

If you have time to repeat the activity, some students can be plants along the river banks, creating a buffer, which will reduce erosion. Their presence reduces the amount of dirt particles in the river, making it easier for the sunlight to kill the E. coli bacteria.



E. Coli magnified

