



Brightwater Site

Microbiology Grade 7

Our survival depends on microorganisms: the decomposers of organic materials, in food production and within our own bodies. Microorganisms also have negative effects on our lives through food spoilage and diseases. (Evergreen Curriculum)

Curriculum:

- 1.1 Appreciate and use safe procedures
- 1.2 Collect and maintain cultures of microorganisms in pond water etc.
- 1.5 Use a microscope to observe the structure and activity of microorganisms
- 5.1 Compare similarities and differences in microorganisms

Pre-visit Wishes:

- Students and teacher have used microscopes at least once. The teacher knows the parts of the microscope and is capable of focusing the microscope.
- Teachers will have discussed with the students some of the vocabulary and concepts we will be using.

Before the lesson: attention Brightwater staff

A hay infusion can be used to produce a protozoan culture. Add a small handful of hay or dried grasses to about 500 ml of water and distribute the water and materials to culture jars. Wheat (20-30 kernels) may be added to provide additional nutrients for the microorganisms. The water should be distilled or from a natural source but not treated water. **In the winter it may take about 2 weeks for the microbes to hatch out of the mud so Brightwater staff will have to collect the sample.**

Collect pond water, water from rainwater collected in pails, a filter from an aquarium. (Can be done as part of the lesson)

Lesson Plan

Hand out worksheet and allow students time to read it. Students should work in pairs.

Start with the big picture. **Go to the creek and observe macro-organisms.** Macro-organisms are organisms that we can see without the use of a magnifier or microscope. Anything that we need a microscope to see is a microorganism. Talk about **the food web** – everything depends on something else for food. As we examine the food web we realize that **microorganisms play a major part in the**

food web, both as something **producing food for larger animals and acting as recyclers** breaking down organic matter and releasing the nutrients back into the soil or our gut to be taken up by plants or ourselves.

Food Webs

Algae absorb energy from the sun. Therefore, algae are primary producers. Algae are usually microscopic.

ALGAL PHOTOS



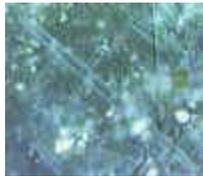
Ankistrodesmus



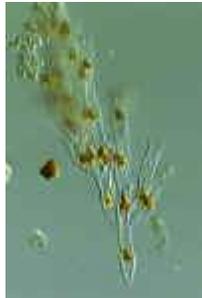
Spirogyra



Fragillaria



Synedra



Dinobryon



Peridinium



Cryptomonas



Anabaena



Aphanizomenon



Microcystis

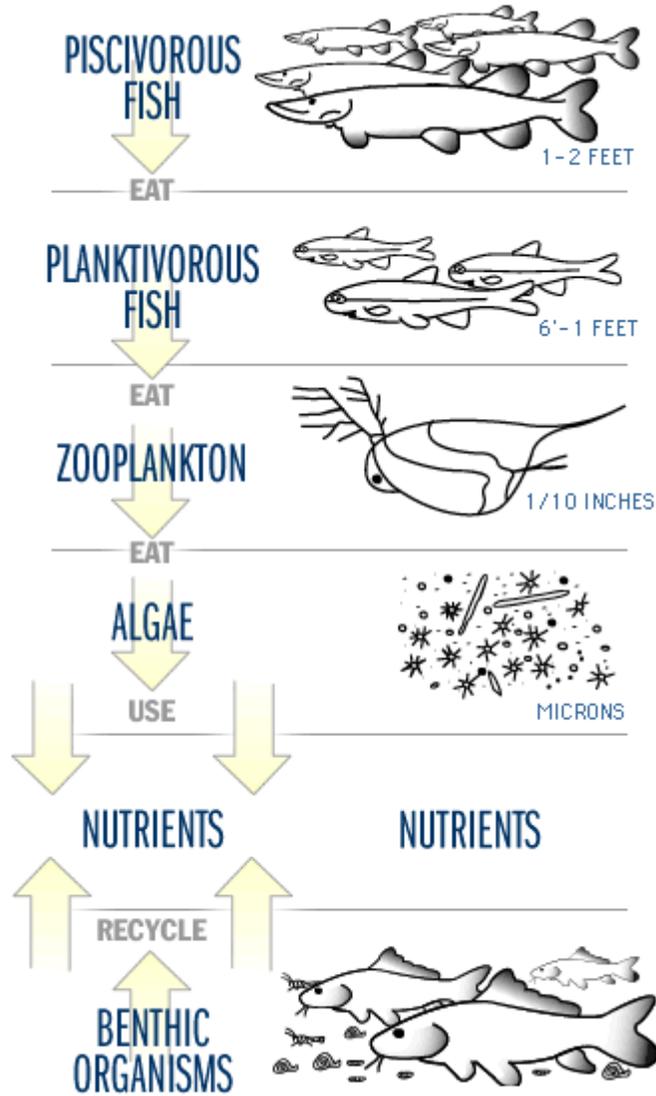


Oscillatoria

Figure 18.

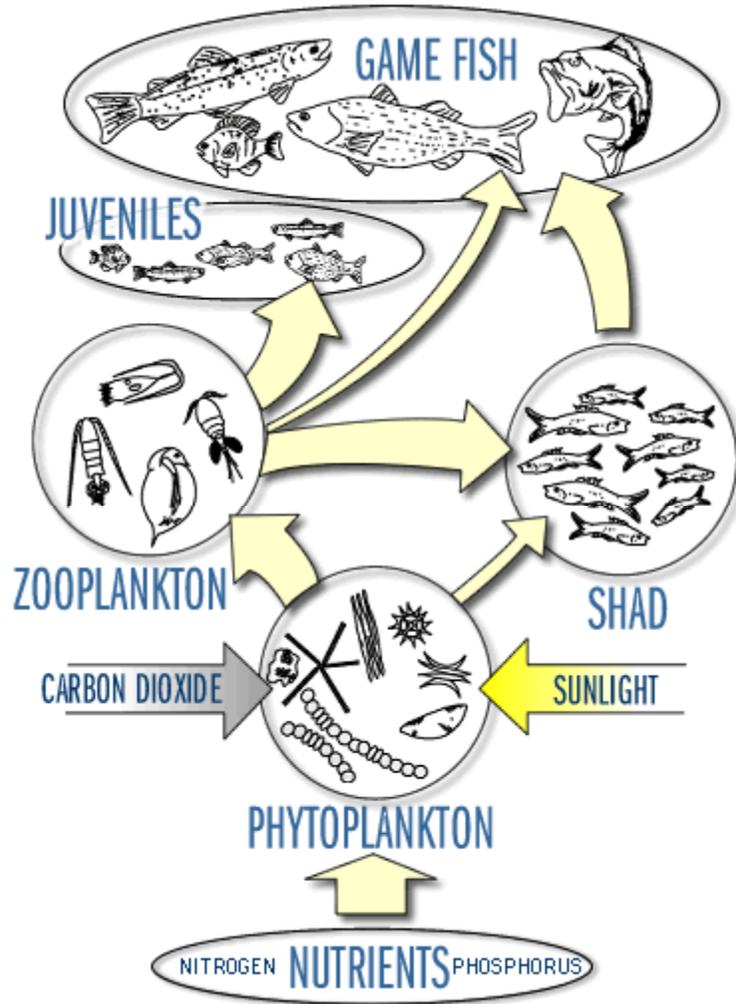
Images courtesy of the **Susquehanna University Algal Image Archive and Cyanosite** (Purdue University).

TYPICAL FOOD CHAIN



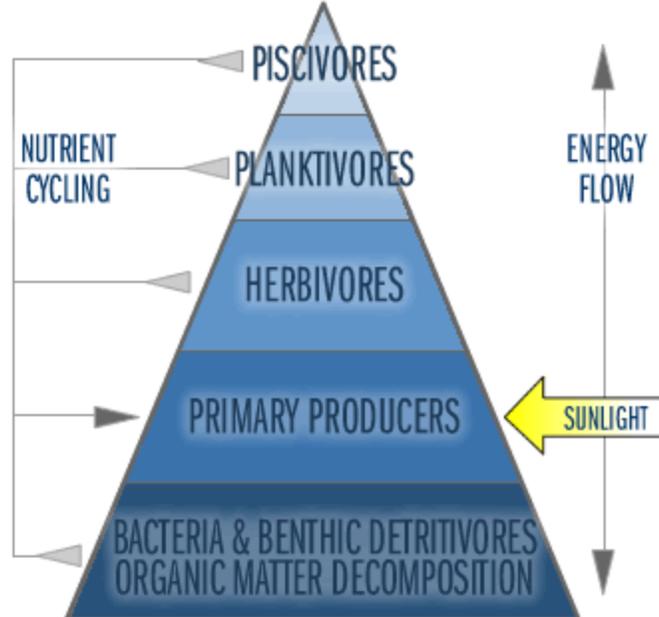
http://waterontheweb.org/under/lakeecology/12_producers.html

FOOD WEB



http://waterontheweb.org/under/lakeecology/12_producers.html

THE ECOLOGICAL PYRAMID



http://waterontheweb.org/under/lakeecology/12_producers.html

Some of these microbes cause disease so we must remember to wash our hands and the equipment when we are done.

Step 1:

- Collect pond water using the dip net with a pail tied to it or just collect pond water from the edge of the creek.
- Collect some mud
- Record the temperature of the air and the water

Step 2

Go to the Project Leaders office.

Microscope Technique:

Demonstrate how to pipette pond water into a dish

Discuss the **parts of the microscope**. Demonstrate **how to look into a microscope and how to focus**. (There is a sheet prepared to help you if you do not know how). Tell them to have **patience** when looking at water samples because the microbes will swim through their field of view. If they are focused on the bottom of the water column and the organisms are at the top the students may not see them. Therefore, they must learn to focus in all parts of the water column.

In order to practice the skills needed to use the microscope the students will view samples of lichen, fungus on leaves and the backs of leaves to see the hairs and stomata. Use analogies while talking. Under a microscope the lichen looks like a corral reef. The white mat of fungi on the leaf looks like woven clear hairs under the microscope.

Since there are only 5 microscopes: 5 students will view hay infusion, pond water, fish filter water, etc, while the other 5 are using the magnifying glasses. They will be working in pairs so the microscopes will be shared between two students.

Students will draw the microbes.

Students will describe the activity they see in their samples.

Students will use the last 5 minutes of the period to wash equipment and their hands.

Your students will see: Daphnia, Euglena, Algae, Amoeba and Cyclops, tiny round worms, Rotifers, and Volvox.

Worksheet is on the next page.

Worksheet:

1) What macro-organisms did you see while we were at the creek?

2) What is the difference between a macro-organism and a microorganism?

3) Describe the activity you see in the different samples of water. Make analogies about what you see. For example, the activities of the microbes look the same as if you were a giant looking down on people in bumper cars. The movement of the worms looks like a slinky moving down the stairs. (Use the back of the sheet if you need more room.)

4) Draw the microbes that you were able to see. Take time to draw every detail of what you see. (Use the back of the sheet if you need more room.)

5) Remember that the structure of your organisms' parts is directly related to their function. Look at your fingers; they bend in order for you to grasp objects. Choose two different organisms and complete the following questions. As you watch your organisms for a few minutes try to theorize about:

	Organism 1	Organism 2
How does it obtain food?		
How does it protect itself?		
If it moves, how does it propel itself?		