CONCEPT 1

A micro-organism is an organism that can only be seen with a microscope.

Activity

Reflecting on Micro-organisms

Each of the living things in **Figure 1.15** is a micro-organism. Record at least five observations and five questions that occur to you as you compare these photos.

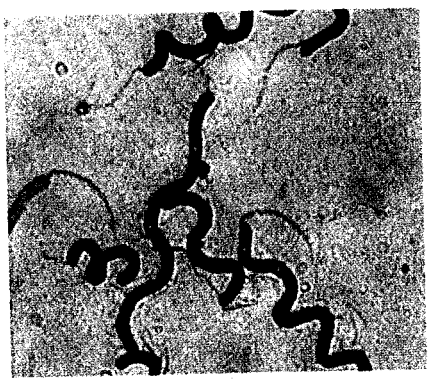
micro-organisms any organisms small enough to need a microscope to be seen

One thing that the organisms in **Figure 1.15** have in common is that they are too small to see with the unaided eye. Anything that is smaller than 1 mm requires technology such as a microscope to see clearly. **Micro-organisms** are all smaller than 1 mm, so they can only be seen with a microscope. For example, each bacterium in **Figure 1.15** has a length of about 1 μm. This means that thousands of them could fit in an area the size of the period at the end of this sentence. The phytoplankton are even smaller, with a length of only 0.1 μm. The *Euglena* is a bit larger, with a length of about 10 μm.

microbes common-language short form for micro-organisms

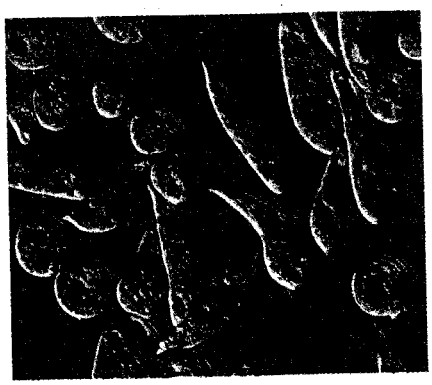
Micro-organisms, or **microbes** for short, live in every place you can possibly imagine. They live inside and on other living things. Many live freely in the air, in large and small bodies of water, and even in small puddles. No matter where you travel in the world—along sandy beaches, in coastal and inland forests, into the mountains, across prairie grasslands, in the freezing Arctic, and in dry, hot deserts—there are microbes.

Figure 1.15 These single-celled organisms are found in various ecosystems, some on land and some in the water.



Spirillum volutans; Bacteria; LM Magnification: 1000x

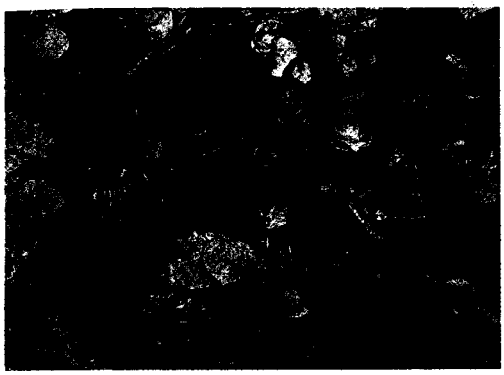
Various Species of Phytoplankton; Magnification: Unknown



Euglena gracilis; Protist; LM Magnification: 200x

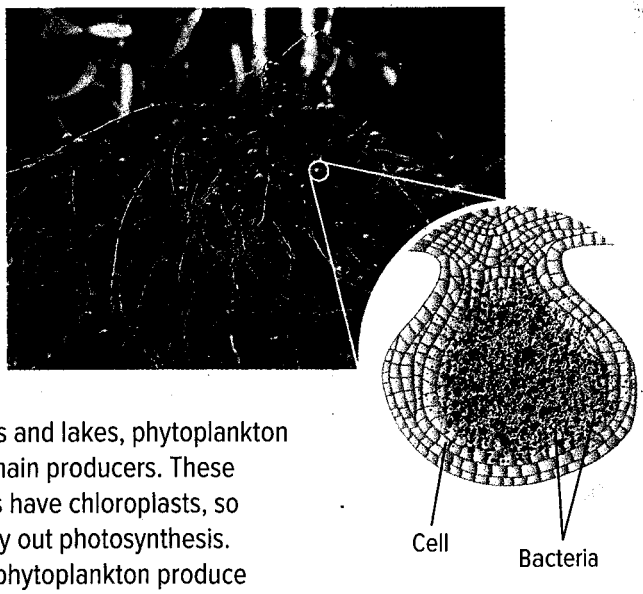
The Importance of Microbes

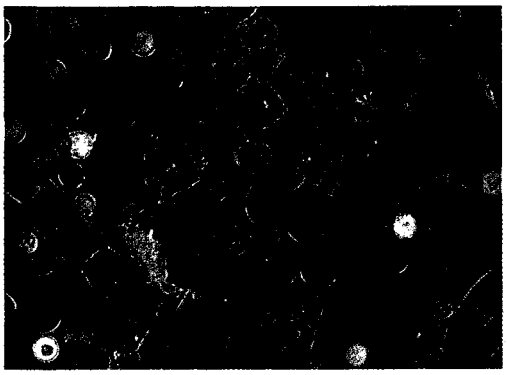
Microbes have important roles in ecosystems. **Figure 1.16** shows how bacteria and phytoplankton are important to other living things in an ecosystem.



Many types of bacteria are decomposers. They break down (decompose) dead or waste materials such as rotting wood, dead animals, and animal wastes. The action of decomposers returns nutrients to the soil. Plants and other organisms use these nutrients to grow and carry out their life processes.

For example, nitrogen is a nutrient that plants and other organisms need. Nitrogen gas makes up about 78 percent of the atmosphere, but it is in a form that plants cannot use. Certain kinds of bacteria make nitrogen available to plants. The bacteria live and grow on the roots of plants such as peas, beans, and alfalfa. As part of their own life processes, the bacteria change nitrogen into a form that the plants are able to use. This usable nitrogen is transferred to other organisms when they eat the plants.





In oceans and lakes, phytoplankton are the main producers. These microbes have chloroplasts, so they carry out photosynthesis. As well, phytoplankton produce about 50 percent of the oxygen in the atmosphere.

Figure 1.16 Forests and other environments could not function without the action of decomposer microbes.

Before you leave this page . . .

1. Explain why a microscope is needed to see micro-organisms.
2. You read about roles that bacteria and phytoplankton play in ecosystems. Suggest two other roles that you think microbes play in ecosystems.