

Germs Make Me Sick!

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Program Description: Our world is shared with millions of microorganisms, and although most of them are harmless, some make people sick. In this program, LeVar uses the world's best private eye, a microscope, to examine pond water. He also visits a microbiology lab to learn how scientists grow different kinds of germs.

Simple Microscope



Key Words: microscope, image, lens

Concept: A bulging drop of water can be used like a lens.

Anton van Leeuwenhoek (1632-1723) built instruments that helped lead to today's microscopes. He used a single, small glass lens which he ground by hand. It is possible to simulate this kind of microscope by making a lens with water.

Materials: Safety pins, water, eye-dropper, magazine pictures (light colors work best), other visuals.

1. Using an eye-dropper, have each student place a drop of water on the bottom loop of their safety pin. This bulging drop of water acts as a lens.

2. Hold this lens very close to a picture and it will magnify the image (i.e. the dots that make up magazine pictures). If it is held further from the picture (or if the water drop is thinner in the middle than on the edges) the drop will make images look smaller. For best results, look straight down through the largest bulge of water.

Beneficial Bacteria

Key Words: bacteria, beneficial, yogurt, culture



Concept: Some kinds of bacteria are beneficial.

Many species of bacteria are beneficial. One example of this is yogurt which is a food produced by the growth of bacteria — *Lactobacillus bulgaricus* and *Streptococcus thermophilus* in particular. To make yogurt, active cultures are needed.

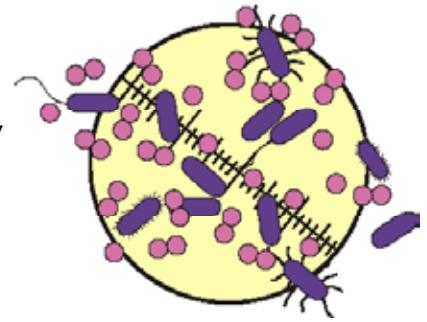
Materials: Plain yogurt (make sure the container states it contains active yogurt cultures), milk, powdered milk, thermometer, heat source, quart jar with a tight seal.

1. Stir $\frac{1}{2}$ cup of dry milk into $3\frac{1}{2}$ cups of milk.
2. Heat the mixture to 180° F (82° C) and then let it cool to 113° F (41° C).
3. Mix one tablespoon of yogurt (with active cultures) into a small amount of the milk mixture. Combine this with the rest and pour it into a very clean jar; seal it well.
4. Wrap the jar in several towels to keep it warm. Let it stand for 6-10 hours.
5. Have students sample the results. (Yogurt tends to be very tangy. It can be sweetened with honey or fruit.)

Observing Microorganisms

Key Words: microscope, microorganism, observation, protist, bacteria, virus

Concept: Like germs, other single-celled microorganisms called protists can be found in many places.



Microorganism cysts and eggs exist just about everywhere and can be activated by favorable conditions. This activity provides an opportunity to create an environment that supports microorganisms.

Materials: Water (let stand 24 hours to allow chlorine to escape), hay or other dead plant materials (dry leaves, grass clippings, etc), jars and covers, eye-dropper, slides, microscopes or microprojector, paper, pencils.

1. Have students put the hay or plant material they have collected into jars with water and observe how the jars look. Next view a water sample from the jar using a microscope or microprojector. They should document both of these initial observations.
2. After discussing what might be good conditions for supporting the growth of microorganisms, have each student decide whether to leave their jar covered (with holes punched in the lid) or uncovered, in a dark or light place, where it is warm or cool, etc.
3. Allow the jars to sit for several days. Then have them observe their jar and document these observations. Next, observing a sample of water from their jar using a microscope or microprojector, have them look for visible moving organisms (these will be protists, not bacteria or viruses which cause most disease infections).
4. Discuss how results varied depending on the plant materials used and the conditions chosen in step 2.