

Experiment #7
Bacteria in Yogurt

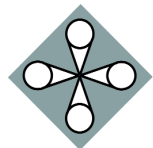
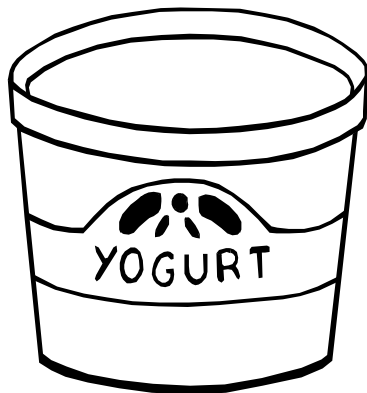
Materials: plain yogurt, distilled water and dropper.

Procedure:

- a. Clean your slide from any dust.
- b. Put a small amount of plain yogurt on the slide, add one drop of water, and top with a cover slip.
- c. Using the lowest power with The Professor, find a section where the yogurt is thin; this is where you will find the bacteria.
- d. Switch to a higher power for a better view.
- e. Make a sketch of your view under the different magnifications.

Conclusion:

1. How many different kinds of bacteria could you find?
2. What other foods have bacteria living in them?



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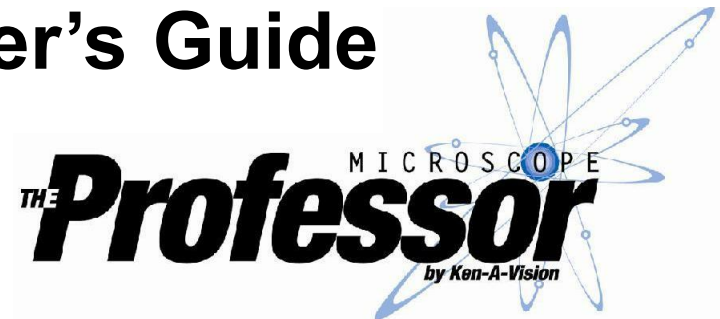
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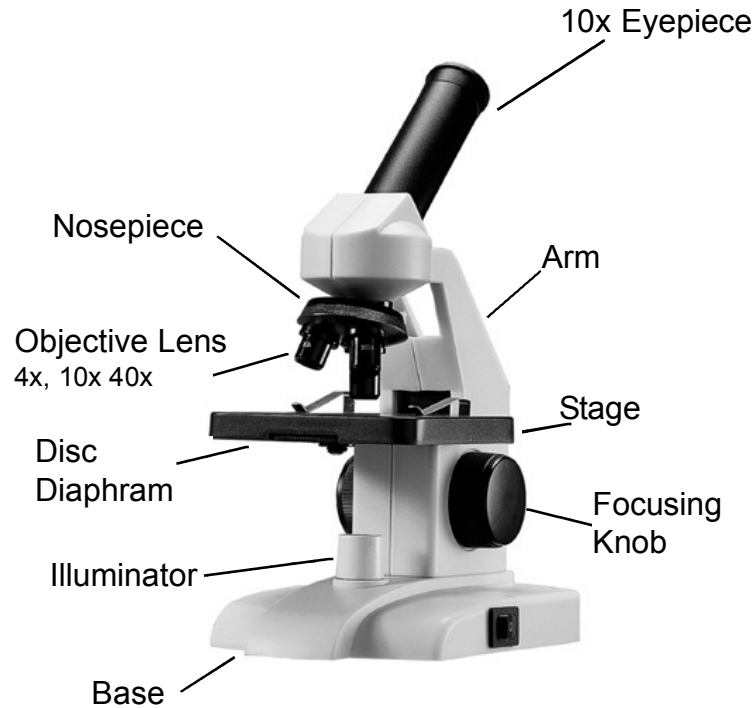
part# INS-ESH



User's Guide



Parts of the Professor Microscope



Experiment #6 Fiber Detective!

Materials: Threads or fibers from cloth made of: wool, cotton, nylon, linen, silk, and polyester. Dropper, scissors, tweezers, and lint from a clothes dryer.

Procedures:

- With the tweezers, place a few pieces of ONE of your fiber in a drop of water on a slide. Cover it with a cover slip and label.
- Observe the fiber with The Professor microscope and write a description and draw a sketch in your journal.
- Repeat with each of your fibers.

Conclusion:

- How many of the dryer lint fibers can you identify by comparing them with your labeled fibers?
- Can you think of any type of work that such a comparison skill might be useful in?



Experiment #5 Hair, Hair, Hair!

Materials: Hair from dad's mustache or beard, from people with different colors of hair, scissors and tweezers.

Procedure:

- a. When collecting samples of hair ask the person a few questions:
 1. Is your hair dyed?
 2. Do you use conditioner?
 3. Do you use a hair dryer, hot curlers, or curling iron?
 4. Have you had a permanent?
- b. With tweezers, place a few pieces of human hair from one person in a drop of water on a slide, and cover it with a cover slip.
- c. Observe the hair using The Professor microscope and write a description of it in a science journal along with the questions previously asked.
- d. Repeat with each sample of hair.



Conclusion:

1. Did you see any differences between each sample of hair?
2. What was the difference in head hair and face hair?
3. See the difference of hair several days after a shampoo and right after a shampoo.

THE PARTS OF A MICROSCOPE

Eyepiece: Is a 10x lens that you use to look through.

Arm: Supports the tube and connects to the base.

Nosepiece: This is the part that holds the objective lenses and rotates to change the magnification.

Objective Lenses: The Professor microscope consists of 3 objective lenses; 4x, 10x, and 40x. When combined with the 10x eyepiece lens we get total magnifications of 40x (4 x times 10x), 100x, and 400x. The shortest lens is the lowest magnification, and the longest lens has the greatest magnification.

Diaphragm: This is a rotating disk under the stage that has different sized holes to vary the amount of light you want projected upward into the slide.

Stage: The flat platform where you place your slides. The metal clips hold your slide in place.

Illuminator: The light source is battery operated with 3 AA batteries.

Focus Knob: Use this knob located on each side of your microscope to focus the image of your specimen or slide.

Base: The bottom of the microscope that is used for support. The push button located on the front turns your microscope on/off. Batteries are located in the bottom of the base.



Getting Started

Welcome to the world of microscopy. Here are a few things to get you started. First, be sure the following items are included with your unit:

- The Professor Microscope
- Box of slides (5) blank and (5) prepared
- (3) AA batteries

NOTE: Be sure to install the batteries prior to use. See replacing the battery instructions in this manual.

Viewing specimens with The Professor microscope is both fun and easy. Follow the instructions below to learn more details.

Installing / Replacing Batteries

1. The batteries are located in the bottom of the base.
2. Turn "The Professor" microscope upside down. Using a coin, insert it into the slot located on one side of the bottom of your microscope. Flip open the bottom.
3. Remove any used batteries.
4. Insert (3) new AA batteries in the +/- direction as indicated on the microscope.
5. Insert the base plate into the notches and push close.

Experiment #4 Collecting Pond Creatures



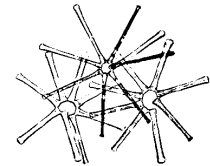
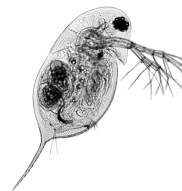
Materials: Old nylon stocking, eyedropper and jar.

Procedure:

- a. Take an old nylon stocking (from mom) and cut a section of it to form a tube, then attach a clear jar.
- b. Drag your new specimen net back and forth through the water for at least one full minute. This will help to make sure you get as many creatures as possible in the bottom of your jar.
- c. Let your jar of specimens settle down (their lively) for a couple of hours. After this time you should be able to see "sludge" of material at the bottom of the jar.
- d. The critters live in the sludge. Using an eyedropper, draw a sample from the jar and place in on a clean slide. Then put a coverslip on top of the specimen. Observe the specimen using The Professor microscope. If there is too much water draw out the excess by touching a piece of tissue to the edge of the coverslip.

Conclusion:

1. What do you see?
2. Draw the different specimens you see.



Experiment #3

The Fungus Among Us - A study of yeast cells

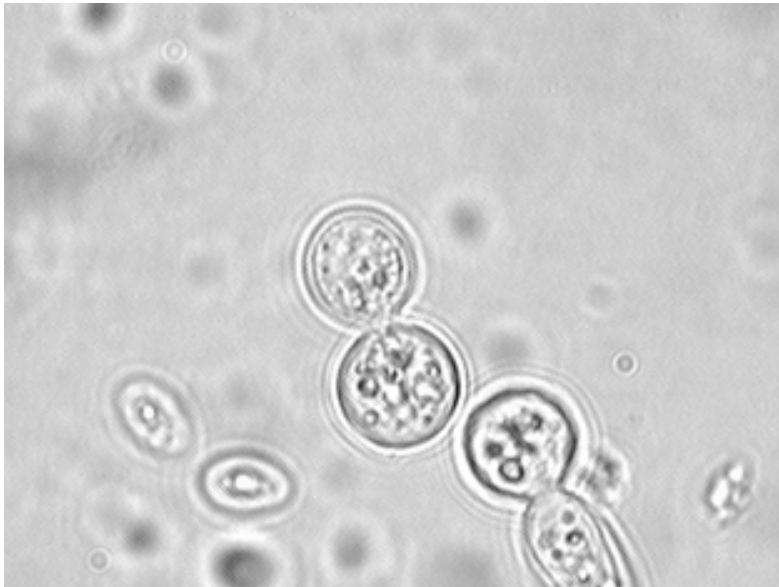
Materials: use any powdered yeast that comes in packages at the grocery store and a container of warm water.

Procedure:

- a. Add $\frac{1}{2}$ teaspoon of yeast powder to warm water and let it sit for at least 15 minutes.
- b. Then place a drop of yeast solution on a clean slide and top it with a cover slip.
- c. Use each objective lens of The Professor to view these fungi.

Conclusion:

- a. Why is the yeast solution foamy?
- b. Can you make out any organelles?
- c. Draw and label.



How To Use Your Microscope

1. Remove the microscope from its storage location by grabbing the arm of the microscope with one hand and place the other hand below the base.
2. Put a slide or specimen under the clips on the stage.
3. To view through the eyepiece lens, close one eye and look through the eyepiece with the other. Now focus your microscope.
4. When your slide is in focus at the 4x objective lens, the other two lenses will only need a small turn to bring into clear focus.
5. Adjust the amount of light by using the disc diaphragm. Turn until you have the amount of light you want on your specimen.
6. Don't forget to turn on your microscope.
7. When using a glass slide put a plastic slide underneath the glass slide.

Focusing

The proper way to focus a microscope is to turn the nosepiece to the lowest power objective lens (4x). Next turn the focus knob to raise the stage up until it stops. Then look through the eyepiece lens and focus downward until the image is clear.



Changing Magnification

Choose the magnification by rotating the nosepiece, see drawing for location, on the microscope until you hear a click. The next objective lens should be in place. You may need to focus to adjust to the different magnification.

Taking Care of your Microscope

1. Your microscope is a precision instrument, treat it with care. When working with your microscope be sure it is directly in front of you and any notes you take are set beside your microscope. This method of viewing will limit the chance of accidentally knocking the microscope off the table.
2. When the objective lenses or eyepiece are dirty, the image will not be very clear and sharp. To clean, use lens paper and distilled water and rub the lens and/or eyepiece softly. Never rub the lens when it is dry. (This can cause static charge that will attract dirt.)

Some Experiment Ideas Using "The Professor"

Experiment #1

The Scum of the Earth - A study of algae cells

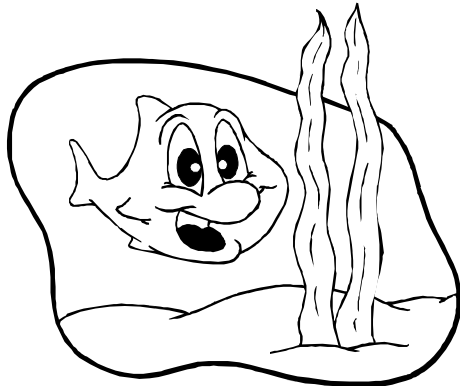
Materials: From any shallow body of still water, obtain a sample of algae or scrape some from the sides of an aquarium.

Procedure:

- Place a sample of algae on a clean slide, then drop water on it - top with a cover slide. Use The Professor to observe the slides.
- Draw and label.
- Compare these cells with the yeast cells in size, shape and function.

Conclusions:

- Why are some of these cells green and the other cells are not?
- Give the sequence in sizes of the cells observed, starting with the smallest.
- Explain the shape, size and color, relative to their respective function.
- To which kingdom does each belong? From your observations, provide support for your answer.



Experiment #2 Observing a Spider Web

Materials: Clear, colorless nail polish, Slide and coverslip, Dry spider web.

Procedure:

- Find a complete, dry spider web. Observe the web for patterns. Sketch your builder's style.
- Paint the center of a slide with clear nail polish. Just a thin layer is needed. The painted area should be about the size of a cover slip. Let it dry for about a minute.
- Holding firmly, place the slide on an interesting part of the web. For example, the middle of the web. Pull the slide towards you with the web attached. Carefully remove the rest of the web with a stick.
- Cover the slide with the cover slip.
- Put slide on "The Professor" microscope.

Conclusion:

- From what you saw under the microscope, why do you think an insect cannot escape from a spider web?
- How do you think a spider learns to spin a web?
- Find a book and see what you can learn about different types of webs.

