

Lesson 5: Herd Health

Name _____

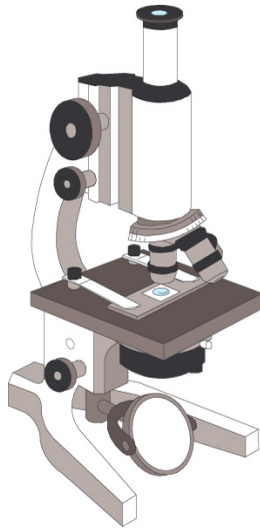
Microscope Use

Objectives: Students will identify parts of the microscope, adjust the microscope and prepare slides to study different materials that affect agriculture.

Activity Length: Preparation time: 20 min.
Class time: 50 min.

Materials and Equipment:

Compound microscope
Cloth or paper towel
Medicine dropper
Lens paper
Scissors
Dish soap
Glass slide
Coverslip
Horse hair
Small hoof pieces
Small manure samples
Rubber gloves
Probe
Water
Absorbent cotton

**PART A: Microscope parts and handling****Procedure:**

1. To move the microscope, place one hand beneath the base and firmly grasp the arm of the microscope with the other hand.
2. Place the microscope on the table with the arm toward you and the stage away from you. The base should be about 8-10 cm from the table's edge.
3. As directed by the instructor, identify the parts of the microscope.

Vocabulary Terms:

Arm - supports the body tube.

Base - supports the microscope.

Body tube - maintains a set distance between the eyepiece and objective lens.

Coarse focus - moves the body tube up and down.

Coverslip - thin piece of glass or plastic that is placed over the specimen on the slide.

Diaphragm - regulates light from the mirror or light source.

Eyepiece - contains lenses for magnification.

Fine focus - focuses and sharpens the image.

Mirror or light - provides light to illuminate specimen.

Nosepiece - contains high- and low-power objective lenses.

Objective (lens) - the microscope lens nearest to the object observed; focuses light to form the image of the object.

Resolution - capability of a microscope to provide fine detail.

Slide - small glass or plastic plate used to mount objects to be examined under a microscope.

Stage - supports the slide being viewed.

Stage clips - holds the slide in place on the stage.

Turret - rotating wheel on which objective lenses are mounted.

Working distance - space between the lens and the top of the coverslip.

PART B: Preparing wet-mount slide

Procedure:

NOTE: Specimens observed through a microscope are placed on a glass slide. A coverslip is placed over the specimen on the slide. Water is usually placed between the slide and the coverslip.

1. Rinse a slide in soapy water. Gently wipe both sides of the slide with a clean paper towel.
2. To prevent smudges, always handle slides by the edge rather than the flat surface.
3. Place the horse hair or manure sample in the center of the slide. (Use rubber gloves when handling manure.) Use a medicine dropper to place a drop of water in the center of the slide.
4. Place the coverslip at a 45-degree angle over the drop of water and the paper. With the probe, gently lower the coverslip into position on the slide.
5. If air bubbles are present, gently tap the coverslip directly over the air bubbles with the eraser of a pencil.
6. Clip the slide to the stage with the stage clips.

PART C: Focusing the microscope

Procedure:

1. Using the coarse focus, raise the body tube of the microscope until the objective lens is 2-3 cm above the opening in the stage.
2. Revolve the nosepiece so the low-power objective (10X) “clicks” and locks directly in line with the body tube.
3. Adjust the diaphragm so the greatest amount of light is coming through the opening in the stage.
4. Looking from the side, use the coarse focus to lower the body tube as far as it will go without hitting the slide. **Do not force the body tube.**
5. Look through the eyepiece. Using the coarse adjustment, focus until the object comes into view.
6. Use the fine focus knob to bring the object into proper focus.
7. Sketch the object as you see it under low power.
8. Move the slide toward your right.
9. Move the slide away from the microscope arm. Recenter the slide.
10. Rotate the turret to the high-power lens and focus with the fine-focus knob.
11. Compare your observations of the object under high and low power.
12. Sketch the object under high power.

13. Compute the total magnification image by multiplying the eyepiece magnification by the magnification of the objective lens. The magnification rate of the lenses of your microscope should be imprinted on the barrel of the lens.

Key Questions:

1. What happened to the first object when you moved the slide to the right? _____
_____ Away from the microscope arm?

2. If you see a living organism moving from the top to the bottom of the field of view, what do you know about the organism's direction of travel? _____

3. How did the first object change position upon switching to high power? _____

4. Why did the field of view get dimmer as you switched to high power? _____

5. What is the total magnification of the image with the microscope on low power? _____

6. What is the total magnification of the image with the microscope on high power? _____

PART D: Resolving power and depth of focus

Procedure:

1. Prepare a wet mount of a small hoof scraping.
2. Observe the hoof piece with low power and then with higher power.
3. Sketch the piece as observed in the field of view with both powers.

Key Questions:

1. How can you decide which hoof piece overlays another? _____

2. In microscope observations, why is it important to resolve power and depth of focus problems? _____

3. How does the focusing ability change when the objective is switched from low to high power? _____

Supplemental References:

Agriscience Activity Manual. Pierre: South Dakota Curriculum Center, 1994.

Lee, J. S., and D. L. Turner. *Introduction to World AgriScience and Technology (Activity Manual)*. Danville, IL: Interstate Publishers, Inc., 1994.

Thompson, Greg. *Agricultural Science Lab Activities*. University of Missouri-Columbia: Instructional Materials Laboratory, 1994.