Part 2

Using Your Microscope

Problem

What is the proper way to use and care for a microscope?

Apparatus

microscope

prepared microscope slides

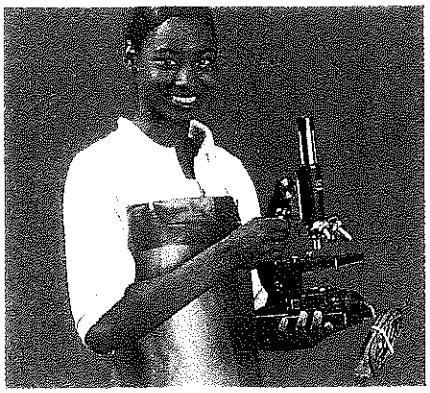
Materials

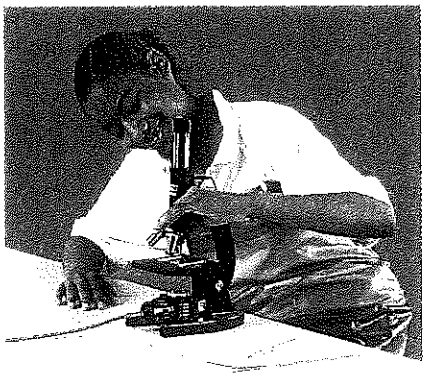
lens paper

Safety Precautions

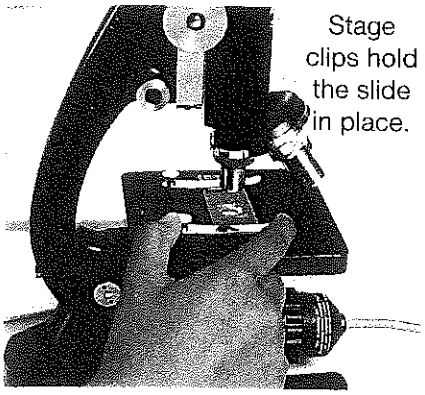
- Be sure your hands are dry when you plug in or disconnect the cord of the microscope.
- Handle microscope slides carefully so that they do not break or cause cuts or scratches.

Procedure





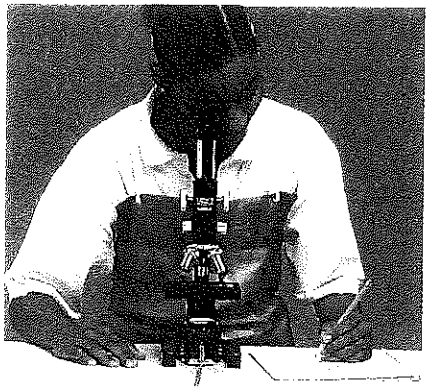
1. Now that you know the parts of the microscope, you are ready to begin using it. Carry your microscope to your work area. When carrying a microscope, hold it firmly by the arm and the base, using both hands.
   (a) Position the microscope at your work area with the arm toward you. If the microscope has an electric cord for the light source, make sure the cord is properly connected and plugged in.
   (b) Use lens paper to clean the lenses and the light source (or mirror). Do not touch the lenses with your fingers.
   (c) Do not turn any knobs until you have read through the rest of the Procedure.
2. The microscope should always be left with the low-power objective lens in position. If it is not, rotate the revolving nosepiece until the low-power objective lens clicks into place.
   (a) Use the coarse-adjustment knob to lower the objective lens until it is about 1 cm above the stage.
   (b) Look through the eyepiece (ocular lens) and adjust the diaphragm until the view is as bright as you can get it.



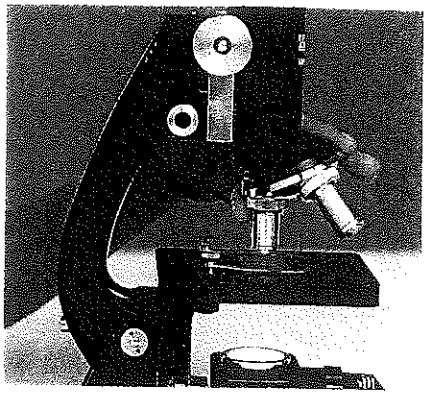
3. Place a prepared slide on the stage. Make sure the sample (object to be viewed) is centred over the opening.
   (a) Look through the eyepiece and slowly turn the coarse-adjustment knob until the sample is in focus.
   (b) Use the fine-adjustment knob to sharpen the focus.
   (c) While looking through the eyepiece, move the slide a little to the left. In which direction does the image move? Move the slide a little away from you and then toward you. What happens to the image?

Skill POWER

To learn how to make accurate scientific drawings, turn to page 557.



4. Find a part of the sample that interests you and, in your notebook, sketch what you see. Start by drawing a circle to represent the area you see through your eyepiece. This area is called the **field of view**. Make sure the details in your drawing fill the same space in the circle as they do when viewed through the microscope.
   (a) Label your drawing to identify the sample.
   (b) Calculate the magnification you are using. To do this, multiply together the magnifying power of the objective lens and the magnifying power of the eyepiece lens. Record this result on your drawing. **Example:** A 10× eyepiece and a 4× objective give a total magnification of 40×.



5. To see more details, rotate the revolving nosepiece to the next objective lens. **Do not change the focus first.** After the medium-power objective lens has clicked into place, adjust the focus using only the fine-adjustment knob.

   CAUTION: Do not use the coarse-adjustment knob with the medium- or high-power objective lens.
   (a) When you have finished viewing and drawing the sample, remove the slide and return it to the proper container.
   (b) If you do not continue to Part 3, carefully unplug the microscope and return it to the storage area.

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Part 3
Measuring the Field of View

Problem

How can the actual size of a microscopic object be determined?

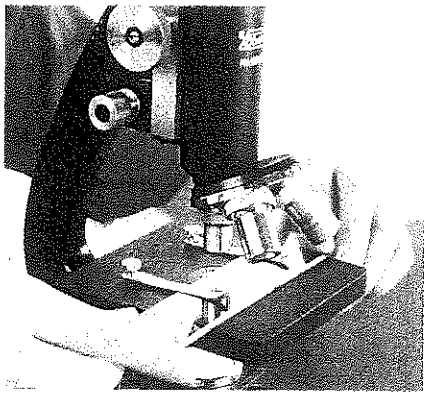
Apparatus

microscope
prepared microscope slides
transparent plastic ruler

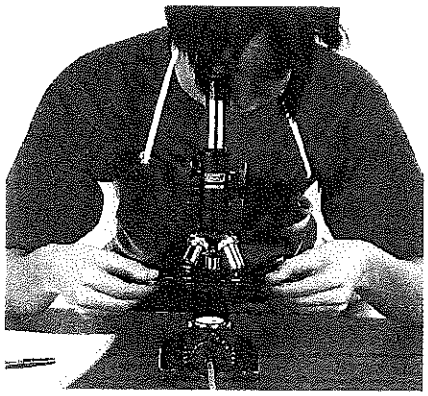
Materials

lens paper

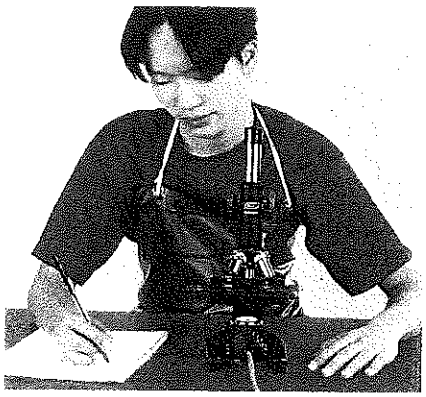
Procedure



1. Set your microscope to the low-power objective and place a clear plastic ruler on the stage.

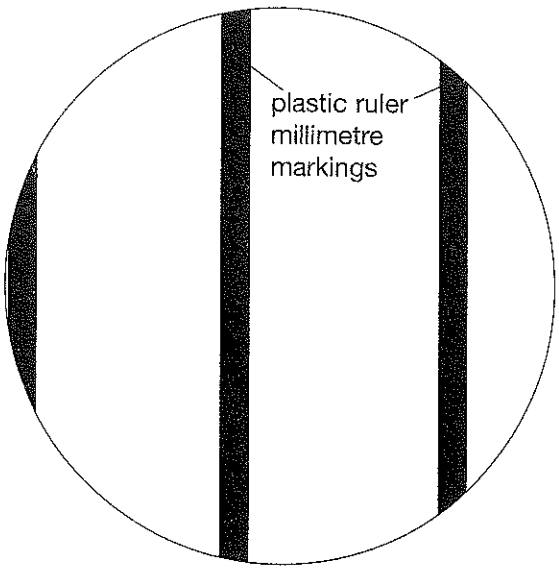


2. Focus on the ruler and move it so that one of the centimetre markings is at the left edge of the field of view.



3. Measure and record the diameter of the field of view in millimetres (mm). Millimetre markings on the ruler are too far apart to permit direct measurement of the field of view for lenses with magnification higher than 10×. You can, however, calculate the field of view for a higher magnification. To find out how to do this, go to "How to Calculate the Field of View" on the following page.

   (a) Unplug the microscope by pulling out the plug. Never tug on the electrical cord to unplug it.



The diameter of the field of view illustrated here is 2.5 mm.