1-3 Focussing on the Microscopic World

SkillCheck

- Observing
- Measuring
- Communicating
- Working co-operatively

Using a microscope can open up an exciting new world of discovery. You can see things with it that you may not have thought possible. In this activity, you will practise using a compound light microscope carefully and accurately. You will also examine some living and non-living things and learn how to prepare your own slides.

Safety


- Microscopes, slides, and cover slips can break, especially when using the high-power objective lens. Handle with care.
- Be careful when using sharp objects such as tweezers.
- Wash your hands thoroughly after doing this investigation.

Materials

- microscope
- prepared microscope slides
- see-through plastic ruler
- lens paper
- microscope slides
- cover slips
- medicine droppers
- tweezers
- water
- live specimens

Science Skills

Go to Science Skill 9 for more information about using microscopes and making scale drawings.

Procedure

Part 1 Focus the Image

1. Pick up your microscope and bring it back to your work table. Check that it is set to the low-power objective lens.
2. Select a prepared slide from the ones provided by your teacher. Place the slide on the stage of the microscope. If your microscope has stage clips, use them to hold your slide in place.
3. Turn the coarse focus knob carefully to bring your image into focus. Draw and label what you observe.
4. Move your slide to the right. Which way does the image move?
5. Move your slide up. Which way does the image move?
6. Change the lens to medium power and focus the image. You may need to turn the fine focus knob to make minor adjustments so that you can bring the image into focus. Draw and label what you observe.
7. **Optional:** Check with your teacher before you do this step. Change the lens to high power and focus the image. Use only the fine focus knob for making any adjustments to make the image clear. Draw and label what you observe.

Part 2 Determine the Field of View

8. Place a see-through ruler on the stage and focus on the ruler at low power.
9. Record the length of the ruler you can see at low power. This is called the **field of view**.
10. Repeat Procedure step 2 at medium power and at high power if your teacher approves.
11. You can use the field of view to determine the approximate size of an object you are viewing. For example, the field of view at low power is usually
4.2 mm. If an object takes up half the field of view at low power, this would mean that its approximate size would be 2.1 mm. Or stated mathematically:

$$\text{approximate size} = \text{field of view} \times \text{fraction of field taken up}$$

or

$$2.1 \text{ mm} = 4.2 \text{ mm} \times 0.5$$

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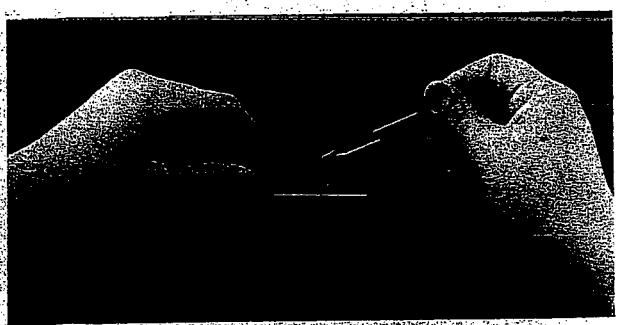
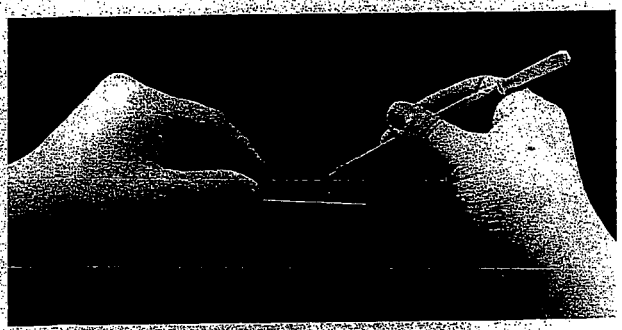
12. Select another prepared slide and determine the approximate size of an object at both low and medium power. Record your answers.

Part 3 Make a Wet Mount Slide

13. You can make your own slide rather than use a prepared one. This type of slide is called a **wet mount slide**. To prepare a wet mount slide, follow the instructions below. (Make sure your slide is clean before you begin. If it is not, use lens paper to wipe it off.)



Place a drop of water on the centre of the slide.



Use tweezers to place your specimen in the drop of water.

Hold the cover slip at a 45° angle and gently lower it onto the slide. There should be no air bubbles under the cover slip. If there is any excess water on the slide, dab a piece of tissue paper on the slide.

14. Prepare a wet mount slide of a strand of hair. Place the slide on the stage of the microscope. Observe and draw the hair at two different powers. Label your drawings.
15. Your teacher will provide you with a live specimen to observe. Prepare a wet mount slide. After placing the slide on the stage, determine which power would be best for observing it. Make your observations, then draw the specimen and label your drawing.
16. When you have completed Procedure steps 13–15, make sure your microscope is set at low power.
17. Clean up and put away the equipment you have used.

Analyze

1. Compare the drawings you made in this activity. Describe how your images changed when you increased the power of magnification. For example, did you see more or less of an image, or was it easier or harder to focus on the whole image?
2. Making clear, well-labelled drawings is an important skill when using a microscope. What are three things a drawing should have to ensure it is done properly?
3. A small, multicellular organism takes up a quarter of the field of view under a compound light microscope at medium power. What is the approximate size of this organism? Show your calculations.
4. You are looking at an image at low power. You see a round object in the top left corner of the image that you would like to see more clearly. You switch to medium power. List the steps you would have to take to get the round object in the middle of your view.

Conclude and Apply

1. A classmate has missed this lab activity and has asked you to help him learn how to use a microscope properly. Write a step-by-step set of directions. Include labelled diagrams where needed.