

Take It Further

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The Compound Light Microscope

A **compound light microscope** uses light focussed through several different lenses to form a magnified image of a specimen. A modern compound microscope, like the one shown in Figure 1.6 below, is a delicate and expensive instrument and needs to be handled with care.

- 1 Eyepiece or ocular lens** This is the lens that magnifies the specimen, usually by 10 times (10x). This is the lens you look into.
- 2 Coarse adjustment knob** This knob moves the stage up or down to focus on the specimen. This is the first knob you use to focus on a specimen.
- 3 Fine adjustment knob** Use this lens to sharpen an image under low and medium power. It is the only adjustment knob needed with the high-power lens.
- 4 Revolving nosepiece** This is where the objective lenses are mounted. Rotate the lens to select low-, medium-, or high-power lenses.
- 5 Objective lenses** There are three lenses that magnify the specimen: low-power (4x), medium-power (10x) and high-power (40x). Keep the lenses free of dirt and fingerprints.
- 6 Stage** This is where you place a slide for observation. Always keep the stage dry.
- 7 Stage clips** These are used to hold a slide in position on the stage.
- 8 Diaphragm** This has different-sized holes that let different amounts of light pass through the specimen on the stage.
- 9 Lamp** The lamp supplies the light that passes through the specimen on the stage. Microscopes that do not have a lamp may have a mirror to collect and direct light.
- 10 Arm** The arm holds the tube in place and is used to carry the microscope.
- 11 Base** This provides a stable platform for the microscope. Always set it on a flat, dry, uncluttered surface.
- 12 Tube** The tube separates the ocular lens from the objective lenses at a distance calculated for proper magnification.
- 13 Condenser lens** This lens is under the stage. It helps focus light onto the specimen on top of the stage.

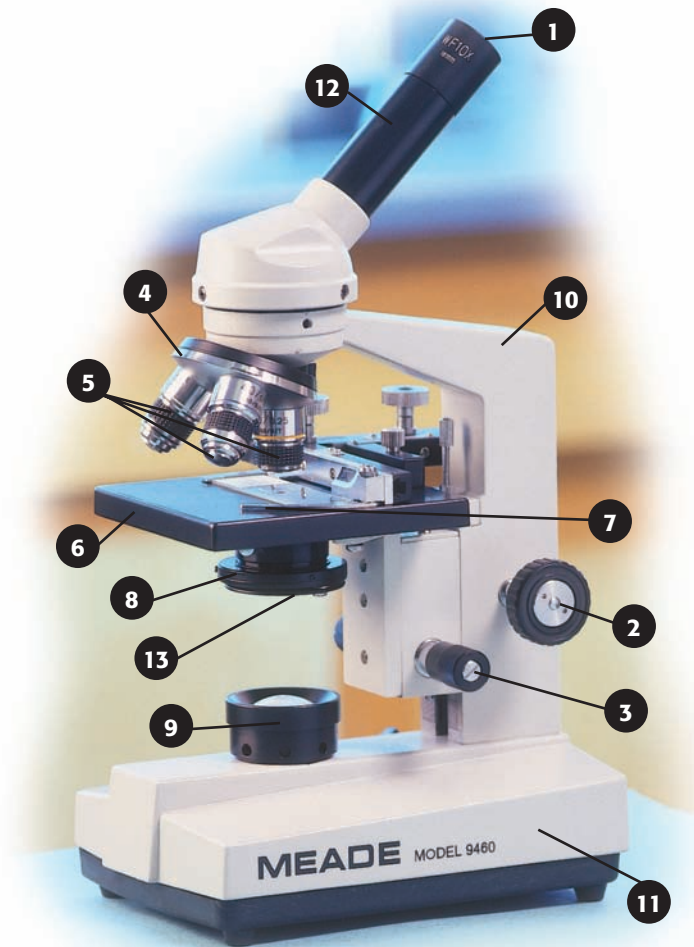


Figure 1.6 This compound light microscope is typical of the ones found in many science classrooms.

Care and Use of a Microscope

When used correctly, microscopes are powerful scientific tools. They are also expensive and delicate. Refer to Toolkit 9 before you follow the steps below to use them safely and effectively.

Purpose

To use a microscope correctly and follow safe laboratory procedures

Materials & Equipment

- compound light microscope
- lens paper
- prepared microscope slides

Procedure

1. Make sure you have a clear, clean, dry, flat work surface for the microscope. If the microscope has a plug, position the microscope so that it is close to the outlet.
2. Use two hands to carry the instrument — one hand on the base and the other on the arm.
3. Use lens paper to clean the lenses. *Never* touch the lenses with your fingers.
4. Rotate the revolving nosepiece until the low-power lens clicks into place.
5. View the microscope from the side. Turn the coarse adjustment knob until the low-power lens is about 1 cm from the stage. It will stop at the correct position. Do not force it.
6. Look through the ocular lens. Adjust the diaphragm until it is as bright as possible.
7. Place a prepared slide on the stage, and secure it with the stage clips. Check to make sure the object on the slide is centred over the hole in the stage.
8. Look through the ocular lens.
9. Slowly turn the coarse adjustment knob to bring the object into focus. The image should be very clear. If it is not, use the fine adjustment knob to make the image sharper.
10. Without adjusting the focus, rotate the revolving nosepiece until the medium-power lens clicks into place.
11. Use the fine adjustment knob to sharpen the image.
12. View an object and at the same time move the slide left, then right, then up, and then down. Describe what happens to the image.

Questions

13. Refer to Drawing Hints in Toolkit 9 to help you draw and label the images you see under the microscope. Draw sketches of two of the specimens you viewed. How are they the same? How are they different?



Figure 1.7 The coarse adjustment knob moves the stage up or down.



Figure 1.8 The fine adjustment knob brings the object into sharper focus.