

Experiment 2

AIM



To study the different parts of a compound microscope.

THEORY



A compound microscope uses a combination of simple lenses in the objective and the eye piece. It offers a much higher magnification of an object than the simple microscope.

MATERIALS REQUIRED



A compound microscope and permanent slides.

DESCRIPTION

The compound microscope (Fig. 2.1) consists of the following parts–

1. Base – It is the basal part that is bifurcated and supports the weight of the microscope. It is made of a metal.
2. Arm – It is curved and supports the body tube, knobs for coarse and fine adjustments, stage and mirror. It is used for holding the microscope. The arm is attached to the base by an inclination joint.
3. Body tube – It is a hollow tube attached to the upper end of the arm. It has the eye piece at the upper end and a circular, movable metallic ring called nose piece at the lower end. Objective lenses are screwed

into the grooves present beneath the nose piece. Usually two objective lenses of 10X (low power) and 40X (high power) magnification are provided.

4. Stage – It is a rectangular platform attached to the lower end of the arm. There is a hole at the centre of the stage which allows light from

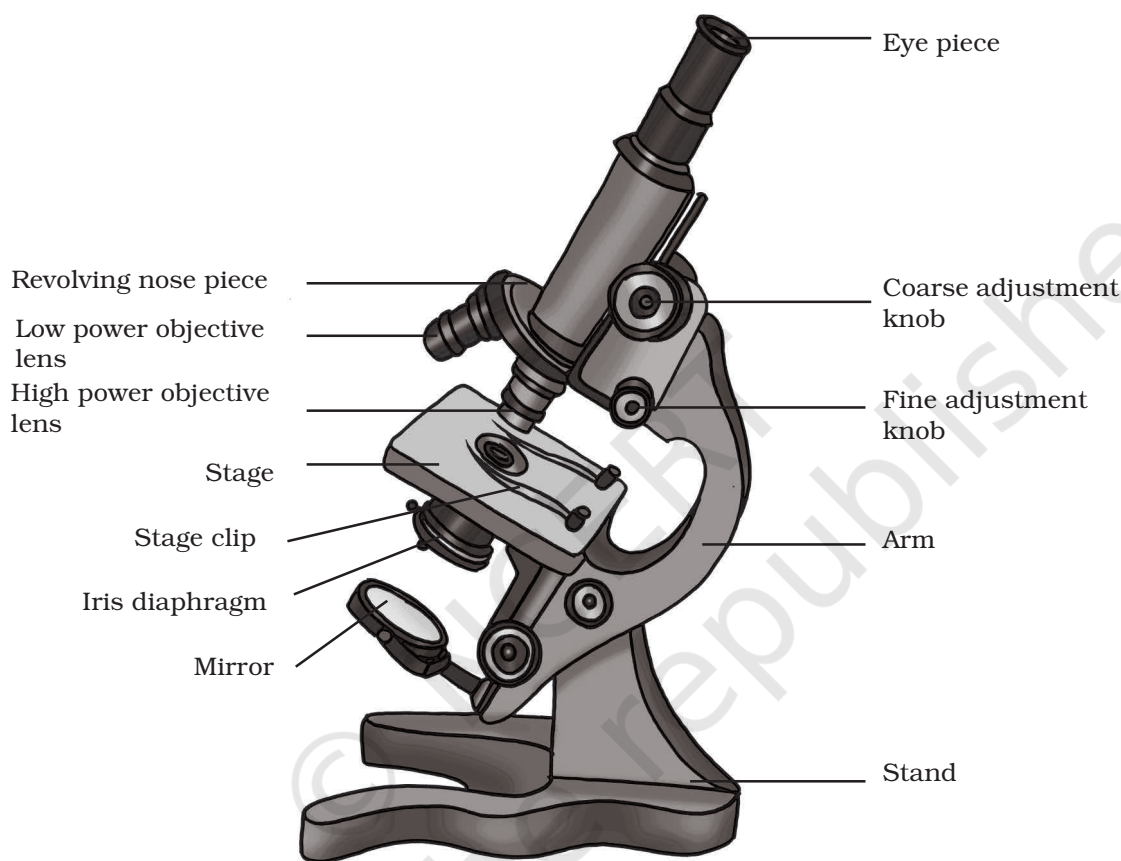


Fig. 2.1 : A compound microscope

the mirror to pass through it and to fall on mounted slide. A pair of clips is provided to hold the slide firmly on the stage.

5. Diaphragm – It is present below the stage and is used for adjusting the intensity of light.
6. Coarse adjustment knob – It is attached to the arm and it moves the body tube up and down for focusing the object.
7. Fine adjustment knob – It is attached to the arm and moves the body tube up and down very slowly. The fine adjustment is very essential for fine focusing of object, particularly in high power.
8. Mirror – A plano-concave adjustable mirror is fitted below the stage to reflect light onto the objective.

PROCEDURE



1. The microscope should be placed safely on the working table with the arm facing yourself.
2. Clean the eye piece, objectives, and the mirror with a soft and dry silk cloth.
3. Rotate the nose-piece slowly till it clicks in position to bring the low power objective in line with the body tube.
4. Adjust the diaphragm for allowing optimum light to pass on to the stage.
5. Observe through the eye piece. Tilt and turn the mirror towards the light source and adjust its position till the microscopic field appears bright.
6. Place the slide on the stage and move it so as to view the object on the slide.
7. Move the body tube with the help of coarse adjustment knob until the image of the object is seen. Sharpen the focus with the help of fine adjustment knob.
8. For viewing the object under high power turn the nose piece to high power objective after the object is focused under low power. Using the fine adjustment knob, focus the object.

PRECAUTIONS



- While carrying the microscope, hold its arm with one hand and support the base with the other [see Fig. 2.2(a)].
- Place the microscope with its arm facing yourself [see Fig. 2.2(b)].
- Do not tilt the microscope, keep it in upright position [see Fig. 2.2(c)].
- Do not use coarse adjustment when viewing through high power objective [see Fig. 2.2(d)]. The slide may break.
- Use a tissue paper (or clean silk or muslin cloth) for cleaning lenses and mirror [Fig. 2.2(e)].
- Place the microscope gently on the working table about 15 cm away from the edge of the table to prevent its accidental fall [Fig. 2.2(f)].
- Do not allow direct sun-rays to strike the mirror. Use plane mirror for natural day light and concave mirror for artificial light.
- After use, lower the body tube and keep the microscope in its box.

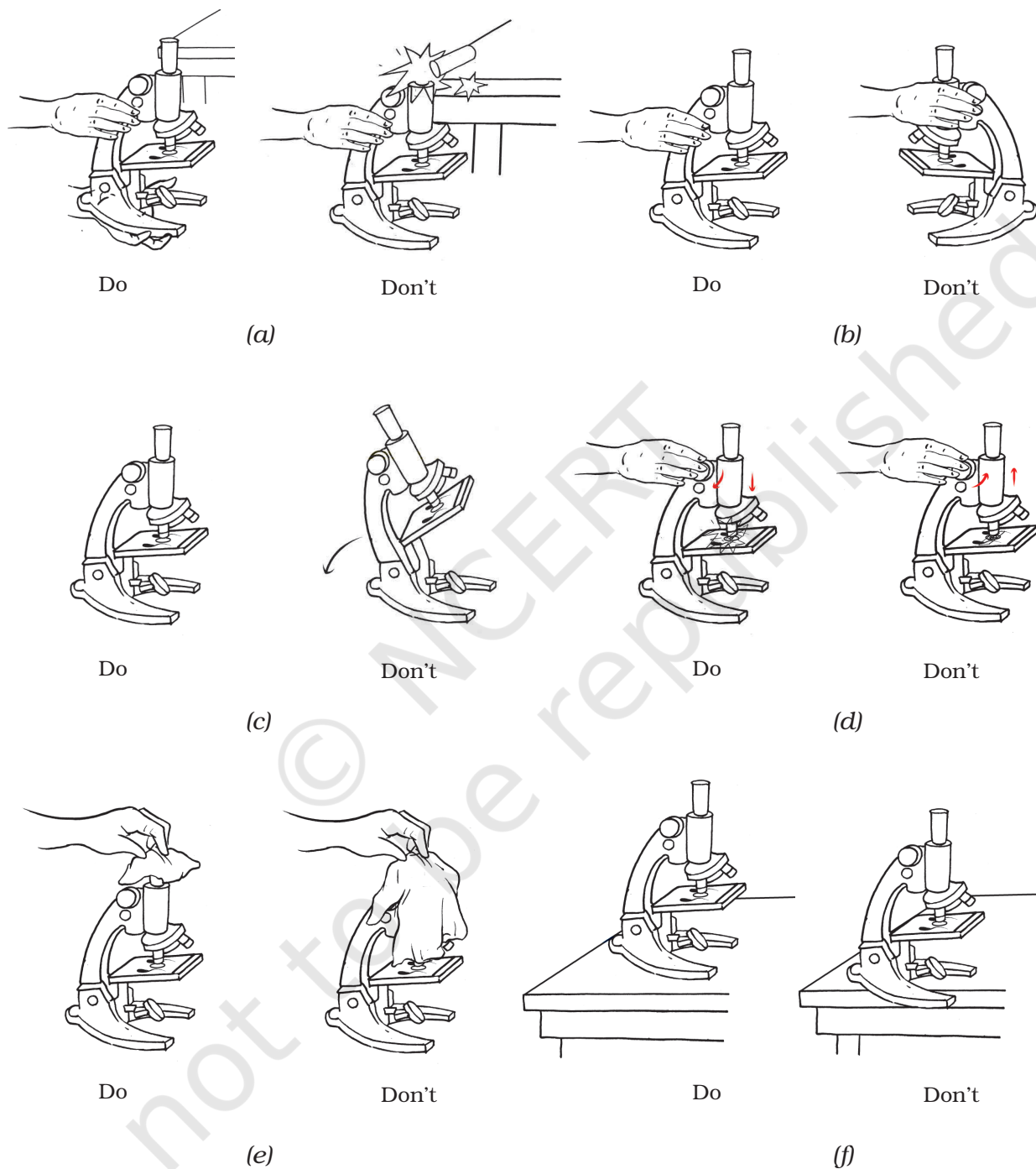


Fig. 2.2 : Handling of a compound microscope

NOTE FOR THE TEACHER

- It is important to acquaint the students with the precautions to be followed for handling a microscope before they proceed to use it.
- Magnification of lenses is often written on the surface of the objectives and eye pieces. It denotes the number of times the object is magnified. In a compound microscope, generally an eye piece is 10X or 15X and an objective is 10X and 40X or 45X. The magnification (M) of a compound microscope is the product of magnification of eye piece lens and that of objective lens. For example, the magnification of a compound microscope with 10X eye piece and 40X objective is 10×40 , that is 400.

QUESTIONS

- What will be the magnification of a microscope when 15X eye piece and 40X objective are used?
- Why is it suggested not to reflect the sunlight directly into the body tube of the microscope?
- What is the difference between a simple (dissecting) and compound microscope?
- What is the function of an adjustment knob in a microscope?
- Which of the following part supports the weight of microscope?
(a) arm (b) stage (c) body tube (d) base.
- Name the part of a microscope with which objective lenses are fitted?
(a) nose piece (b) diaphragm (c) stage (d) arm.
- What holds the slide firmly on the stage of a microscope?
(a) diaphragm (b) clips (c) nose piece (d) objective.
- Which of the following regulates the intensity of illumination in a compound microscope.
(a) diaphragm (b) body tube (c) stage (d) mirror.