UNIT I

Materials

Experiment 1

Aim

To study the different parts of a simple (dissecting) microscope.

Theory

The human eye cannot distinguish objects smaller than 0.1 mm. Hence, we cannot observe cells, tissues, and minute organisms through naked eyes. Before the invention of microscope, biologists used lenses that could magnify minute objects only up to some extent. Subsequently scientists started using combination of lenses that led to the invention of microscope. Microscopes are instruments designed to produce magnified visuals of smaller objects.

The simple microscope, also known as dissecting microscope, has a single lens system through which the image of an object is seen. The simple microscope is infact a magnifying lens mounted on a metallic frame in such a way that lens can be mechanically moved up and down or sideways to get a magnified view of the object under observation. Its principle is not different from an ordinary lens used by a watch repairer.

Materials Required

A simple (dissecting) microscope, permanent slides of plant (or animal) materials, parts of plants (or small insects), a slide, forceps, and a needle.

DESCRIPTION

A simple (dissecting) microscope (Fig. 1.1) consists of the following parts.

1. Base – It is the basal part that is bifurcated and supports the weight of the microscope. It is generally horse-shoe shaped and is made of metal.
2. Stand – It is a short, hollow cylindrical rod fixed to the base. Another small cylindrical rod called vertical limb fits into the stand, at the other end. The vertical limb can be moved up and down, with the help of an adjustment knob attached to the upper end of the stand.

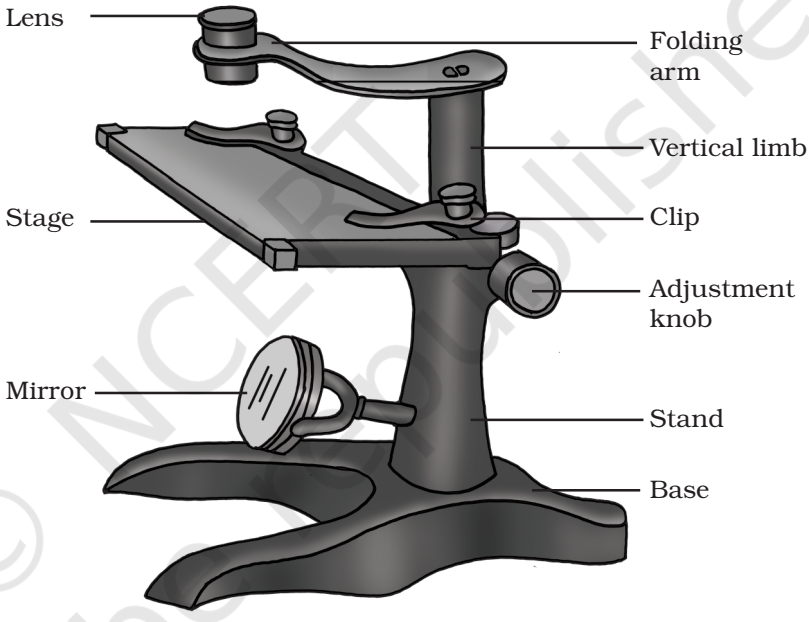

Fig. 1.1 : *A simple (dissecting) microscope*

3. Folding arm – To the upper end of vertical limb, a flat horizontal folding arm is attached. This can move sideways.
4. Stage – It is a rectangular glass plate fitted with a pair of clips on its upper surface. The clips are used to hold the object or slide on the stage.
5. Mirror – A movable plano-concave mirror is attached to the stand below the stage for reflecting light onto the stage.
6. Lens – A simple convex lens (known as eye piece) is mounted on the folded arm. The magnification of a dissecting microscope depends on the magnification of the lens which is normally 5X, 10X or 20X. ('X' denotes the number of times a lens magnifies an object).

Procedure

1. Clean the stage, lens and mirror with a soft and dry cloth or with a tissue paper.
2. Place a permanent slide or a slide with an object mounted on it on the stage.
3. Adjust the mirror to get maximum (reflected) light on to the object.
4. Align the microscope lens over the object under observation.
5. Rotate the adjustment knob to bring the object to clear focus.

Precautions

- Keep the microscope in its box after use.
- Clean the lens and mirror with a lens cleaning solution. Always wipe the lens and mirror with a piece of silk cloth.
- Always carry the microscope in an upright position. Use both your hands to hold it.
- Clean the stage properly before placing the slide.
- Take care to prevent the microscope lens coming in contact with the slide or an object.

Note for the Teacher

- A dissecting microscope is used to observe whole mounts of small organisms, parts of plants or animals and for dissecting small organisms.
- It is important to acquaint the students with the precautions to be adhered to while handling a microscope before they proceed for using it.
- It is advised to mount a suitable material on a slide and demonstrate to students.

Questions

- What is the magnification of the simple microscope you have used?
- Why is a simple microscope also called a dissecting microscope?
- Which type of mirror is fitted in the simple microscope? What is its function?