MICROSCOPE

Definition:

Microscopes are instruments that are used in science laboratories to visualize very minute objects such as cells, and microorganisms, giving a contrasting image that is magnified. Microscopes are made up of lenses for magnification, each with its own magnification powers. Depending on the type of lens, it will magnify the specimen according to its focal strength.

Structural Parts:

There are three structural parts of the microscope i.e. head, base, and arm.

1. **Head** – This is also known as the body. It carries the optical parts in the upper part of the microscope.
2. **Base** – It acts as microscopes support. It also carries microscopic illuminators.
3. **Arms** – This is the part connecting the base and to the head and the eyepiece tube to the base of the microscope. It gives support to the head of the microscope and it is also used when carrying the microscope. Some high-quality microscopes have an articulated arm with more than one joint allowing more movement of the microscopic head for better viewing.

**Optical parts of a microscope and their functions**

The optical parts of the [microscope](https://thebiologynotes.com/microscope/) are used to view, magnify, and produce an image from a specimen placed on a slide. These parts include:

1. **Eyepiece** – also known as the ocular. This is the part used to look through the microscope. Its found at the top of the microscope. Its standard magnification is 10x with an optional eyepiece having magnifications from 5X to 30X.
2. **Eyepiece tube** – it’s the eyepiece holder. It carries the eyepiece just above the objective lens. In some microscopes such as the binoculars, the eyepiece tube is flexible and can be rotated for maximum visualization, for variance in distance. For monocular microscopes, they are none flexible.
3. **Objective lenses** – These are the major lenses used for specimen visualization. They have a magnification power of 40x-100X. There are about 1- 4 objective lenses placed on one microscope, in that some are rare facing and others face forward.  Each lens has its own magnification power.
4. **Nose piece** – also known as the revolving turret. It holds the objective lenses. It is movable hence it cal revolve the objective lenses depending on the magnification power of the lens.
5. **The Adjustment knobs** – These are knobs that are used to focus the microscope. There are two types of adjustment knobs i.e fine adjustment knobs and coarse adjustment knobs.
6. **Stage** – This is the section in which the specimen is placed for viewing. They have stage clips that hold the specimen slides in place. The most common stage is the mechanical stage, which allows the control of the slides by moving the slides using the mechanical knobs on the stage instead of moving them manually.
7. Aperture – This is a hole on the microscope stage, through which the transmitted light from the source reaches the stage.
8. Microscopic illuminator – This is the microscopes light source, located at the base. It is used instead of a mirror. It captures light from an external source of a low voltage of about 100v.
9. **Condenser** – These are lenses that are used to collect and focus light from the illuminator into the specimen. They are found under the stage next to the diaphragm of the microscope. They play a major role in ensuring clear sharp images are produced with a high magnification of 400X and above. The higher the magnification of the condenser, the more the image clarity. More sophisticated microscopes come with an Abbe condenser that has a high magnification of about 1000X.
10. **Diaphragm** – it’s also known as the iris. Its found under the stage of the microscope and its primary role is to control the amount of light that reaches the specimen. It’s an adjustable apparatus, hence controlling the light intensity and the size of the beam of light that gets to the specimen. For high-quality microscopes, the diaphragm comes attached with an Abbe condenser and combined they are able to control the light focus and light intensity that reaches the specimen.
11. Condenser focus knob – this is a knob that moves the condenser up or down thus controlling the focus of light on the specimen.
12. Abbe Condenser – this is a condenser specially designed for high-quality microscopes, which makes the condenser to be movable and allows very high magnification of above 400X. High-quality microscopes normally have a high numerical aperture than objective lenses.
13. The rack stop – It controls how far the stages should go preventing the objective lens from getting too close to the specimen slide which may damage the specimen. It is responsible for preventing the specimen slide from coming too far up and hitting the objective lens.

INSTRUCTION:

**1.Place the microscope on a clean, flat surface.** Clear your surface of any debris that could potentially harm your microscope. Clean the area with a surface cleaner and lint-free rag, if necessary. Make sure the table is located near an electrical outlet.

* Carry the microscope below the base and on the arm. Never pick it up solely by the arm.
* Place the microscope on the table and plug it in.

2. **Prepare microscope slides.**

In order to prepare microscope slides, obtain a specimen you’d like to look at in more detail. Pond water or pollen are great samples to start with.

* Drop a small drop of the water or place a few spores of the pollen directly onto the slide.
* Place a cover slip at a 45-degree angle to the slide and gently let it fall on top of the slide. The water should hold the coverslip in place.[[5]](https://www.wikihow.com/Use-a-Microscope#_note-5)
* To preserve samples for longer, add a bit of clear nail polish around the edges of the slide to secure the coverslip in place.

**3.Place the slide on the stage of the microscope.**

* **Secure the slide in place with the 2 stage clips.**
* **Turn on your microscope.**

**4.In order to focus your microscope,**

* **Adjust your eyepiece, if you have a binocular set.**
* **Adjust the diaphragm to its widest opening.**
* **Start focusing on the lowest power objective.**
* **Move the slide to center it on the stage, if necessary.**[[](https://www.wikihow.com/Use-a-Microscope#_note-9)
* **Focus the slide using the adjustment knobs and diaphragm.**
* **Magnify the image with a higher objective.**