



MICROSCOPES

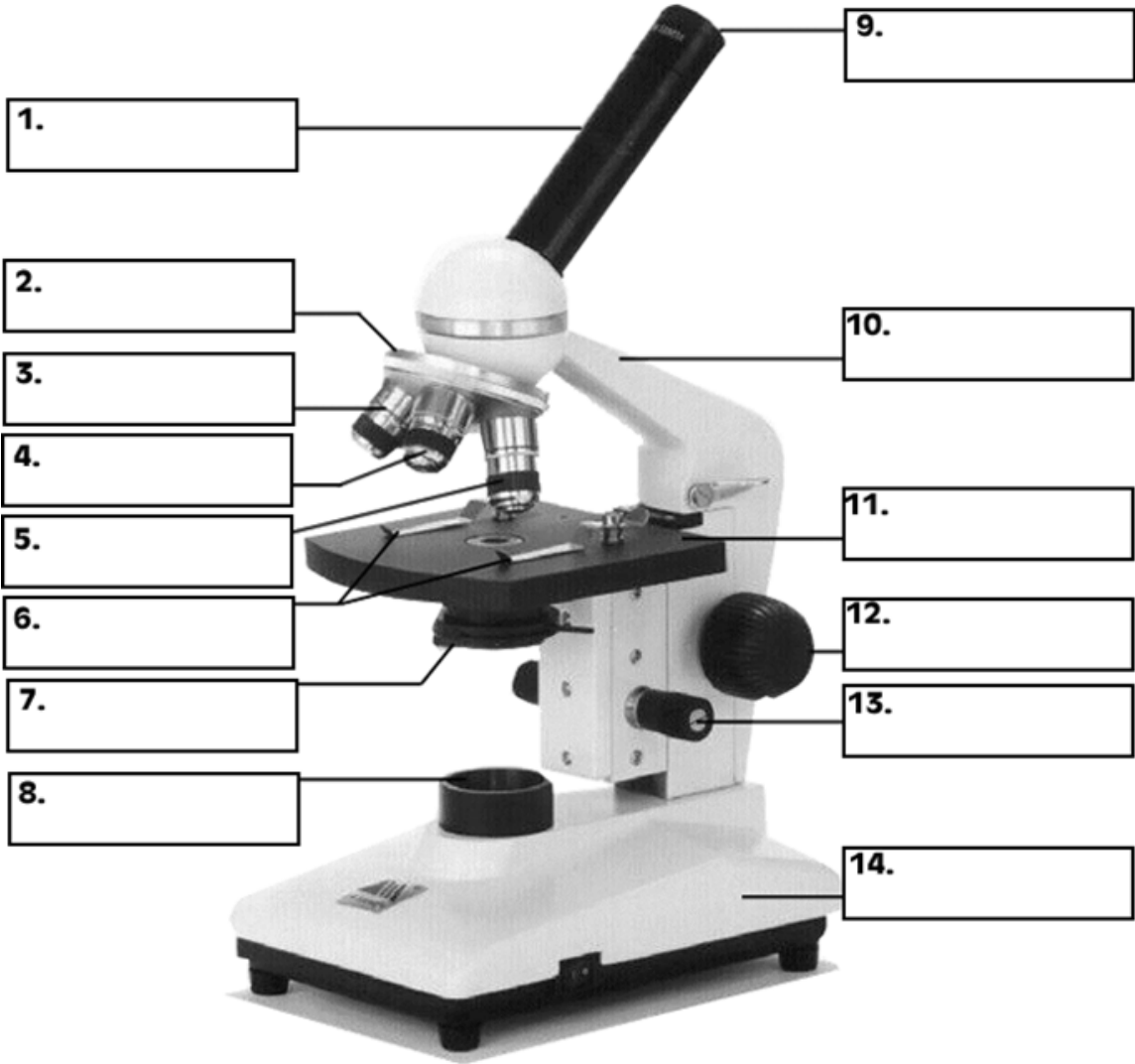
ELECTRON MICROSCOPES

- Scanning Electron Microscope
 - Scans a specimen with a beam of primary electrons that knock electrons from its surface. These secondary electrons are picked up by a collector, amplified, and transmitted onto a viewing screen or photographic plate, producing an excellent 3-D image of the outside surface only.
 - Can obtain clear images of organisms as small as bacteria and viruses.
- Transmission Electron Microscope
 - Used to view extremely thin sections of material (ex. 30 thousandths of a millimeter thick).
 - Electrons are passed through the specimen and are scattered, and the image is then focused on a photographic plate by magnetic lenses.
 - It can magnify several hundred thousand times.

OPTICAL MICROSCOPES

- Dissecting microscope
 - A type of binocular microscope used for observations at a low total magnification (40x to 50x).
 - A 3-D view of the specimen is produced.
- Compound Light Microscope
 - Uses a combination of lenses (two or more) to magnify objects up to several hundred times.
 - The specimens viewed must be thin and mostly transparent, otherwise little or no detail will be visible as the light is focused up through the condenser and specimen.

Microscopes



BIOLOGICAL DRAWINGS

- When examining a specimen through a microscope, it is useful to make a drawing of *what was actually seen*. This will depend on the *resolution* of the microscope being used.
 - **Resolution** - the ability of a microscope to separate small objects that are very close together.
- There are certain considerations that will lead to an effective drawing:
 - Drawing materials - use a sharp pencil
 - Positioning - the drawing should occupy the upper left quarter of the page.
 - Size - it should be a quarter of a page.
 - Accuracy - it should be a complete, accurate representation of the material being observed, not an "idealized" drawing. Make sure the proportions are correct and that two ends of a line meet if, according to your specimen, they are supposed to.
 - Technique - use only simple narrow lines. Represent depth by stippling and do not use shading.
 - Labels - All parts of your diagram must be labeled accurately and include the following:
 - A title at the bottom of the page that identifies the organism and the total magnification.
 - The calculation of the drawing magnification.
 - Labeling lines that are drawn with a ruler and are not cross.
- Remember - draw what you see, not what you think you see!