

### 1. Introduction:

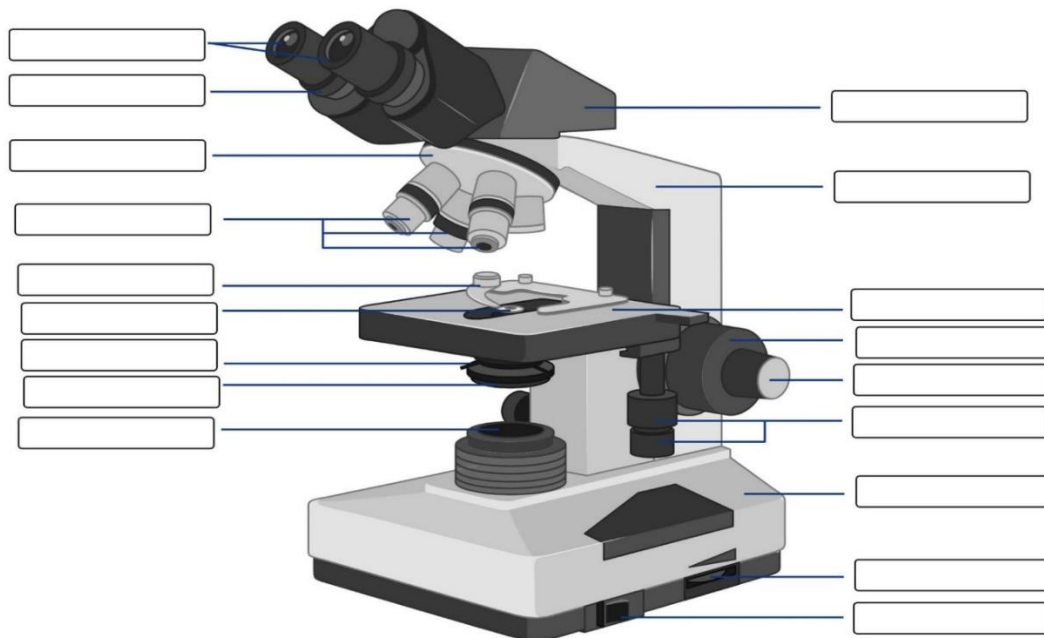
- Before microscope, no one knew about microbial world.
- Leeuwenhoek perfected lenses and the first to see living cells.
- Hooke: coined the term cell while viewing cork.
- Schleiden: a German Botanist, determined that all plants and their parts (roots, stems, leaves, etc) are composed of cells– plant cell drawing.
- Schwann: a German zoologist, determined that all animals and their parts are composed of cells.

### 2. Classification of Microscopes:

1. Light microscopes.

2. Electron microscopes.

#### Microscope Parts Worksheet



### 3. Microscopes Parts and Functions:

#### 1. Ocular lenses (eyepiece):

part you look through. It contains lenses that contribute to total magnification with a power of 10x (magnifies 10 times).

**2. Diopter adjustment:** changes focus on one eyepiece so as to correct for any difference in vision between your two eyes.

**3. Nosepiece:** holds objectives.

**4. Objective lenses:** contain lenses that contribute to total magnification. They come with various powers of magnification: 4x, 10X, 40X and oil immersion lens 100x.

- **Magnification formula: calculate total magnification**

- **Total mag. = ocular power X objective power**

- **Total Magnification**

<u>Ocular</u>	<u>Objective</u>	
---------------	------------------	--

- 10x      red 4      = 40x

- 10x      yellow 10      = 100x

- 10x      blue 40      = 400x

- 10x      white 100      =1000

- only use lens paper to clean objective lenses.

**5. Head:** it carries the optical parts in the upper part of the microscope.

**6. Arm:** supports head and connects it to the base.

**7. Base:** supports entire microscope and contains the illuminator (when carrying, keep hand back on base because lamp will be hot!)

**8. Stage:** tray-like structure that supports specimen/slide over stage opening.

**9. Stage Clips:** keep specimen/slide tight against stage.

**10. Aperture (Stage Opening):** allows light to pass through/around specimen

**11. Diaphragm:** a rotating disk under the stage. It controls the amount of light that is projected upward into the slide and reaches your eye.

**12. Light source (illuminator):** provides light to create the image that you see.

**13. Coarse adjustment:** larger knob, used to focus the microscope. It is **always used first**, and it is used only with the **low power objective** because it moves fast.

**14. Fine Adjustment:** smaller knob, moves the **high- $\rightarrow$  power objective** slightly to bring the specimen into better focus.

#### **4. Characteristics of Light Microscopes:**

- Smaller/portable and sometimes Chargeable.
- Cost less than electron Microscopes. We can get more than one microscope for every lab and they are easily provided by manufacturers.
- Training: simple and easy specimen prep. (live specimens can be used) and examined with them. They also help us see microscopic items.

## Homework:

- **Q.1** What are the characteristics of electron Microscope? (you can use the previous ones to compare with, or you can just search the internet).
- **Q.2** Using the microscope, how would you examine a transparent specimen? (without using dyes).