## **Observing Cells: Microscopes**



- <u>Magnification</u>: refers to the microscope's power to increase an object's apparent size.
- <u>Resolution</u>: refers to the microscope's power to show detail clearly.

## **Observing Cells: Light Microscope**

- Invented around 1590-1600, name "microscope" given in 1625.
- Uses visible light and a system of lenses.
- Magnification of up to ~2000X.
- Resolution ~200-500 nm (limited by diffraction of visible light).
- Makes it possible to observe living cells in true color.









## **Observing Cells: Electron Microscope**

- Uses accelerated electrons as a source of illumination together with electrostatic and electromagnetic lenses to control the electron beam and focus it to form an image.
- 2D or 3D black and white images (may be colorized) with magnification of up to ~10,000,000X
- Preparation needed (for example, chemical fixation or freeze drying) kills the cells.





Invented ~1930; first commercial device produced by Siemens in 1939.

