Vision

For an object to be seen, light emitted by or scattered from it must be detected by the eye. The structures of the eye relate to their functions.

You see the world by reflected light.

- Light rays in a room, for example, reflect off a page in your textbook and into your eyes.

The reflected light carries information that allows your brain to form an image of the page.

- If you were in a room with no light, you would not be able to see a page because it does not give off its own light.

The eye is the sensory organ used for vision.

- The structures of the human eye are similar to the eyes of other mammals.

To see, light passes through the cornea and enters the eye through the pupil.

- The cornea is the transparent front part of the eye that covers the iris and pupil.

The pupil is an opening created by the iris, the pigmented part of the eye.
A ring of muscles causes the iris to open or close to change the size of the pupil.

- When there is a lot of light, the iris closes and pupil gets smaller.
- When the light is dim, the iris opens up and the pupil gets larger.

The light then passes through the lens and is refracted to a focal point on the retina.

The retina contains light-sensitive cells called photoreceptors.

- Photoreceptors convert light into nerve impulses that travel through the optic nerve to the visual cortex of the brain.

The visual cortex interprets the light as an image.

An image is a picture of an object formed where light rays meet.

- Recall that a convex lens refracts light rays to a focal point.
- The lens in your eye refracts light rays to a focal point on the retina called the fovea.

Since the lens in your eye is a single lens, the image formed on the retina is actually upside down!

- Don’t worry - Your brain interprets the image as right-side up so you don’t notice.
You are able to focus on near and distant objects because the lens in your eye is flexible.

Small muscles around the edge cause the lens to stretch and change its shape.

- When the lens changes its shape, so does the focal length.
- The cornea works with the lens to refract light and helps the eye to focus.
- But unlike the lens, the curvature of the cornea is fixed.

People who are nearsighted see nearby objects better than distant ones; and those that are farsighted see distant object better than nearby ones.

Nearsightedness is common, affecting one in four people, and most often developing during school age and adolescence.

Many people become farsighted later in life.

Light Ray Eye Diagram
How is the eye like a camera?

- The eye is equipped with a lens that brings an image into focus on a sheet of light-sensitive cells called the retina, which is equivalent in a camera to film or a video chip.
- The amount of light entering the eye is controlled by the iris, which is an adjustable circular aperture.
  - In bright lighting, the iris contracts and the pupil becomes smaller in diameter to admit less light.
  - In dim lighting the iris relaxes and the pupil becomes larger to admit more light.