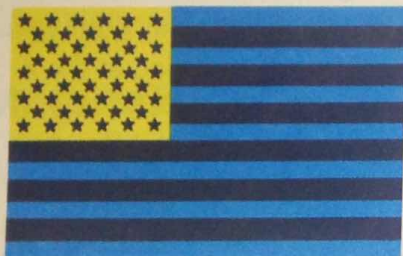


True Colors

When you stare too long at a color, the cones in your eyes get tired.

1. Stare at the bottom right star of the flag for at least 60 seconds. Do not move your eyes or blink during that time.



2. Now stare at a sheet of blank white paper.

Observing What do you see when you look at the white paper? How are the colors you see related to the colors in the original flag?

The Human Eye

Your eyes allow you to sense light. The eye is a complex structure with many parts, as you can see in Figure 20. Each part plays a role in vision. **You see objects when a process occurs that involves both your eyes and your brain.**

Light Enters the Eye Light enters the eye through the transparent front surface called the **cornea** (KAWR nee uh). The cornea protects the eye. It also acts as a lens to help focus light rays.

After passing through the cornea, light enters the pupil, the part of the eye that looks black. The **pupil** is an opening through which light enters the inside of the eye. In dim light, the pupil becomes larger to allow in more light. In bright light, the pupil becomes smaller to allow in less light. The **iris** is a ring of muscle that contracts and expands to change the size of the pupil. The iris gives the eye its color. In most people the iris is brown; in others it is blue, green, or hazel.

An Image Forms After entering the pupil, the light passes through the lens. The lens is a convex lens that refracts light to form an image on the lining of your eyeball. Muscles, called ciliary muscles, hold the lens in place behind the pupil. When you focus on a distant object, the ciliary muscles relax, and the lens becomes longer and thinner. When you focus on a nearby object, the muscles contract, and the lens becomes shorter and fatter.

When the cornea and the lens refract light, an upside-down image is formed on the **retina**. The **retina** is a layer of cells that lines the inside of the eyeball. (Cells are the tiny structures that make up living things.)

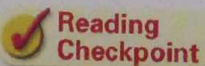
The retina is made up of tiny, light-sensitive cells called rods and cones. **Rods** are cells that contain a pigment that responds to small amounts of light. The rods allow you to see in dim light. **Cones** are cells that respond to color. They may detect red light, green light, or blue light. Cones respond best in bright light. Both rods and cones help change images on the retina into signals that then travel to the brain.

A Signal Goes to the Brain The rods and cones send signals to the brain along a short, thick nerve called the **optic nerve**. The optic nerve begins at the blind spot, an area of the retina so called because it has no rods or cones. Your brain interprets the signals as an upright image. It also combines the images from each of your eyes into a single three-dimensional image.

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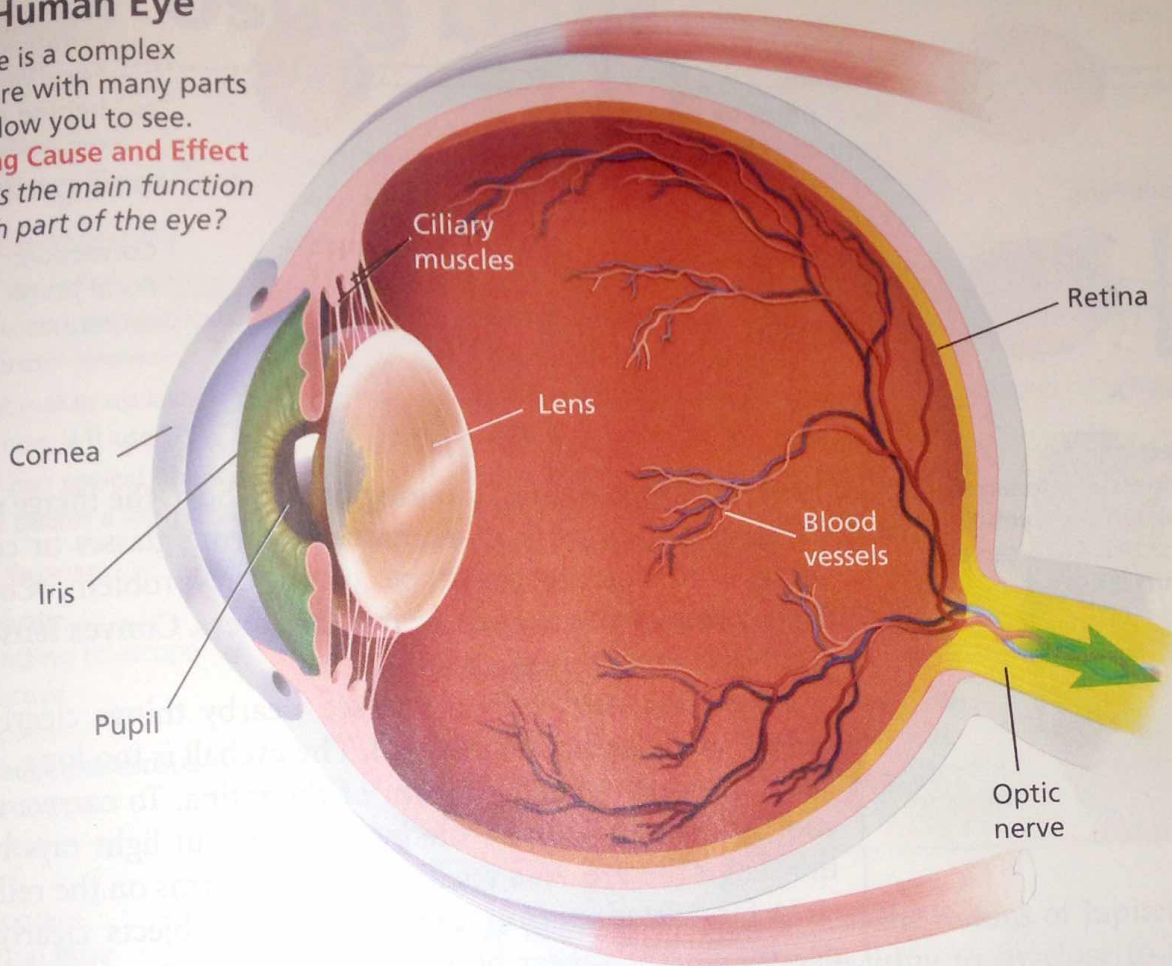


Reading
Checkpoint

Where does an image form in the eye?

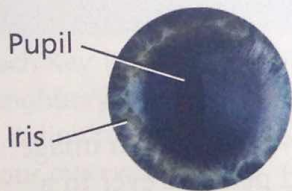
FIGURE 20
The Human Eye

The eye is a complex structure with many parts that allow you to see.
Relating Cause and Effect
 What is the main function of each part of the eye?



Pupil and Iris

The iris controls the size of the pupil, which determines how much light enters the eye.



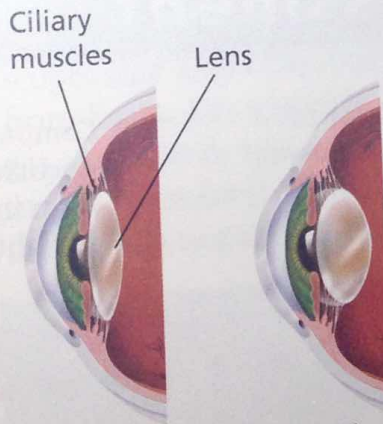
Dim Light The iris contracts, making the pupil large.



Bright Light The iris expands, making the pupil small.

Lens and Ciliary Muscles

The ciliary muscles change the shape of the lens.



Seeing Far Away The ciliary muscles relax, making the lens thin.

Seeing Close Up The ciliary muscles contract, making the lens thick.

Retina

The retina has two kinds of cells that detect light. The rods respond to dim light. The cones respond to red, green, and blue light.

