

## Chapter 20

Use with Text Pages 564–567

## STUDY GUIDE

## ● The Optics of Lenses

Use the terms in the list below to fill in the blanks in the paragraphs about lenses.

concave      longer      larger      curved      convex      length      clearly  
 object      thick      shape      lens      retina      less  
 refracting      inverted      muscles      virtual      cornea      astigmatism

Lenses are made of transparent material and have a \_\_\_\_\_ surface. A convex lens has thin edges and a \_\_\_\_\_ middle. Another type of lens is thicker at the edge than the middle and is called a \_\_\_\_\_ lens. All lenses work by \_\_\_\_\_ light. Parallel rays of light are refracted toward each other and brought to a focal point in a \_\_\_\_\_ lens. Light is refracted both when it enters and leaves a \_\_\_\_\_. The amount of refraction depends on the change of the speed of light as it passes through a material and on the \_\_\_\_\_ of the lens. In a convex lens, the type of image formed depends on the position of the \_\_\_\_\_ and the focal length of the lens. When the object is more than twice the focal length from the lens, the real image is smaller than the object and \_\_\_\_\_. If the object is between one and two focal lengths, the image is \_\_\_\_\_ than the object and inverted. When the object is between the lens and the focal point, the image is larger and upright but is a \_\_\_\_\_ image. Concave lenses are not able to produce real images and are used with convex lenses to create a \_\_\_\_\_ focal length.

The light we see enters our eyes through the transparent covering of the eye called the \_\_\_\_\_. The light then passes through the pupil and converges on the back part of the eye called the \_\_\_\_\_. Images are properly focused on the retina by the convex lens in the eye, which is controlled by eye \_\_\_\_\_. To focus images of distant objects, a longer focal \_\_\_\_\_ is needed. To do this, the muscles relax, allowing the lens to be \_\_\_\_\_ convex. People are farsighted when they can see things far away \_\_\_\_\_ but have fuzzy vision at close range. To correct this problem, a \_\_\_\_\_ lens is used. A \_\_\_\_\_ lens is used to correct the vision of a nearsighted person. An eye problem caused by an unevenly curved cornea is \_\_\_\_\_.