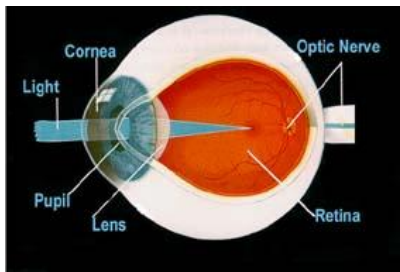
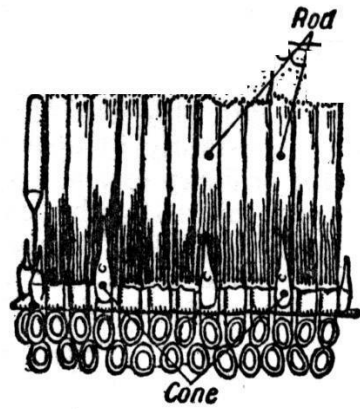


Name _____



Your Eyes

by Cindy Grigg



Answer the following questions **BEFORE** you read this book. It is okay if you do not know as much as you thought. Do the best you can!

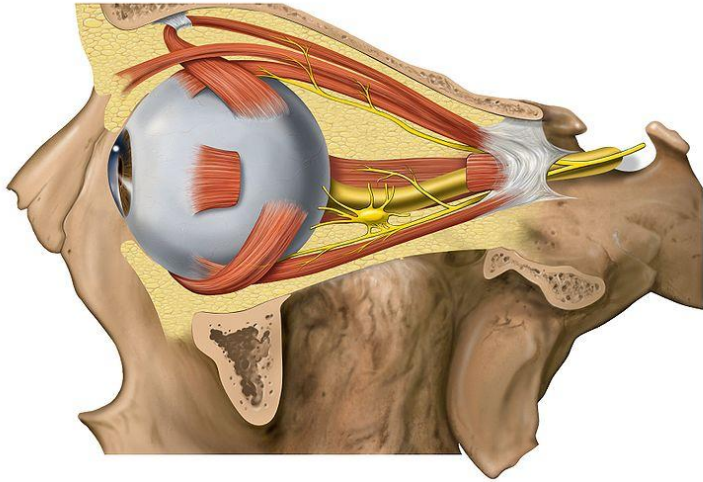
1. List as many different parts of the eye that you can.

2. What information do your eyes give you? Color? Distance? What else?

3. Which other body systems work with your eyes to help you see?



How do our eyes work? Sight is a very intricate process. Our eyes take in light, focus it, and make images in much the same way as a camera does. The process begins when light rays reflect off an object and enter the eyes through the cornea. The light is converted to a stream of billions of nerve signals that are sent to the brain by the optic nerve. Then the brain analyzes the signals and tells us what we see.



The sclera is the white, tough outer covering of the eyeball - the "white" of the eye. The pupil is the black circle in the center of the eye. It is actually a hole that lets light into the eye.

Around the pupil is the iris, the colored part of the eye. The color of the iris is determined by the amount of melanin present, just as skin color is. This is an inherited trait. Brown eyes have the most melanin, and blue eyes have the least.

People often have the same eye color. But the patterns of the pigment in irises are as individual as fingerprints. Some security systems are based on recognizing iris patterns. In this photo, an iris scanner is being used by a U.S. Marine to identify a member of the Baghdad, Iraq, city council before a meeting.

Only a small part of our eyes can be seen. The rest lie inside the eye sockets, or orbits, of the bony skull where they are cushioned by fatty tissue. Six muscles control the movement of each eyeball in the sockets. These muscles make extremely precise movements that let the eye follow objects as they move.

Photo credit: Patrick J. Lynch, medical illustrator; C. Carl Jaffe, MD, cardiologist.



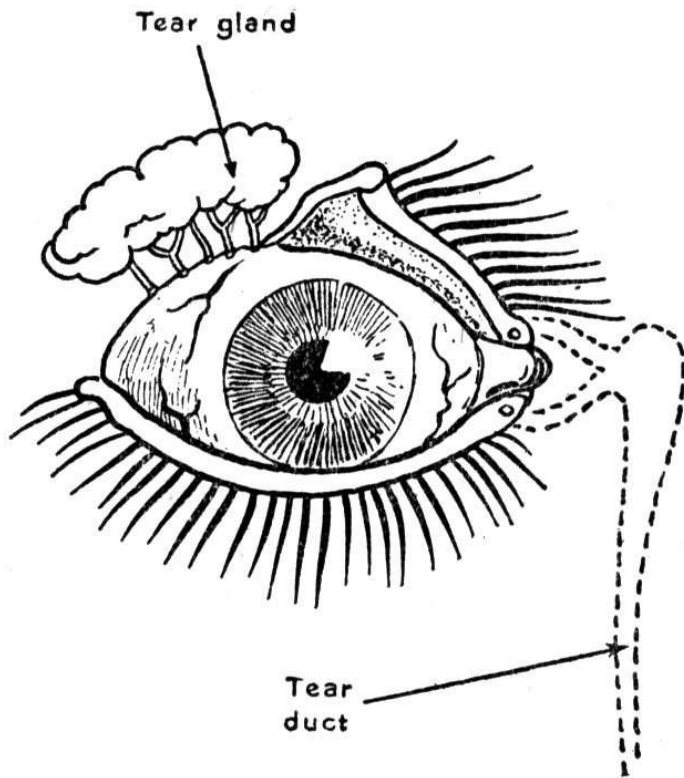
Light enters the eye through the transparent domed covering called the cornea. The cornea helps to focus light, and it moves on through the pupil opening.

Our eyes have to adjust to a huge range of light. In bright light, the muscles in the iris contract. This causes the pupil to become smaller. It limits the amount of light entering the eye.



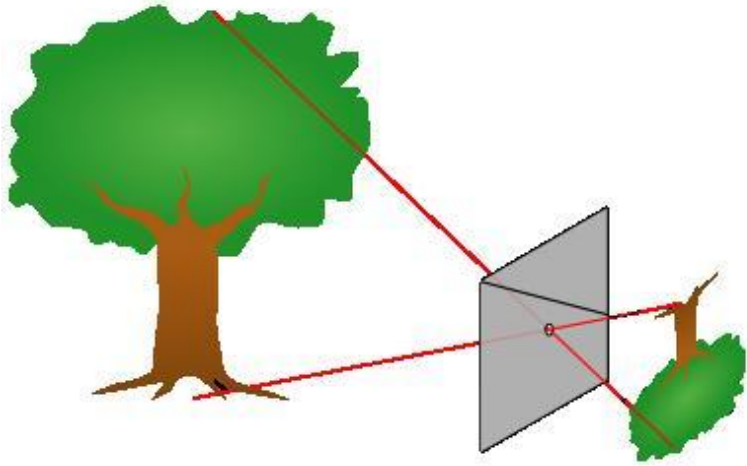
In dim light, muscles in the iris cause the pupil to dilate, or grow bigger. Pupils adjust to different light conditions quickly - it takes only about one-fifth of a second.

Blinking is a reflex action. If something moves quickly toward the eye, the eyelid closes to protect it.

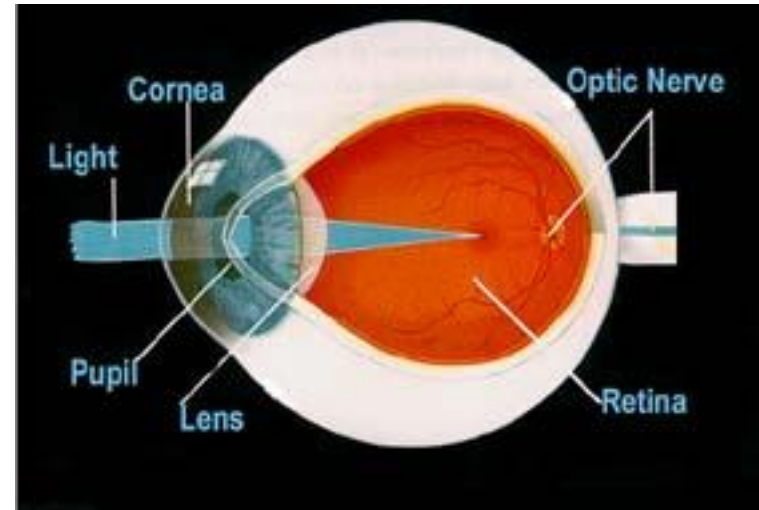


The eyebrows, eyelashes, and eyelids all help protect the eye from too much light and from dust and debris. The front of the eye is kept moist by tears, which are located under the eyelid. Tears wash away specks of dust and help prevent infection. Tears drain away through the openings in the corner of the eye into the nasal cavity.

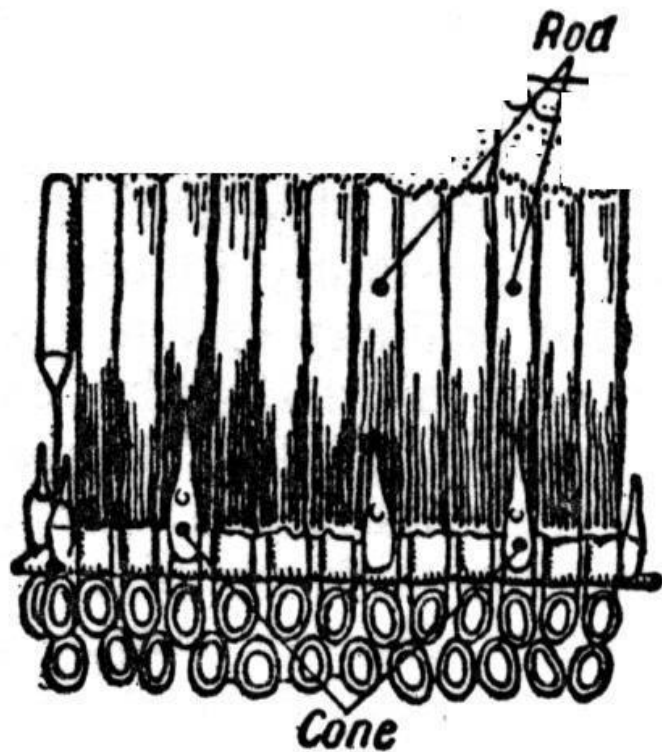
Tears are washed across the eye by blinking.



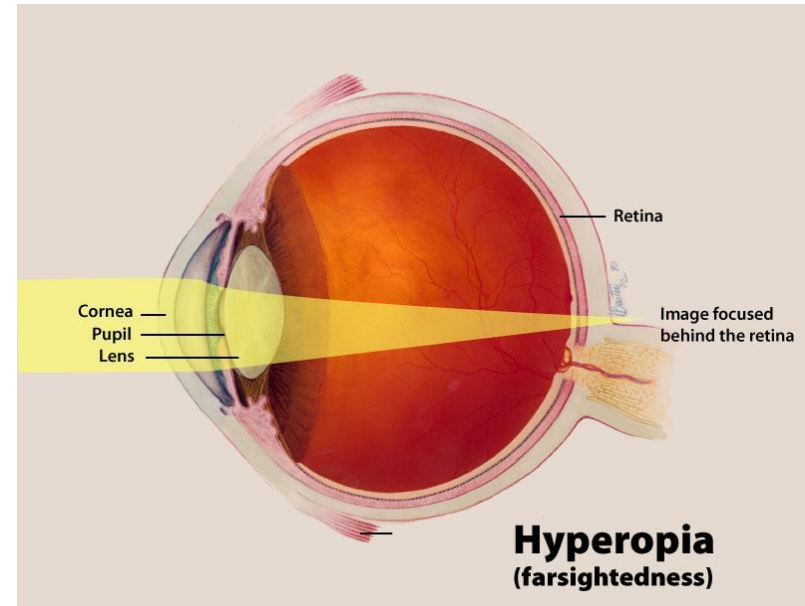
The lens focuses light onto the retina. Unlike a camera's lens, the lens of the eye is flexible. It focuses by changing its shape. These changes are controlled by a ring of muscle fibers. The changes take only a split second. The image focused on the retina is inverted, or upside-down.



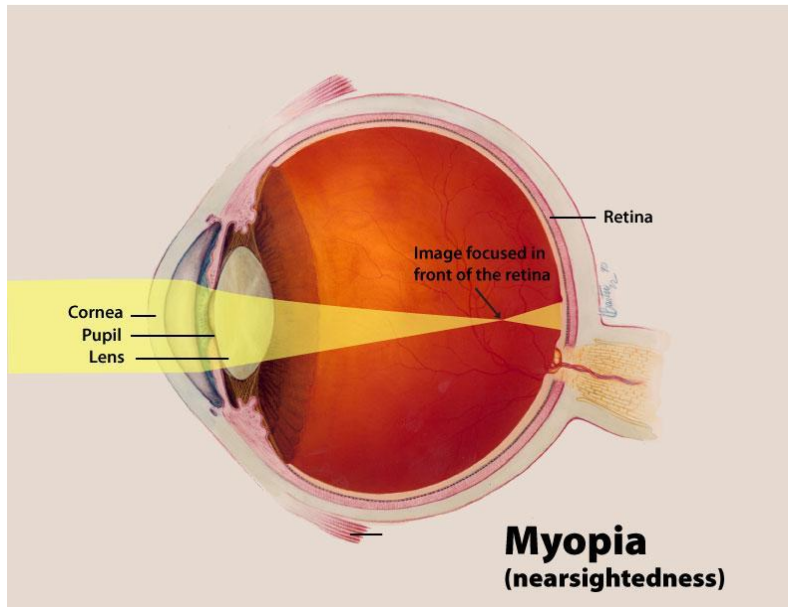
The retina covers most of the back part of the eyeball. The retina has about 125 million photoreceptors, or light-sensing cells. These cells in the retina turn light rays into nerve signals. The optic nerve carries the nerve signals to the brain.



Rods and cones are two kinds of light-sensing cells in the retina. Rods help us see in the dark and help us sense the shape of things we see. Cones add color to our vision. Cones need light to work. That is why you cannot see colors in the dark.



In some people's eyes, images do not focus at just the right spot. One vision problem is hyperopia, or farsightedness. Objects close up look blurry. The image is focused behind the retina. Eyeglasses correct the problem by adjusting the eyes' focal points with convex lenses.



With myopia, or nearsightedness, far away objects look blurry. The image is focused in front of the retina. Eyeglasses with concave lenses are used to adjust the eyes' focal points.



In a fraction of a second, our eyes tell us many things about what we see. They tell us what an object is and about how far away it is. They tell us whether it is standing still or moving toward us. Our sense of sight tells us about the color, texture, size, and shape of millions of objects every day. Our eyes constantly adapt to changes in light. They help us avoid bumping into things in a darkened room and can quickly adjust to harsh sunlight. Our eyes may be small compared to our body size, but they do a big job. Our eyes, with the help of our brains, help us understand the world around us in so many ways!

3. What is the job of the optic nerve?

4. If our eyes had no cones, how would our vision be different?

5. What part of this book was the most interesting or informative to you? Explain your answer.

6. Your friend just told you that he is farsighted. Explain to your friend what is happening in his eyes that causes this problem. Tell your friend what kind of glasses he needs to fix his problem.
