**(Read) INTRODUCTION**

The purpose of this lab activity is to allow you the opportunity to learn the structures and functions of the eye. The eye is an example of a **receptor**. All receptors function to convert energy into nerve impulses. Each type of receptor can only detect one particular form of energy. For the eye, this energy is light. That is, light is the stimulus for the eye. Nerve impulses made by receptors are conveyed to the brain over sensory neurons. Receptor cells in the retina of the eye change light (“pictures”) into nerve impulses. Sensory neurons carry these impulses to the occipital lobe of the cerebrum over the optic nerves. Perception of vision, as do perception of all senses, occurs in the brain.

The actual receptor cells for vision are the **rods** and **cones** located in the **retina** of the eye. All the other structures of the eye serve only to clearly focus images on the photoreceptor cells. These photoreceptors then convert the images into a particular pattern of nerve impulses which the brain perceives as vision.

**(Write) PROBLEM**

How does the eye process images from light and color?

**(Write) RESEARCH**

Define the following terms: Cornea, Sclera, Lens, Pupil, Iris, Aqueous humor, Vitreous humor, Fovea, Retina, Blindspot, Cliliary muscles, Optic Nerve, Rods, Cones

**(Write) HYPOTHESIS**

Write a hypothesis (guess) that will solve the problem stated above: How does the eye process images from light and color? Use what you already know about the eye to write your hypothesis. (You should have read the introduction, and the procedure below BEFORE writing your hypothesis)

**(Read and Follow) PROCEDURE**

1. Begin by removing as much white/yellow fat and brownish muscle from the back of the eye as possible. Avoid cutting off the stub of the optic nerve. It is white, cylindrical and rigid.
2. Now, cut the eye into a front and rear half. Do this by inserting a point of scissors through the wall and cut all the way around in a circle. Take care to cut only through the eye wall.
3. Now, using the tip of your scissors, slice through the vitreous humor. You should now have two halves. The front half includes the cornea, lens, iris, and more.
4. Take the rear half of the eye first:
   1. Notice the delicate tan/gray **retina** just beneath the vitreous humor. The retina contains the cones and rods. The cones are concentrated on the **fovea**.
   2. Notice the “puckered” area of the retina where its cells merge to form the optic nerve. This spot marks the **“blindspot”.** Objects focuses here on the retina cannot be seen as there are no rods and cones present.
   3. Look beneath the retina to find the thin black-but-shiny **choroid coat**. This layer has blood vessels that supple the retina and sclera. It also absorbs light so it does not bounce around in the eye.
   4. The thick rigid coat remaining is the **scleroid coat**. It protects and gives shape to the eyeball.
5. Now look into the front half of the eye.
   1. Find the clear window in the front of the scleroid coat. This is the **cornea**. The cornea admits light and acts as a fixed lens in the focusing of the image. (The preservative usually clouds up the cornea)
   2. Behind the cornea, notice the black **iris** with its rectangular **pupil** in the center. The pupil admits light into the eye: the iris controls the size of the pupil.
   3. Find the amber-colored cloudy **lens** about the size of a flattened marble. When fresh, the lens is beautifully transparent and soft. It is made fatter to focus on close objects and flattened thinner to focus on farther away objects. The **cilliary muscles** change the shape of the lens for focusing.
   4. The runny fluid between the lens and cornea is aqueous humor. When the eye was alive, this fluid was remarkably transparent. Both the **aqueous humor and vitreous humor** serve to maintain the proper shape of the eye.
6. Once complete, place your eye in the trash disposal provided.
7. Clean and dry your tray and table. Return all supplies.

**(Write) CONCLUSION**

1. Why is there a “blindspot” in the retina?
2. Why is the best daytime vision located in the fovea, while the best night-time vision occurs when objects are not focused on the fovea?
3. Which of your photorecptors (rods or cones) are you using now? Why?
4. Describe the steps that light travels as it passes through the eye to the brain for processing.