Introduction

The eyes of cows are structurally and functionally similar to the eyes of humans. During this activity, you will dissect a cow eye. You will observe several important features of the eye and develop your understanding of how each part functions to make vision possible.

Materials

- Preserved Cow Eye
- Scalpel or Scissors
- Forceps
- Dissection Tray
- Gloves
- Safety Glasses
- Lab Apron

Procedure

1. Put on your personal protective equipment: gloves, glasses, and apron.
2. Place the preserved cow eye on a tray. Examine the external characteristics of the eye.
   a. What is the purpose of the fatty tissue surrounding the eye?
   b. Notice the muscles surrounding the eye. What is the function of these muscles and how do they affect vision?
3. Trim the fat and muscle from around the eye. Be careful not to cut the optic nerve on the back of the eye.
4. Using scissors or a scalpel, carefully cut the eye in half. Separate the front from the back of the eye.
   a. Describe the sclera, the external part of the eye that you cut through. What can you infer about its functions?

Procedure continued on the next page.
Procedure (continued)

5. Use the diagram to identify the internal structures of the eye.

6. Remove the **vitreous humor** and **lens** from the front portion of the eye.
   a. Describe the vitreous humor. Why must the vitreous humor be clear?
   b. The lens focuses light onto the retina. Preservatives make the lens hard and opaque, but in living organisms the lens is clear and flexible. Based on the function of the lens, why are these features important?

7. With scissors or a scalpel, cut around the edge of the **cornea** to expose the **iris**.

8. Use forceps to detach the iris from the sclera, and examine the structures.
   a. The iris is pigmented in humans and controls the size of your **pupil**. How does your pupil respond to bright light and to dim light? Infer the function of the iris.

9. Examine the back portion of the eye.

10. Carefully remove the **retina**, the thin film covering the back of the eye. The retina contains light-sensitive cells called rods and cones. Rods and cones process the light coming into the eye and send neural signals to the brain, which processes these signals to form the images we see.

11. Examine the iridescent, reflective layer beneath the iris. This layer is called the **tapetum lucidum**.
   a. Cows have a tapetum lucidum (as do cats, dogs, and many nocturnal animals). Humans do not have a tapetum lucidum. Hypothesize the function of this structure.

**Extension Activities**

Research various visual impairments, such as glaucoma, cataracts, presbyopia, hyperopia, myopia, and macular degeneration. In each case, how does a structural defect negatively affect function?
Introduction

The eyes of cows are structurally and functionally similar to the eyes of humans. During this activity, you will dissect a cow eye. You will observe several important features of the eye and develop your understanding of how each part functions to make vision possible.

Materials

- Preserved Cow Eye
- Scalpel or Scissors
- Forceps
- Dissection Tray
- Gloves
- Safety Glasses
- Lab Apron

1. Put on your personal protective equipment: gloves, glasses, and apron.
2. Place the preserved cow eye on a tray. Examine the external characteristics of the eye.
   a. What is the purpose of the fatty tissue surrounding the eye?
      *The fat cushions the eye and helps to protect it.*
   b. Notice the muscles surrounding the eye. What is the function of these muscles and how do they affect vision?
      *These muscles allow the eye to move in different directions so that the animal can see more of its surroundings without turning its head.*
3. Trim the fat and muscle from around the eye. Be careful not to cut the optic nerve on the back of the eye.
4. Using scissors or a scalpel, carefully cut the eye in half. Separate the front from the back of the eye.
   a. Describe the sclera, the external part of the eye that you cut through. What can you infer about its functions?
      *The sclera is rigid, thick, and difficult to cut through. It serves as the protective barrier between the inside and outside of the eye and helps maintain the shape of the eye. Also, it is the attachment point of the muscles that allow the eye to move.*

Procedure continued on the next page.
Extension Activities

Research various visual impairments, such as glaucoma, cataracts, presbyopia, hyperopia, myopia, and macular degeneration. In each case, how does a structural defect negatively affect function?