



**Distance Learning Program
Pig Eye Dissection
Middle School/ High School**

This guide is for middle and high school students participating in AIMS Pig Eye Dissections, which will be presented by an AIMS Anatomy Specialist. The primary focus is the anatomy, physiology and function of the structures of the eye. Eye diseases and disorders are also discussed. Students participating in this activity will have the opportunity to dissect and compare anatomical structures between the human eye and the pig eye. At the end of this document, you will find anatomical diagrams, vocabulary review, and pre/post tests for your students.

National Science Education (NSES) Content Standards for grades 9-12

- Content Standard:K-12 ***Unifying Concepts and Processes***: Systems order and organization; Evidence, models and explanation; Form and Function
- Content Standard F, ***Science in Personal and Social Perspectives***: Personal and community health
- Standard C, ***Life Science***: Matter, energy and organization of living systems
- Content Standard A ***Science as Inquiry***

National Science Education (NSES) Content Standards for grades 5-8

- Content Standard A ***Science as Inquiry***
- Content Standard C, ***Life Science***: Structure and function in living systems; Diversity and adaptations of organisms
- Content Standard F, ***Science in Personal and Social Perspectives***: Personal Health

Show Me Standards (Science and Health/Physical Education)

- ***Science*** 3. Characteristics and interactions of living organisms
- ***Health/Physical Education*** 1. Structures of, functions of and relationships among human body systems
- ***Health/Physical Education*** 2.Principles and practices of physical and mental health

- **Health/Physical Education 3.** Diseases and methods for prevention, treatment and control
- **Health/Physical Education 5.** Methods used to assess health, reduce risk factors and avoid high risk behaviors

Objectives:

The student will be able to:

1. locate and identify the major structures of the eye, including some of the muscles that move the eye;
2. explain the general function of the eye;
3. observe the internal and external structures of the eye;
4. reinforce their dissecting technique.
5. identify common conditions and disorders of the eyes and treatment

Lesson Objectives:

This lesson will:

1. allow students to observe and identify the major structures of the eye;
2. familiarize students with the actual structures of the eye;
3. provide students with useful information about the eye;
4. allow students to improve and reinforce their skills of observation and analysis.
5. students will learn about diseases and conditions of the eye and their treatment.

Related Websites:

Cow's Eye Dissection –Exploratorium - Index

http://www.exploratorium.com/learning_studio/cow_eye/index.html

Cow's Eye Dissection Directions

http://www.exploratorium.edu/learning_studio/cow_eye/coweys.pdf

Anatomy Vocabulary:

Anterior Chamber - The space in the eye that is behind the cornea and in front of the iris.

Aqueous humor - the thin, watery fluid that fills the space between the cornea and the iris (anterior chamber). It is continually produced by the ciliary body, the part of the eye that lies just behind the iris. This fluid nourishes the cornea and the lens and gives the front of the eye its form and shape.

Blind spot - The blind spot is the area on the retina without receptors that respond to light. Therefore an image that falls on this region will NOT be seen. It is in this region that the optic nerve exits the eye on its way to the brain.

Canal of Schlemm - a circular canal between the cornea and the iris that provides an exit for the aqueous humor from the eye into the bloodstream

Caruncle - a small, red portion of the corner of the eye that contains modified sebaceous and sweat glands.

Central Retinal Artery - The central retinal artery supplies blood to the retina as it branches into smaller segments upon leaving the optic disc.

Central retina vein - the vessel that carries blood away from the retina.

Choroid - the thin, blood-rich membrane that lies between the retina and the sclera; responsible for supplying blood to the retina.

Ciliary body - The thickened part of the vascular portion of the eye that lies between the iris and the choroids that produces the aqueous humor

Cones - Photoreceptor cells in the retina of the eye that function best in bright light and provide for color vision.

Conjunctiva - The conjunctiva is the thin, transparent tissue that covers the outer surface of the eye. It begins at the outer edge of the cornea, covering the visible part of the sclera, and lining the inside of the eyelids. It is nourished by tiny blood vessels that are nearly invisible to the naked eye.

Cornea - the clear, dome-shaped surface that covers the front of the eye.

Fovea centralis - In the eye, a tiny pit located in the macula of the retina that provides the clearest vision of all. The fovea contain only cones.

Iris the colored part of the eye. The iris is partly responsible for regulating the amount of light permitted to enter the eye.

Lens (Also called crystalline lens.) - transparent structure inside the eye that can change shape to allow precise focusing of light rays onto the retina.

Macula - the focusing portion of the eye that allows us to see fine details clearly. It contains mostly cones.

Optic Disc - The point inside the eye where the nerve that leads from the eye to the brain (optic nerve) leaves the eye (also called the *blind spot*)

Optic nerve - a bundle of nerve fibers that connect the retina with the brain. The optic nerve carries signals of light, dark, and colors to the area of the brain (the visual cortex), which assembles the signals into images (i.e., our vision).

Ora serrata -

behind the iris and in front of the lens.

that are responsible for vision in dim light
more sensitive to light than cones, but do not

the top of the eye toward the nose

rectus muscle that primarily rotates the eye downward, and
top of eye

rectus muscle that moves the eye

A **ligament** that supports an organ or body part,
the lens of the eye in place.

AIMS
Anatomy of the Human Eye
Pre/Post Test

1. The first structure of the eye that light passes through on its way to the retina is the _____.
2. This is the name of the gelatinous-like fluid that fills the space between the retina and the lens, and comprises 80% of the eye's volume. _____
3. This small area near the center of the retina has a high concentration of cones and is responsible for high acuity vision.
4. This tough outer covering of the eye is responsible for the "white of the eye". _____
5. The six muscles, which control movement of the eye, are the _____, _____, _____, _____, _____, _____.
6. These cells in the retina respond to bright light and are mainly responsible for the eye's color sensitivity. _____
7. This visual disorder occurs when light rays are focused at a point in front of the retina. _____. It is also known as _____.
8. The _____ conducts visual impulses from the retina to the brain.
9. This condition is a clouding of the eye's natural lens, which results from a clumping together of some proteins in the eye. _____
10. This colored circular muscle is responsible for human eye color and adjusts in size to regulate the amount of light entering the eye. _____
11. Which are more numerous in the human eye, rods or cones?

12. This is the term used to describe the automatic adjustment of the eye for seeing at different distances, affected mainly by changes in the shape of the eye. _____

Bonus: Are you interested in a career in medicine, as either a doctor, nurse, or some other member of the healthcare community? Y or N

AIMS
Anatomy of the Human Eye
Pre/Post Test
Answer Sheet

1. cornea
2. vitreous humor
3. macula
4. sclera
5. superior rectus, inferior rectus, lateral rectus, medial rectus,
superior oblique, inferior oblique
6. cones
7. myopia – nearsightedness
8. optic nerve
9. cataract
- 10.iris
11. rods
12. accommodation