

FRIDAY, December 7, 2018

Your Learning Goal:

Students will explore the parts of the eye, how they work and how they utilize the properties of light to see clearly.

Table of Contents:

All About the Eye- 25L + R

Catalyst (25L):

- How might your eye act like a camera? Describe similarities in parts and functions.



Homework:

Final Exam
12/13 - 12/14



Agenda:

1. Catalyst
2. Eye Notes
3. Vision Lab
4. Reflection

Table of Contents

<u>Date</u>	<u>Assignment</u>	<u>Pg #</u>
10/25/18	Atomic Jeopardy	16 L + R
11/6/18	Star Bright	17 L + R
11/8/18	Heartbeat Frequency	18 L + R
11/13/18	Spring Into Waves	19 L + R
11/26/18	EM Spectrum Hero	20L + R
11/27/18	Reflections	21L + R
11/29/18	Spectacular Spectra	22L + R
12/3/18	Through the lens of the EM Spectrum	23L + R
12/4/18	Absorption Gummies	24L + R
12/7/18	All About the Eye	25L + R

YOU ARE DONE WITH UNIT ONE!

8R

Catalyst:

How might your eye act like a camera? Describe similarities in parts and functions.

12/7/18

All About the Eye

Name	Right Eye	Left Eye	Both Eyes

25R

Name	Focus Distance Right Eye (cm)	Focus Distance Left Eye (cm)	Focus Distance Both Eyes (cm)

In and Out Focus

As an object approaches the human eye, its lens flexes to focus on it. Eventually the object gets so close, however, that the lens can no longer focus on it. At that point, the object begins to blur.

- For the first test, have a test subject cover their left eye with one hand.
- SLOWLY bring the index card toward the test subject's uncovered eye, while the test subject tries to focus on the words.

In and Out Focus

- Direct the test subject to say “stop” when s/he can no longer focus clearly on the words. At that point, stop moving the card.
- Have the test subject hold one end of the tape measure to her/his cheekbone just below the eye and measure the distance to the index card.
- Write down the measurement.
- Repeat with the left eye and both eyes uncovered.



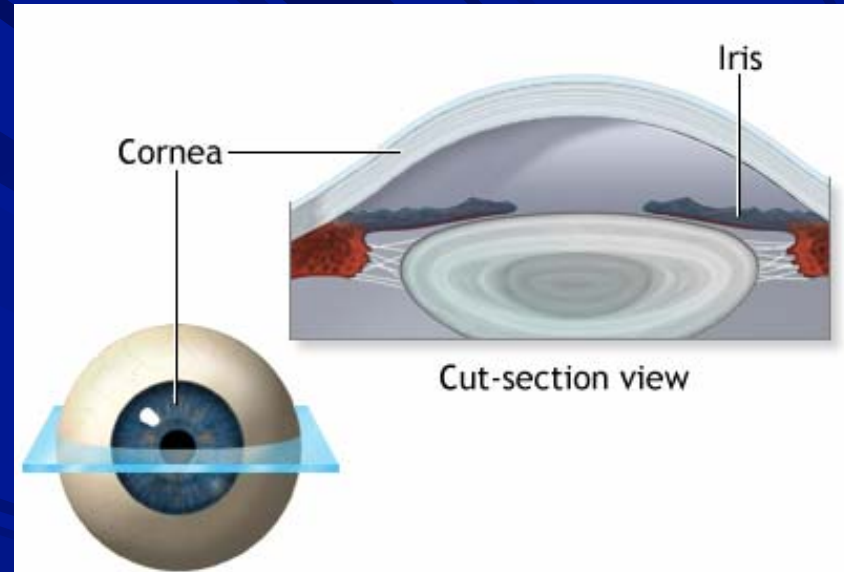
Eye Structure and Seeing Light

The eye is like a camera: Light enters, is focused on a surface, and a picture is made.



Light enters your eye through a clear portion of the **sclera** (the tough, white, outer covering of the eye), called the **cornea**.

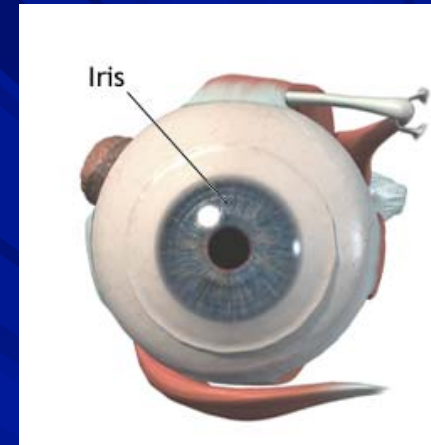
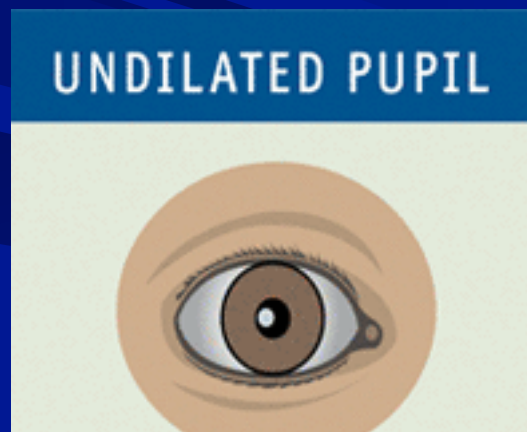
The **cornea** is curved, so it slightly bends the light as it goes through.



Light then passes through the **aqueous humor** (a clear fluid for eye nourishment, in the **anterior chamber**) and through the pupil.

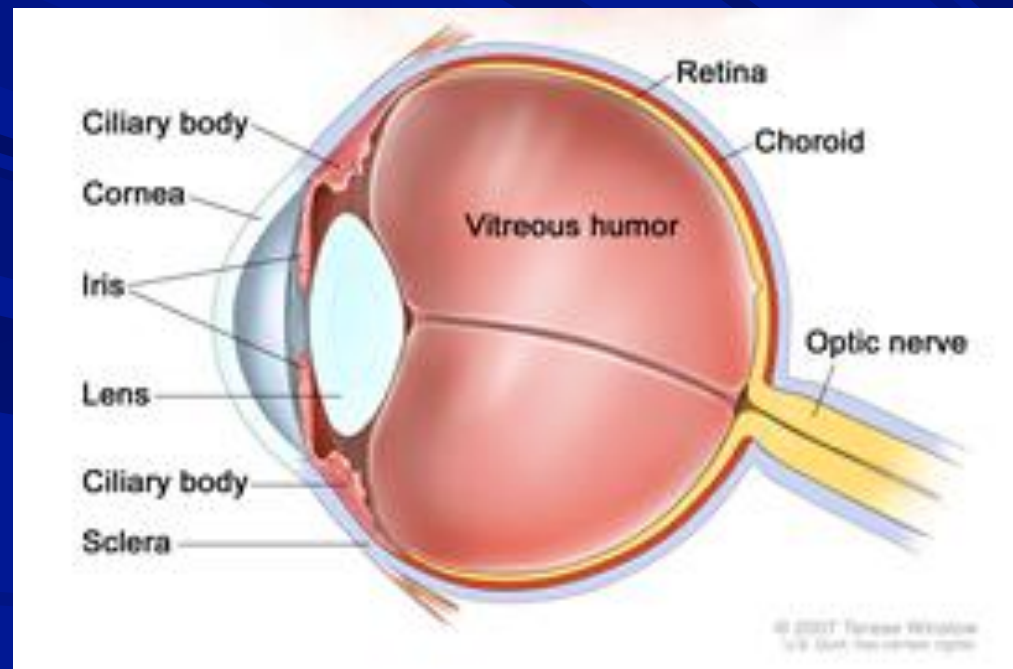
The **pupil** is simply a hole in the iris.

The **iris** is a muscle that controls the size of the pupil. The iris is the colored part of the eye.

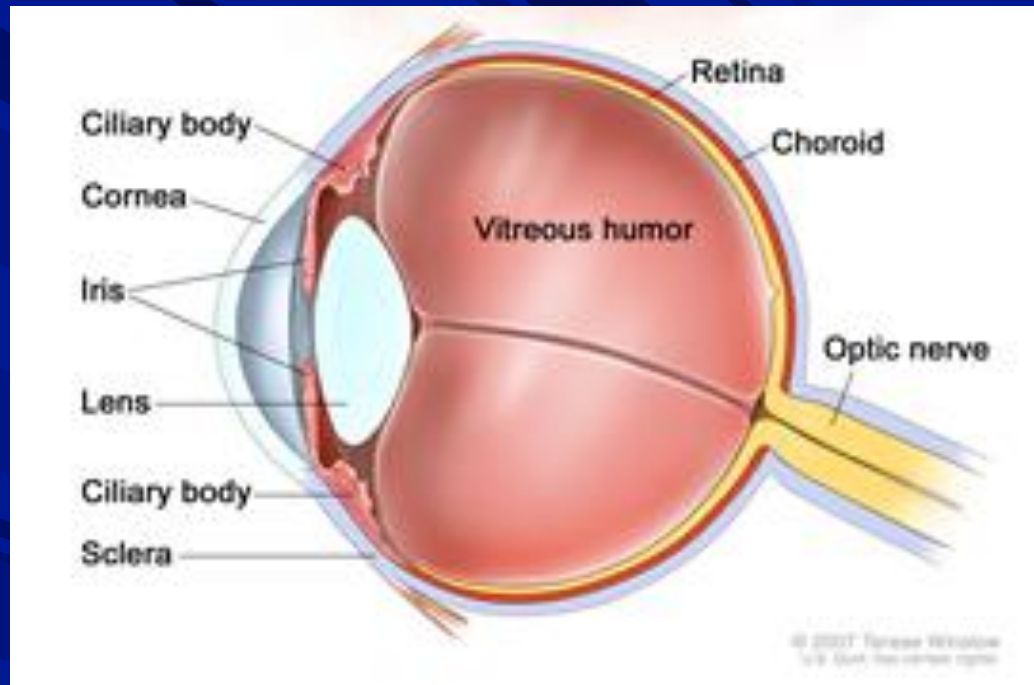


- In bright light, the iris expands and the pupil gets smaller
- In low light, the iris contracts and the pupil gets bigger

Directly behind the **iris** is the **lens**. This structure changes shape to focus the light so that we can see clearly. Its shape is convex, meaning it curves outward on both sides.



The **ciliary muscles** above and below the lens control the shape of the lens.



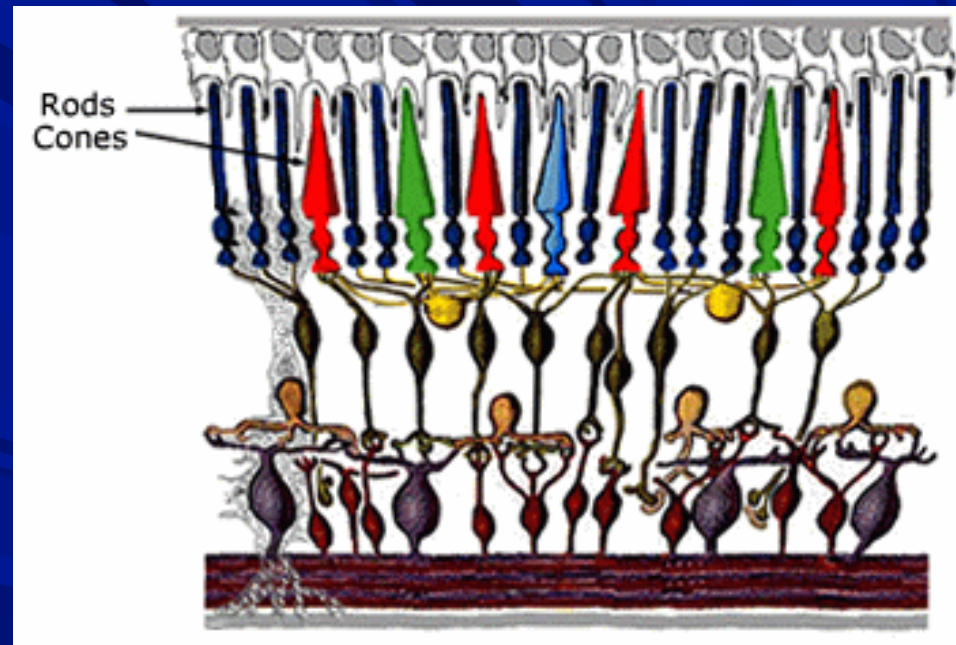
Behind the **lens** is a clear gel called the **vitreous humor**. After moving through the vitreous humor, the light strikes the **retina**. The retina is the lining on the inside of the back of the eye that contains two types of light-sensitive cells: **rods and cones**.

Rods sense black and white and work in low light.

Cones sense color and must have more light than rods to work.

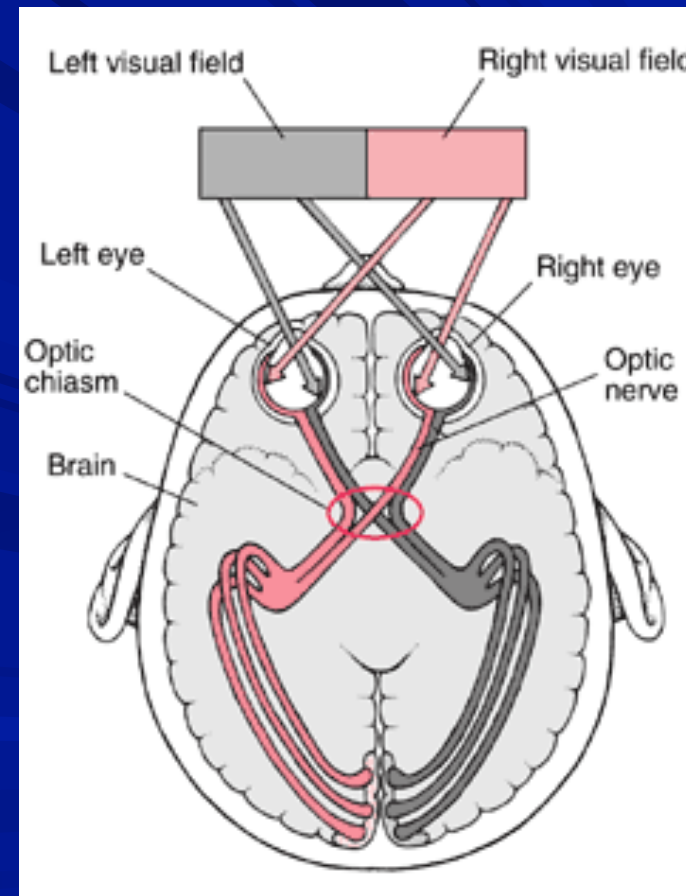
Three kinds of cones:

- **L-cones** sense long wavelengths in the red range
- **M-cones** sense mid-range wavelengths in green range
- **S-cones** sense short wavelengths in the blue range



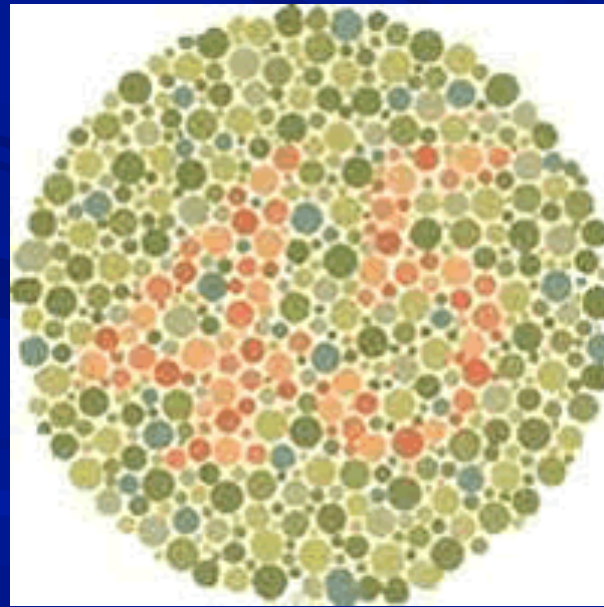
The **rods and cones** send messages to the brain through the **optic nerve**. The brain makes sense of all the information it is receives.

In your brain, the sight center is in the back, **between your ears**. This location explains why a blow to the back of your head might cause blindness, even though your eyes are fine.

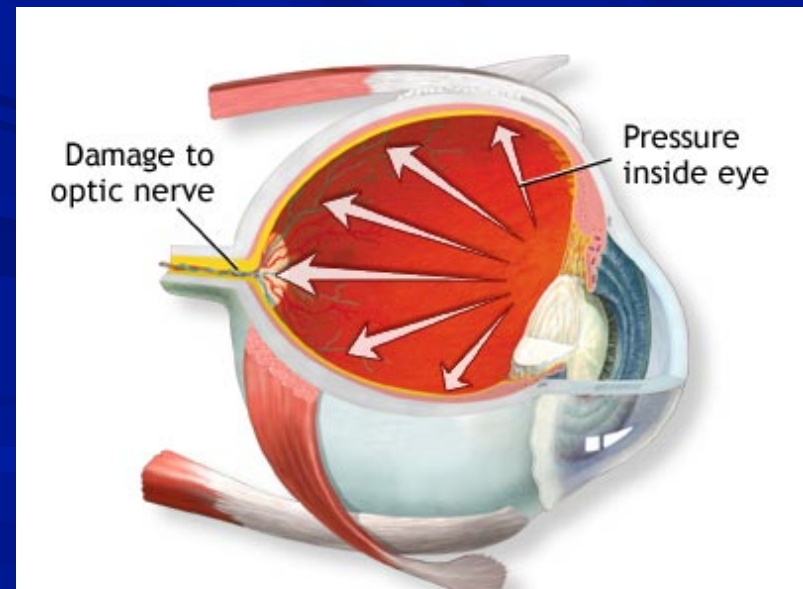


Two Causes of Color Blindness

1. Genetic (you are born with these types) Sometimes a cone is missing, or the cone does not recognize the correct wavelengths of light. L- and M-cone problems result in red-green color blindness, the most common.

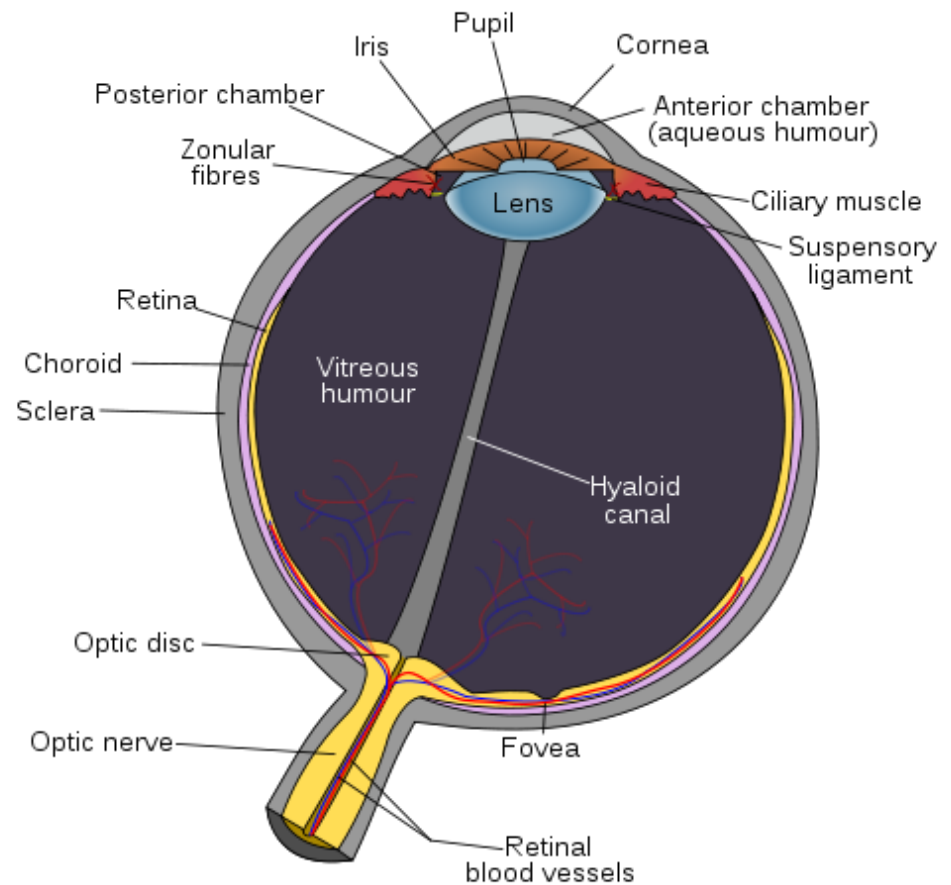


2. **Non-Genetic** (these types occur after birth) Accidents that damage the vision center of the brain, cataracts, glaucoma, Parkinson's Disease can cause S-cone problems, diabetic retinopathy can affect color vision



Eye Anatomy Review

- cornea
- pupil
- iris
- anterior chamber
- aqueous humor
- lens
- vitreous humor
- retina
- fovea
- choroid
- sclera
- optic nerve



12/7/18

Catalyst:

How might your eye act like a camera? Describe similarities in parts and functions.

Reflection:

Describe the path of light moving through the eye.
What property(ies) of light are at work here?

25L

All About the Eye

Name	Right Eye	Left Eye	Both Eyes

25R