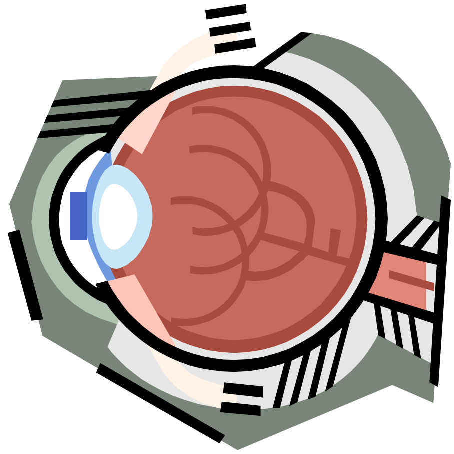

An Eye for Science

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web site: www.educationfund.org

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Goals and Objectives:

LA.A.2.2

The student constructs meaning from a wide range of texts.

1. reads text and determines the main idea or essential message, identifies relevant supporting details and facts, and arranges events in chronological order.
2. identifies the author's purpose in a simple text.
3. recognizes when a text is primarily intended to persuade.
4. identifies specific personal preferences relative to fiction and nonfiction reading.
5. reads and organizes information for a variety of purposes, including making a report, conducting interviews, taking a test, and performing an authentic task.
6. recognizes the difference between fact and opinion presented in a text.
7. recognizes the use of comparison and contrast in a text.
8. selects and uses a variety of appropriate reference materials, including multiple representations of information, such as maps, charts and photos, to gather information for research projects.

MA.B.1.2

The student measures quantities in the real world and uses the measures to solve problems.

1. uses concrete and graphic models to develop procedures for solving problems related to measurement including length, weight, time, temperature, perimeter, area, volume, and angle.
2. solves real-world problems involving length, weight, perimeter, area, capacity, volume, time, temperature, and angles.

SC.B.1.2

The student recognizes that energy may be changed in form with varying efficiency.

1. knows how to trace the flow of energy in a system(e.g., as in an ecosystem).
2. recognizes various forms of energy (e.g., heat, light, and electricity).
3. knows that most things that emit light also emit heat.
4. knows the many ways in which energy can be transformed from one type to another.
5. knows that various forms of energy (e.g., mechanical, chemical, electrical, magnetic, nuclear, and radiant) can be measured in ways that make it possible to determine the amount of energy that is transformed.
6. knows ways that heat can move from one object to another.

SC.F.1.2

The student describes patterns of structure and function in living things.

1. knows that the human body is made of systems with structures and functions that are related.
2. knows how all animals depend on plants.
3. knows that living things are different but share similar structures.
4. knows that similar cells form different kinds of structures.

<u>Suggested Timeline/Sequence:</u>

August: Pre-test

September: Guest speaker

October: Concave/convex lenses and vision screenings

November: Functions of the eye and common eye diseases

December: Color of light and making your own spectroscope

January: Energy and then more specifically light energy

February: Selected class novel(s) and optical illusions

March: Continue with optical illusions

April: Cumulative month review and any other activities not yet performed

May: Post-test

Course Outline/Overview:

Spectacle Eyes is a ten month science unit, which has been correlated to reading, math, social studies, writing, and technology to help students learn about the human eye and energy.

Students are asked to assess their background knowledge as it relates to the project, they are given an opportunity to speak with a guest presenter and ask questions related to the eye. Information on how to perform a vision screening will be obtained, and vision screening will be performed in class with partners. Concave and convex lenses will be studied and differenced noted. Common eye diseases will be researched on the internet and in the media center, and the major parts of the eye and their functions will be examined.

The concept of energy will also be analyzed and linked to light. Students will find that light has color, and that it bends as it travels through space. Additionally, students will read novels in class that pertain to visually impaired children and/or teenagers, as well as animals to provide real world connections to what they are learning in class.

This project is designed to enhance student learning as it relates to light and the human eye. The participating students put together a model of the human eye, they make and learn to use their own spectroscopes, and they experiment with visual illusions allowing them a clear understanding of how the brain perceives images. The project can be easily adapted to successfully teach students in third through sixth grade.

Lesson One: Grade Level: 3-5

Sunshine State Standards: SC.B 1.2.2, LA.A 2.2.5

Objective: Students identify the characteristics of light, and know the difference between a concave lens and a convex lens.

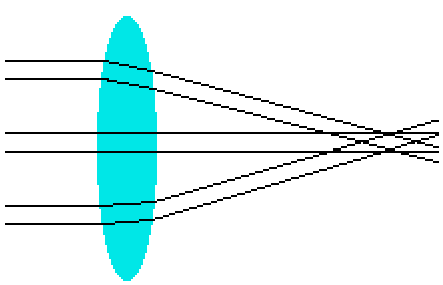
Materials:

3 big flashlights
Pieces of red, blue and green cellophane paper
Tape
30 cm white card (construction paper)
Concave lens/Convex lens

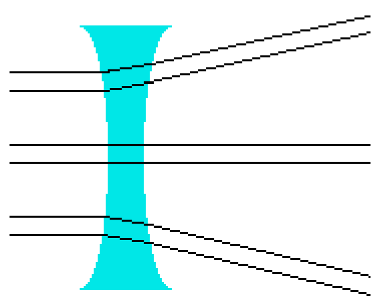
Vocabulary: reflection, refraction, concave, convex

1. Begin lesson by asking students "What is the color of light?" Put up a small concept map on the board with student answers.* *Sunlight or light may look white, but it's actually made up of red, blue, and green (primary colors).*
2. Tape on a different color piece of cellophane over the bulb end of each flash light.
3. Have fun with the students making yellow (red and green), and cyan (blue and green), etc.
4. Now shine all three flashlights on the white card. (*You get white!*)
5. Continue lesson introducing the vocabulary words (these may also be found in the textbook), and reviewing how light reflects off objects and gives off the colors we see (the colors you see are the only color(s) reflected, everything else is absorbed.) Also discuss how light bends (refracts).
6. Give students a chance to view textbook section pertaining to concave and convex lenses. Then have students come up with an illustration* explaining how light travels through the concave and convex lenses, and the differences between both lenses when you look through them.

* ESOL/ESE strategies



Convex Lens



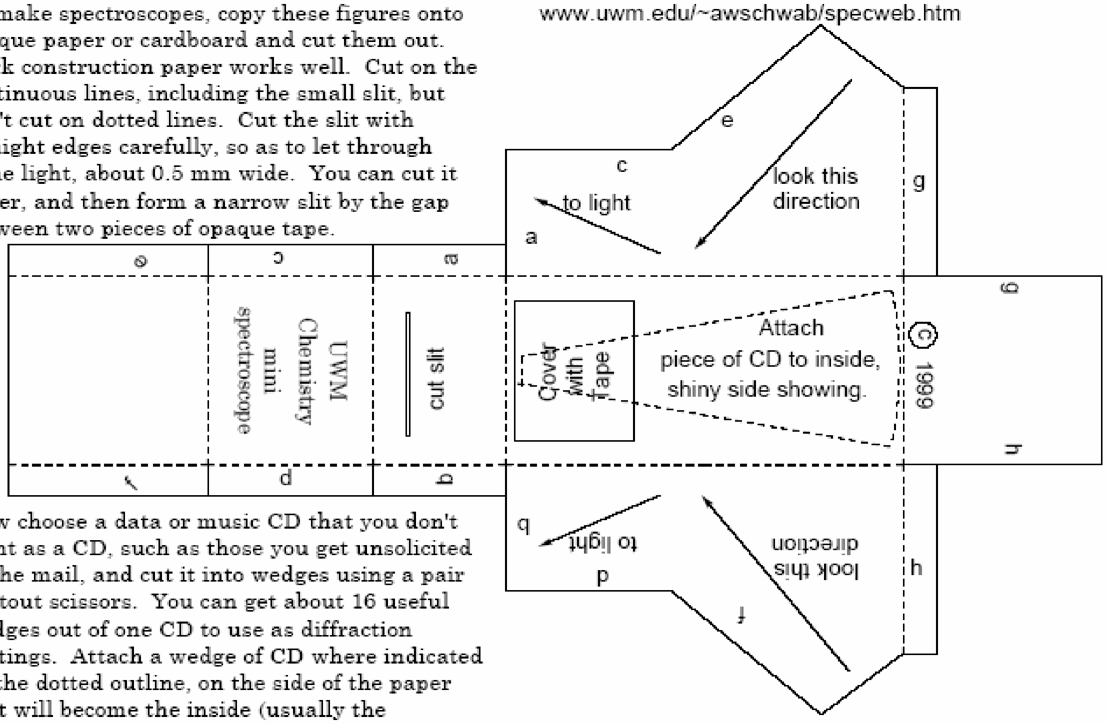
Concave Lens

As a follow lesson (and fun activity), have students make their own spectroscopes. (See attached instruction).

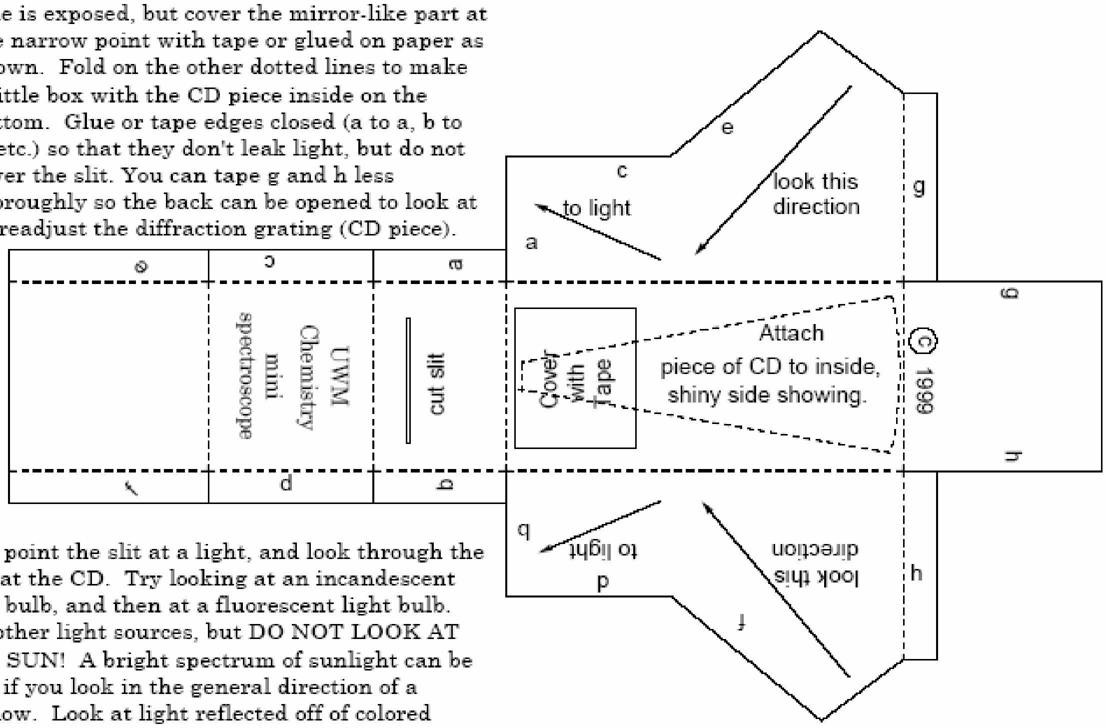
UWM Chemistry

"Science of Stuff" Spectroscopes

To make spectroscopes, copy these figures onto opaque paper or cardboard and cut them out. Dark construction paper works well. Cut on the continuous lines, including the small slit, but don't cut on dotted lines. Cut the slit with straight edges carefully, so as to let through some light, about 0.5 mm wide. You can cut it wider, and then form a narrow slit by the gap between two pieces of opaque tape.



Now choose a data or music CD that you don't want as a CD, such as those you get unsolicited in the mail, and cut it into wedges using a pair of stout scissors. You can get about 16 useful wedges out of one CD to use as diffraction gratings. Attach a wedge of CD where indicated by the dotted outline, on the side of the paper that will become the inside (usually the unprinted side). Make sure the iridescent shiny side is exposed, but cover the mirror-like part at the narrow point with tape or glued on paper as shown. Fold on the other dotted lines to make a little box with the CD piece inside on the bottom. Glue or tape edges closed (a to a, b to b, etc.) so that they don't leak light, but do not cover the slit. You can tape g and h less thoroughly so the back can be opened to look at or readjust the diffraction grating (CD piece).



Now point the slit at a light, and look through the hole at the CD. Try looking at an incandescent light bulb, and then at a fluorescent light bulb. Try other light sources, but DO NOT LOOK AT THE SUN! A bright spectrum of sunlight can be seen if you look in the general direction of a window. Look at light reflected off of colored paper. What happens if you widen the slit?

Instructions for Construction of UWM Chemistry Mini Spectroscopes
Alan Schwabacher www.uwm.edu/~awschwab/specweb.htm
What you need: Spectroscope pattern, wedge of CD, scissors, glue or tape.
Optional: black marker, sharp knife.

1. If your copy of the pattern is on white paper, you should photocopy it onto dark paper, or print the downloaded version onto dark paper. Dark construction paper works well, or any paper if you photocopy black onto the reverse. Carefully cut out the pattern. Cut on the solid lines, but don't cut on dotted lines. The small slit is important. Cut the slit carefully with *straight smooth* edges, so as to let through some light, about 0.5 mm wide. A sharp knife can be useful for cutting slits, but must be used carefully with adult supervision. You will also need to cut out the rectangular eyehole (between g and h) to view through.
2. Now you need a wedge of CD. Choose a data or music CD that you don't want as a CD, (such as those you get unsolicited in the mail,) and cut it into wedges using a pair of stout scissors. You can get about 16 useful wedges out of one CD to use as diffraction gratings. If the CD tends to crack as it is cut, you can prevent that by putting it under warm water (about 50°C or 122°F) while cutting with scissors.
3. Crease on the dotted lines by folding over the edge of a ruler, so the pattern can fold to make a little box. Fold it so the dark side is inside, and the printing is on the outside. Attach a wedge of CD to the *inside* where indicated by the dotted outline, but on the other side of the paper (the unprinted side). Make sure the iridescent shiny side of the CD wedge is exposed, but cover the small mirror-like crescent near the tip. (See the pattern.) It's convenient to cover this with tape over the narrow point to hold the wedge in place, or to blacken this part with a permanent marker or a bit of black paper glued over the point of the CD. If you cover it with black paper or tape, make sure that the paper or tape is flat and does not stick up at all.
4. Complete the spectroscope by folding it into a little box. Glue or tape edges closed (a to a, b to b, etc.) so that they don't leak light, but do **not** cover the slit. Rubber cement can be applied to all the flaps on one side of the paper, and to all the lettered regions the flaps will contact on the other side of the paper. After the cement dries, the spectroscope can be neatly folded into shape, in alphabetical order. Unlabelled flaps need not be glued. It's convenient to tape at x less thoroughly or not at all so the back can be opened to look at or readjust the diffraction grating (CD piece). You're finished!
5. Using the spectroscope: Note the arrows at the side of the spectroscope. The trick is to point the slit at a light in the direction indicated by one arrow, while looking into the spectroscope in the direction indicated by the other arrow, with your eye quite close to the rectangular eyehole. This is much easier than it sounds, and most easily done by holding the spectroscope with your finger pointing along the arrow labeled "to light". Now hold the spectroscope to your eye, and turn until your finger points at the light. You will see the spectrum of colors that make up the light you are pointing at. Do **NOT** look directly at the sun! A bright spectrum of sunlight is visible if you point the spectroscope toward a window. Try looking at an ordinary incandescent light bulb, and then at a fluorescent light bulb. Are all fluorescent lights the same? Try streetlights and other light sources. Look at light reflected off of colored paper, or shining through transparent colored plastic, glass, or juice. How does white light from your computer monitor compare to white paper? Does the paper look the same under different lights?

Lesson Two: Grade Level: 3-5

Sunshine State Standards: SC.F. 1.2.1, MA.B. 1.2.2, LA.A 2.2.5

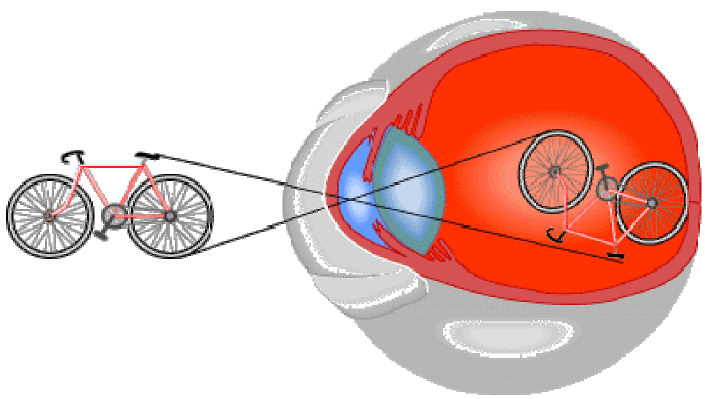
Objective: Students will identify the major parts of the eye and how they function, and they will learn how to perform a vision screening.

Materials:

Model of the human eye (you may find one in the Science Lab or Media Center)
Eye Chart
Anatomical chart of the eye (you may find one in the Science Lab or Media Center)
Eye worksheet
The Eyes Have It materials (see attached)

Vocabulary: cornea, pupil, iris, sclera, lid, lens, retina, optic nerve

1. Introduce lesson vocabulary
2. Discuss the major parts of the eye and their functions (show visuals*). Explain that objects are actually seen upside down, and that the brain then turns them right side up.



3. Conduct eye simulation activity with materials stated above.*
4. Explore what students already know about farsightedness and nearsightedness.*
5. Pair students up and have them give each other a vision screening.

Instructions: Tape the eye chart to a wall, making sure it is in plenty of light. Stand twenty feet away from the chart. Cover one eye and begin reading each line. Have a friend watch to see that you are reading each letter correctly. The last line that you are able to read will give you an approximate idea of your vision. If you can read the very bottom line, your vision is 21/10! Now try testing the other eye. Is one eye better than the other?

6. Let students determine if their partners need glasses, and if so what kind of lenses they require to correct their vision. (see lesson 1)

* ESOL/ESE strategies

The Eyes Have It
(Hands-on Experiment)

Materials:

flashlight
small toy car
hand lens
small, round fishbowl
sheet of white paper

Procedure:

1. Line up material in the following order:

   Flashlight---toy car---hand lens---fishbowl---white paper

2. Make sure the room is dark. Turn on the flashlight.
3. Shine the light on the toy car.
4. Focus the shadow through the lens and the fishbowl onto the white paper.
5. Observe the image formed on the white paper.

This activity can be found in the Harcourt Teacher's Edition.

Lesson Three: Grade Level: 3-5

Sunshine State Standards: SC.F. 1.2.1, LA.A.2.2.5

Objective: Students will find their blind spots, and will discover that eyesight is not the only factor in how we perceive visually.

Materials:

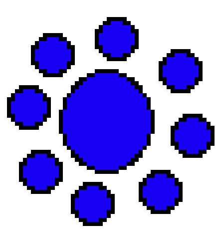
Computers with internet access
Blind spot testers (see attached or download directly from Neuroscience for Kids)
Book: Can You Believe Your Eyes?

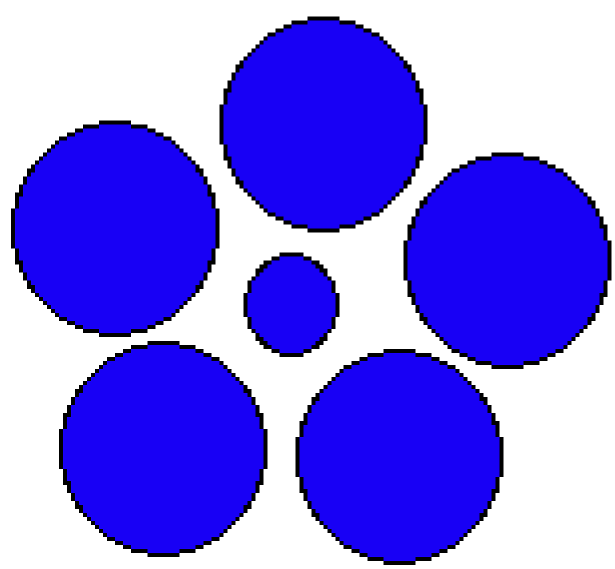
1. Allow students a few minutes to perform the blind spot test. Explain that there is a small area on the retina without light receptors. Any image that falls in this area will not be acknowledged by the brain.
2. Now ask the students if everything the see is actually what it seems? Go around the room accepting answers from everyone. (Answers will vary)
3. Pair up students and give them access to the following web sites:

http://faculty.washington.edu/chudler/chvision.html BEST
www.uvi.edu/SandM/Physics/Opticalillusions/Opticalillusions.html
http://www.scientificpsychic.com/graphics/
http://www.sites4teachers.com/links/redirect.php?url=http://faculty.washington.edu/chudler/bigeye.html

4. If the internet is not available us the book identified in the material list.
5. Ask students to write a short summary of the activities done in class, and why they found them interesting.
6. As a family extension have students go home and explain the blind spot to family members and perform blind spot test on them. Let students share what happened the following day.

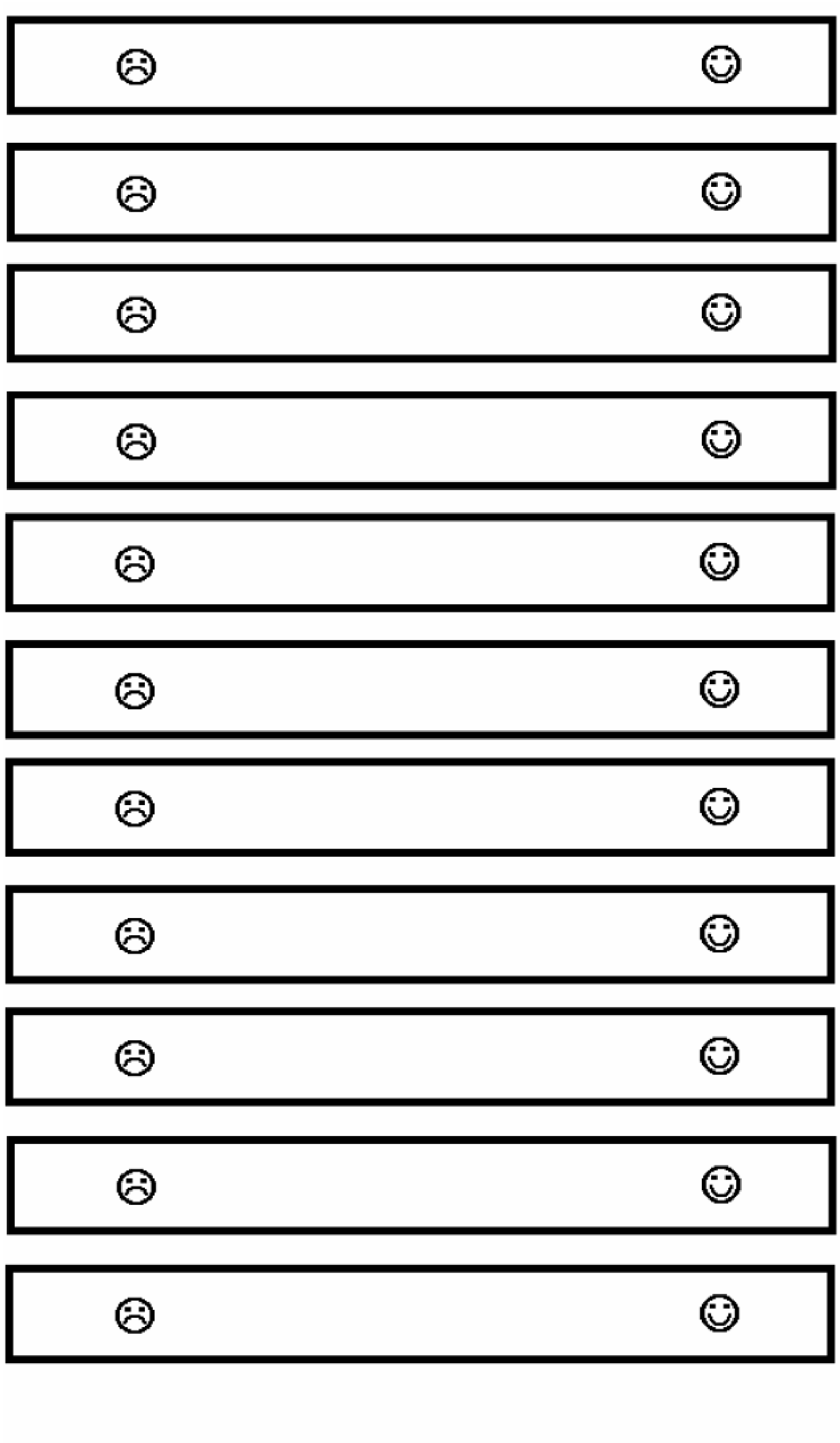
Sample visual illusion:





Which center circle is larger?
Are you sure? They are BOTH the same!
Go ahead and check.

Blind Spot Testers



Lesson Four: Grade Level: 3-5

Sunshine State Standards: SC.F. 1.2.1, SA.A.3.2.1

Objective: Students will research the history of eyeglasses, and assemble a report on said history.

Materials:

Computers with internet access
Access to media center reference books as well as any other non-fiction books related to topic
Paper
Pencil

1. Discuss the use of eyeglasses and how they help people see.* Review vision screening and lenses from previous lessons.
2. Ask students to research the history of eyeglasses, and compile information to write a short report. (This should be done in pairs.*) Allow students time to check out books from media center and the use of the internet.

Report should include:

Year glasses were invented
Who invented eyeglasses and why
Why people need to use eyeglasses
How eyeglasses have changed throughout the years
How eyeglasses have changes the lives of people with eye disorders
Picture/illustration of glasses*
Interesting facts learned during research

*ESOL/ESE strategies

Lesson Five: Grade Level: 3-5

Sunshine State Standards: SC.F. 1.2.1

Objective: Students learn about common eye disorders and how to avoid eye injury.

Vocabulary:

conjunctivitis: commonly referred to as "pink eye"

hyperopia: farsightedness (can't see objects that are close)

myopia: nearsightedness (can't see objects that are far away)

strabismus: commonly referred to as cross eyed

Materials:

Computer with internet access
Paper/journal for notes
Pencil/pen
Poster board (1 for every two students)
Crayons, colors, or markers

1. Ask students who in their family wears glasses. Ask if they know why?*
2. Introduce and discuss the vocabulary with students.
3. Ask students to determine what kids of lenses can be used to correct hyperopia and myopia?
4. Discuss the signs of vision problems.

    - Loses their place while reading
    - Avoids close work
    - Holds reading materials closer than normal
    - Tends to rub his or her eyes
    - Has headaches
    - Turns or tilts head to use one eye only
    - Makes frequent reversals while reading or writing
    - Uses finger to maintain place when reading
    - Omits or confuses small words when reading
    - Consistently performs below potential

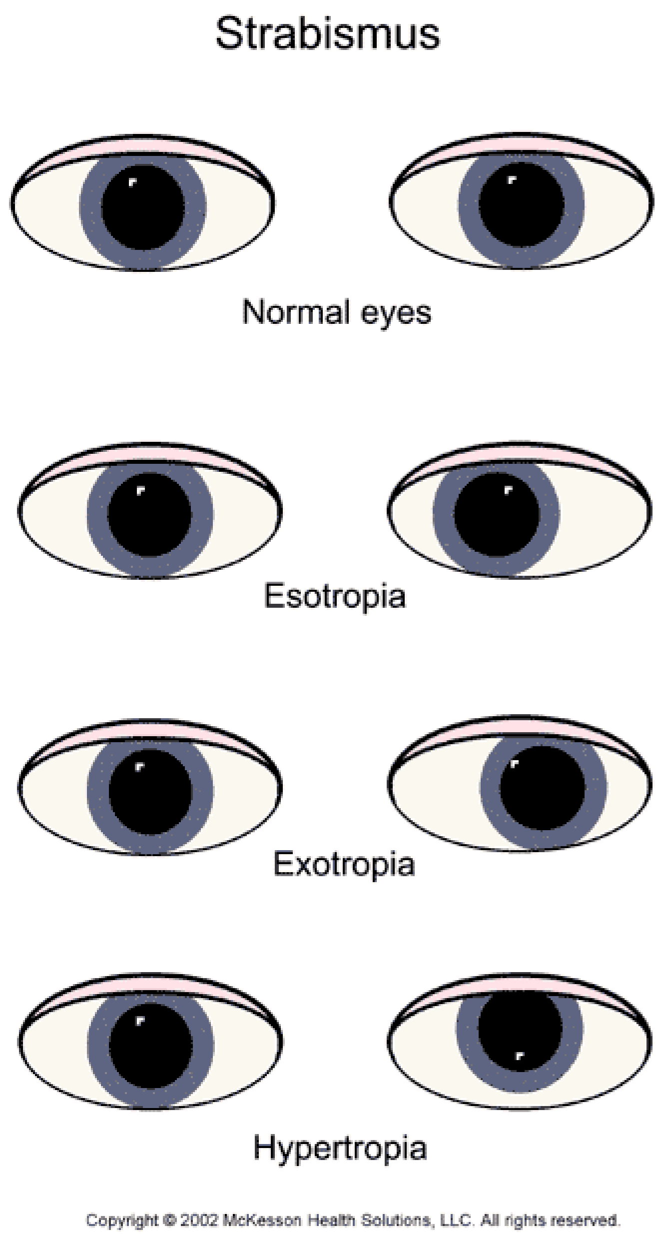
5. As a whole group construct a concept map on the board on the possible causes of eye injuries
6. Pair up students and have them brainstorm ways to avoid the situations that may lead to eye injuries. (this should correlate to the concept map)*

7. Have students create an "Eye Safety" poster in small groups.* Display finished poster around the classroom.

*ESOL/ESE strategies

Helpful websites

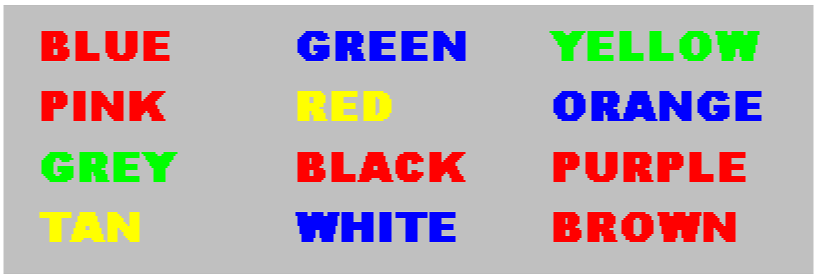
http://www.aoa.org/
http://www.healthychild.net/articles/mc34eyeinjury.html



Additional Activities

Stroop Effect: Colors, Colors:

Here is your job: name the colors of the following words. Do NOT read the words...rather; say the color of the words. For example, if the word "BLUE" is printed in a red color, you should say "RED". Say the colors as fast as you can. It is not as easy as you might think!



Why you say?

The words themselves have a strong influence over your ability to say the color. The interference between the different information (what the words say and the color of the words) your brain receives causes a problem. *See attached activity cards*

Tasty Vision Experiment:

Does what you see influence what you taste? Find out here. Get four different flavored sodas (fruity ones such as lemon, grape, cherry, etc.). These sodas should also be different colors. Also get one unflavored, clear soda (such as, club soda or seltzer water). Add a few drops of food coloring to the unflavored, clear soda (orange works well). This will make it LOOK like orange soda, but of course, it will NOT have any taste. Pour the five drinks into different cups for taste testers. Ask people to tell you what each drink tastes like.

How many people said your unflavored drink was "Orange"?

Food companies add color to food to influence what it tastes like. People like to see foods in colors that they expect.

Materials:

- 4 different flavored sodas, 1 unflavored, clear soda
- Cups
- Food Coloring

- *These fun activities can be found on the Neuroscience for Kids website.*

Light Experiment # 1: (Demonstration of Refraction)

Materials:

Coin
Bowl
Water

1. Put the bowl on a table and place the coin in the bottom.
2. Keep looking at the coin and move backwards until the coin disappears from view.
3. Stay where you are and ask a friend to pour water into the bowl.

You should be able to see the coin again!! Why? The light from the coin is “bent” (refracted) by the water so you can see it again.

Light Experiment # 2:

Whenever it's not completely filled with clouds, we can see that the sky is blue. As the sun rises and as it sets, it looks red. These two observations are related, as this experiment will show.

You will need the following materials:

- a flashlight
- a transparent container with flat parallel sides (a 10-liter [2½-gallon] aquarium is ideal)
- 250 milliliters (1 cup) of milk

Set the container on a table where you can view it from all sides. Fill it ¾ full with water. Light the flashlight and hold it against the side of the container so its beam shines through the water. Try to see the beam as it shines through the water. You may be able to see some particles of dust floating in the water; they appear white. However, it is rather difficult to see exactly where the beam passes through the water.

Add about 60 milliliters (¼ cup) of milk to the water and stir it. Hold the flashlight to the side of the container, as before. Notice that the beam of light is now easily visible as it passes through the water. Look at the beam both from the side and from the end, where the beam shines out of the container. From the side, the beam appears slightly blue, and on the end, it appears somewhat yellow.

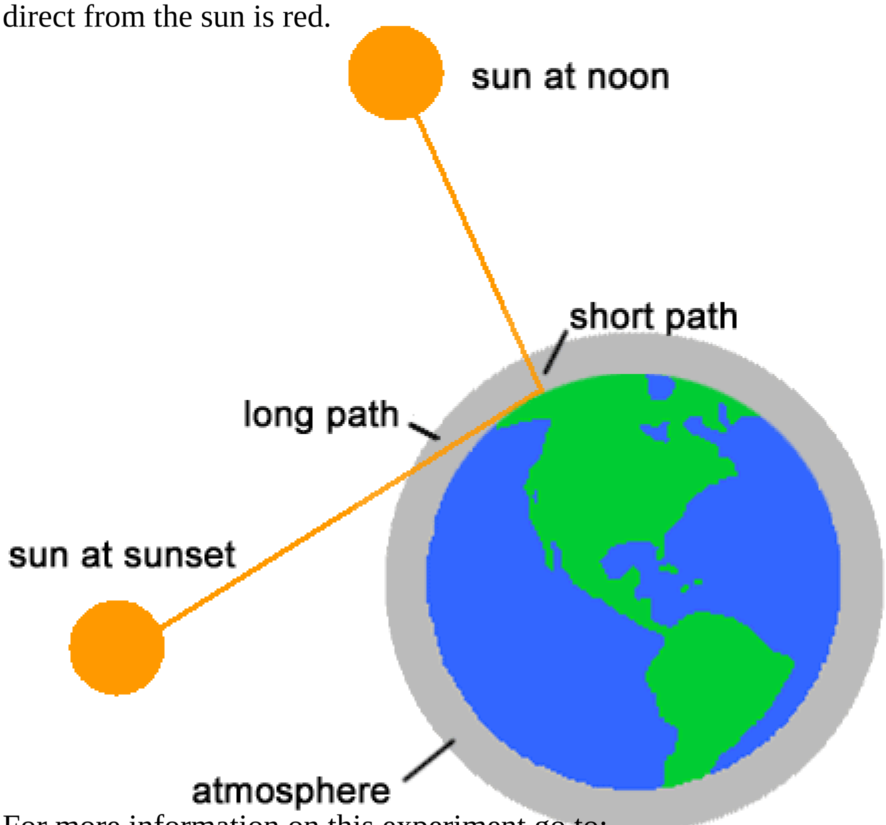
Add another ¼ cup of milk to the water and stir it. Now the beam of light looks even more blue from the side and more yellow, perhaps even orange, from the end.

Add the rest of the milk to the water and stir the mixture. Now the beam looks even more blue, and from the end, it looks quite orange.

When you added milk to the water, you added many tiny particles to the water. These particles scatter the light and make the beam of the flashlight visible from the side. Different colors of light are scattered by different amounts. Blue light is scattered much more than orange or red light. Because we see the scattered light from the side of the beam, and blue light is scattered more, the beam appears blue from the side. Because the orange and red light is scattered less, more orange and red light travels in a straight line from the flashlight. When you look directly into the beam of the flashlight, it looks orange or red.

What does this experiment have to do with blue sky and orange sunsets? The light you see when you look at the sky is sunlight that is scattered by particles of dust in the atmosphere. If there were no scattering, and all of the light traveled straight from the sun to the earth, the sky would look dark as it does at night. The sunlight is scattered by the dust particles in the same way as the light from the flashlight is scattered by particles in milk in this experiment. Looking at the sky is like looking at the flashlight beam from the side: you're looking at scattered light that is blue. When you look at the setting sun, it's like looking directly into the beam from the flashlight: you're seeing the light that isn't scattered, namely orange and red.

What causes the sun to appear deep orange or even red at sunset or sunrise? At sunset or sunrise, the sunlight we observe has traveled a longer path through the atmosphere than the sunlight we see at noon. Therefore, there is more scattering, and nearly all of the light direct from the sun is red.



For more information on this experiment go to:
http://scifun.chem.wisc.edu/HOMEEXPTS/BlueSky.html

Mirror Multiplication:

Materials:

2 mirrors
Small toy

1. The use of two large mirrors is best for this activity. Place the small toy between the two mirrors. Make sure the mirrors lean against something solid, facing one another. (Mirrors should be parallel to one another.)
2. Look at one mirror. How many reflections can you count before they become too small? Now look at the other mirror. Is the number of reflections the same?

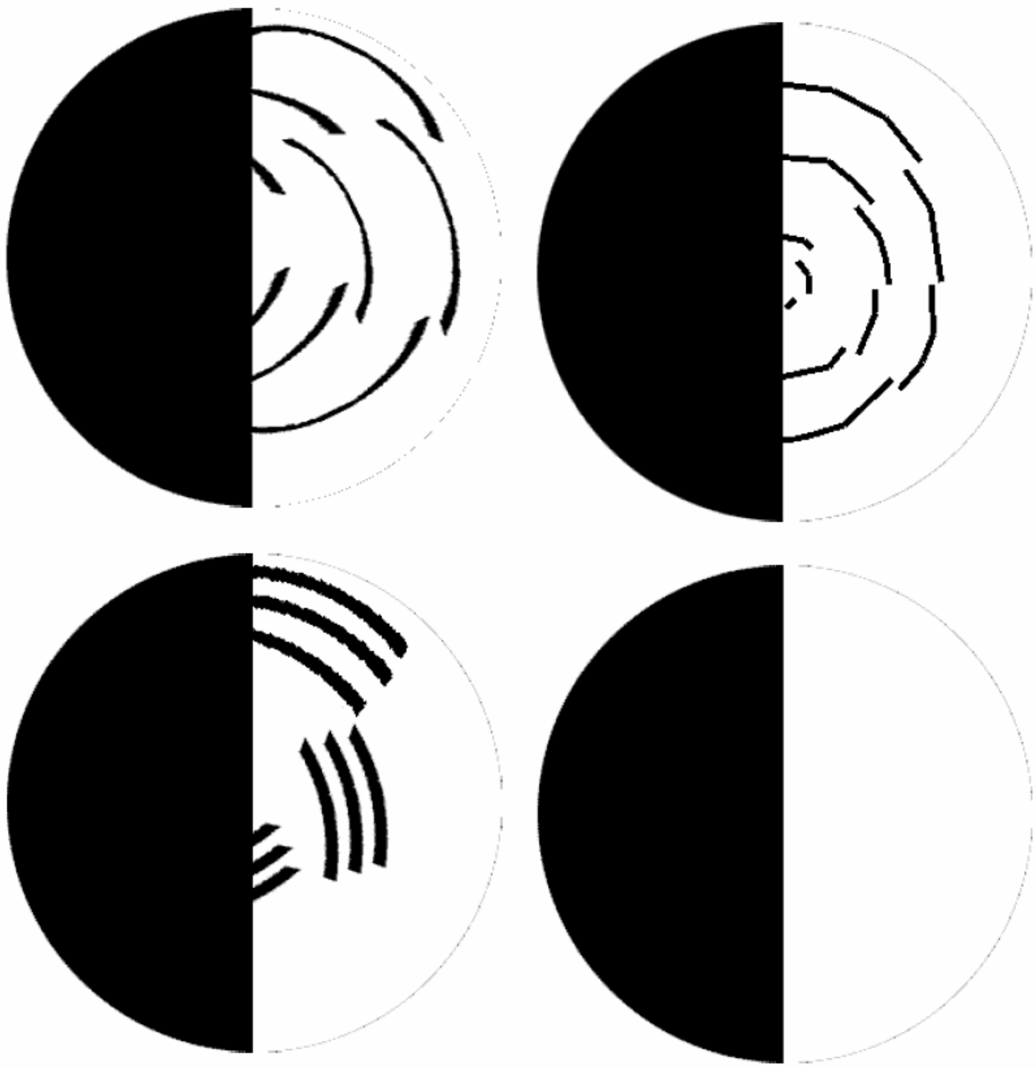
Ask students:

What happens to the light rays when two mirrors reflect each other? Do they continue to bounce back and forth forever?

What does each set of reflections do as the images stretch off into the distance? Fade away? Curve? Do they seem to reach a vanishing point?

- *This activity comes from Power of Science by Learning Resources, Inc*.

Benham's Disks



Instructions: Cut out each disk carefully. If you are using the CD spinner, make a small slit in the center of each disk so the disk will slide over the penny. If you are using the top of a plastic container, push a toothpick through the center of each disk and then slide the toothpick through the middle of the plastic lid. Break the toothpick in half for the best results. The "blank disk" without a pattern (lower right) is for you to design yourself: use a black marker to draw on the white half. Attach your disk to a spinner and see if it works!

STROOP TEST MINI CARDS

RED	BLUE	GREEN	BLUE	BLACK
YELLOW	GREEN	ORANGE	GREEN	RED
PINK	BLACK	BROWN	YELLOW	GRAY
BLUE	RED	GREEN	PINK	BROWN
ORANGE	BLACK	BLUE	GREEN	RED

RED	BLUE	GREEN	BLUE	BLACK
YELLOW	GREEN	ORANGE	GREEN	RED
PINK	BLACK	BROWN	YELLOW	GRAY
BLUE	RED	GREEN	PINK	BROWN
ORANGE	BLACK	BLUE	GREEN	RED

RED	BLUE	GREEN	BLUE	BLACK
YELLOW	GREEN	ORANGE	GREEN	RED
PINK	BLACK	BROWN	YELLOW	GRAY
BLUE	RED	GREEN	PINK	BROWN
ORANGE	BLACK	BLUE	GREEN	RED

RED	BLUE	GREEN	BLUE	BLACK
YELLOW	GREEN	ORANGE	GREEN	RED
PINK	BLACK	BROWN	YELLOW	GRAY
BLUE	RED	GREEN	PINK	BROWN
ORANGE	BLACK	BLUE	GREEN	RED

Name: ______________________________________ Date: _____________

Human Eye Pre/Post Test (Answers)

Circle the best possible answer.

1. What is the cornea?
   A. transparent tissue covering the front of the eye
   B. black hole in the iris
   C. the eye's white outer layer

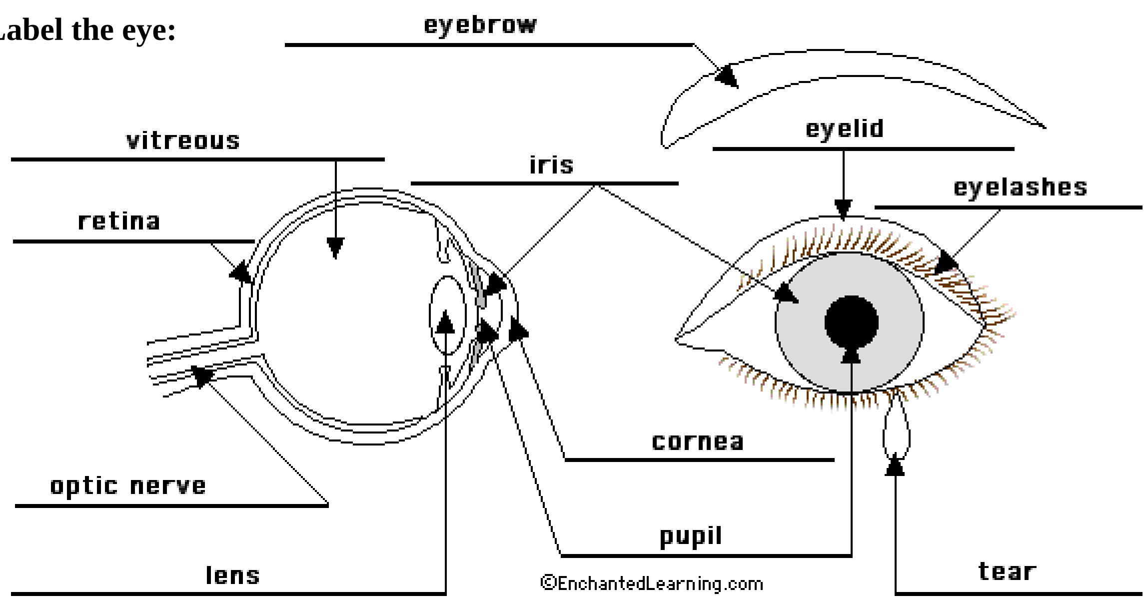
2. Which of these is responsible for focusing light rays on the retina?
   A. sclera
   B. optic nerve
   C. lens

3. The ______________ transmits electrical impulses from the eye to the brain.
   A. lens
   B. optic nerve
   C. vitreous

4. The eye works a lot like a ________________.
   A. computer
   B. projector
   C. camera

5. The _________________ is the most sensitive part of the retina.
   A. sclera
   B. vitreous
   C. macula

Label the eye:



Name: ______________________________________ Date: ____________

Human Eye Pre Test

Circle the best possible answer.

1. What is the cornea?
   A. transparent tissue covering the front of the eye
   B. black hole in the iris
   C. the eye's white outer layer

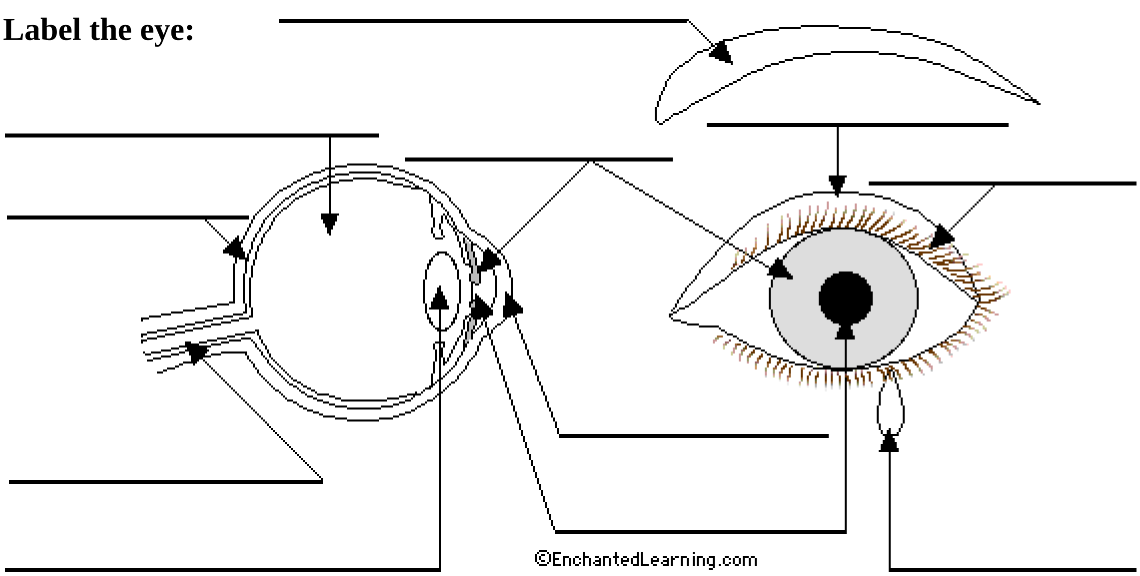
2. Which of these is responsible for focusing light rays on the retina?
   A. sclera
   B. optic nerve
   C. lens

3. The _____________ transmits electrical impulses from the eye to the brain.
   A. lens
   B. optic nerve
   C. vitreous

4. The eye works a lot like a _______________.
   A. computer
   B. projector
   C. camera

5. The ________________ is the most sensitive part of the retina.
   A. sclera
   B. vitreous
   C. macula

Label the eye:



Name: ____ Date: _____________

Human Eye Post Test

Circle the best possible answer.

1. What is the cornea?
    - A. transparent tissue covering the front of the eye
    - B. black hole in the iris
    - C. the eye's white outer layer

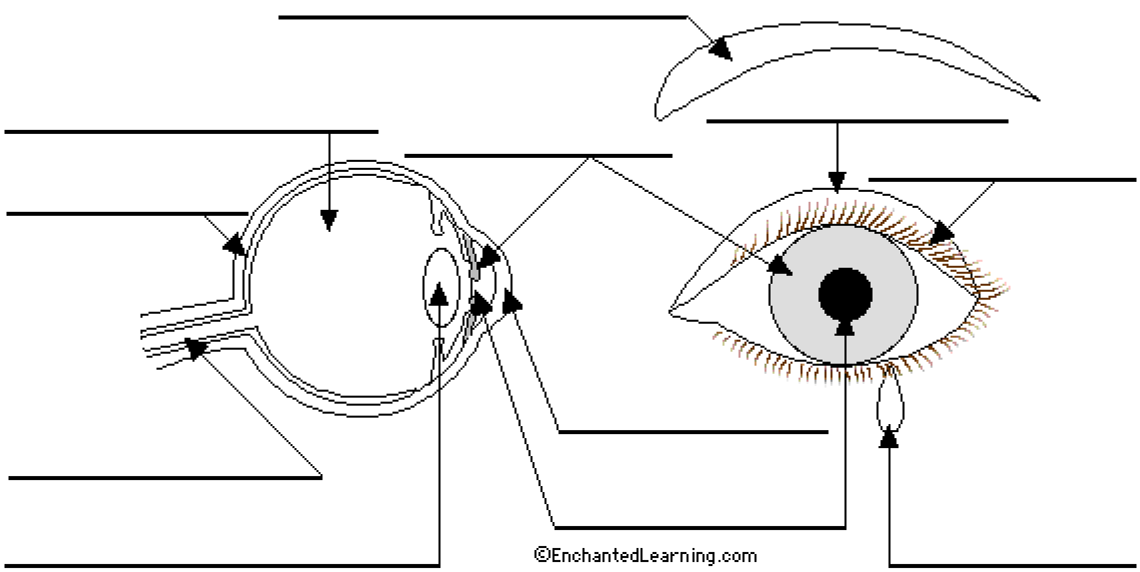
2. Which of these is responsible for focusing light rays on the retina?
    - A. sclera
    - B. optic nerve
    - C. lens

3. The ______________ transmits electrical impulses from the eye to the brain.
    - A. lens
    - B. optic nerve
    - C. vitreous

4. The eye works a lot like a ________________.
    - A. computer
    - B. projector
    - C. camera

5. The _________________ is the most sensitive part of the retina.
    - A. sclera
    - B. vitreous
    - C. macula

Label the eye:



Material/Resource List

Materials:

Item Description	Supplier	QTY.	Cost
Eye Model	Boreal Lab.	1	$ 51.00
Anatomical Chart Co:The Eye	Boreal Lab.	1	$ 31.50
Eye Test Chart	Boreal Lab.	2	$ 19.30
Can You Believe Your Eyes?	Boreal Lab.	1	$ 27.95
Light and Color Tutorial Kit	Carolina	1	$ 29.95
Lens and Mirror Kit	Carolina	1	$ 29.95
Concave Lenses	Carolina	1	$ 3.50
Convex Lenses	Carolina	1	$ 3.50
Spectroscope	Boreal Lab.	1	$ 7.25
Flashlights	Walgreens	3	$ 26.97
Total:			**$ 196.92**

Boreal Laboratorios 800-828-7777 http://sciencekit.com
Carolina 800-222-7112
https://www2.carolina.com/webapp/wcs/stores/servlet/StoreCatalogDisplay?storeId=10151&catalogId=10101&langId=-1
Walgreens * check your local listings

Resources:

Books:

Harcourt 5th Grade Textbook
Can You Relieve Your Eyes?
Sandwich Bag Science

People:

Ophthalmologist/Optometrist (Guest speakers): Call your local professionals and ask them to come in and help.
Media Specialist
Science Coach: Not all schools have a science coach.

Websites:

http://www.hometrainingtools.com/articles/eye-chart-science-project.html
http://faculty.washington.edu/chudler/chvision.html
www.uvi.edu/SandM/Physics/Opticalillusions/Opticalillusions.html
http://www.scienctificpsychic.com/grap[hics/

http://www.sites4teachers.com/links/redirect.php?url=http://faculty.washington.edu/chudler/bigeye.html
http://inventors.about.com/od/gstartinventions/a/glass_3.htm
http://www.teagleoptomerty.com/history.htm
http://www.cbc.ca/kids/general/the-lab/history-of-invention/eyeglasses.html
www.enchantedlearning.com
http://www.aoa.org
http://www.healthychild.net/articles/mc34eyeinjury.html
http://scifun.chem.wisc.edu/HOMEEXPTS/BlueSky.html
http://www.uwm.edu/~awschawb/specweb.htm#tomake

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Optical Tricks. Home page. David Smith. 23 Oct. 2006. <www.uvi.edu/SandM/Physics/Opticalillusions/Opticalillusions.html>.

Scientific Psychic. Home page. Antonio Zamora. 23 Oct. 2006. <http://www.scienctificpsychic.com/grap[hics/>.

Teagle Optometry. Home page. 10 Oct. 2006. <http://www.teagleoptomerty.com/history.htm>.