Do You See What I See?

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Overview: Learn about one of the five senses, the sense of sight. Is it the most important of the five senses? Learn about the parts of the eye, how the eye works and why some people have to wear glasses or contacts. Also, find out what happens when your brain tricks you with visual illusions.

Grade Level: 3-5

Time Allotment: Three 45-minute classes

Subject Matter: Science, English (Written Language), and Technology

Learning Objectives
Students will be able to:

- Label the eye.
- Describe how the eye works.
- Recognize Braille and why and when it is used.
- Understand and use vocabulary:
    - Pupil
    - Iris
    - Lens
    - Cornea
    - Retina
    - Rods and cones
    - Far sighted
    - Near sighted
    - Ophthalmologist
    - Optometrist

Standards: *The objectives listed above may be used to address the following Virginia Standards of Learning available at:*
http://www.pen.k12.va.us/go/Sols/historysol2001.doc
Science
K.2 The student will investigate and understand that humans have senses including sight, smell, hearing, touch, and taste.
3.1 The student will use effective communication skills in group activities.
3.2 The student will use strategies to read a variety of fiction and nonfiction materials.
4.1 The student will use effective oral communication skills in a variety of settings.
C/T5.4 The student will communicate through application software.
C/T5.3 the student will process, store, retrieve, and transmit electronic information.

Media Components

Video: The Five Senses/ Sight
Streaming Video For Classrooms found at www.unitedstreaming.com

Web Sites:
http://faculty.washington.edu/chudler/sight.html
This site is about wearing glasses. It explains why people need glasses and what it means to have 20/20 or 20/200 vision.

http://faculty.washington.edu/chudler/eyesafe.html This site lists eye safety.

http://faculty.washington.edu/chudler/flash/nill.html
This site has many visual illusions that are interactive so the student can check to see if they are correct.

Materials:
Materials needed for each student or each group of two.

- Computer with access to the Internet.
- Computer that can project image to screen or television
- Copy of handouts (see attachments)
- Transparency of the eye for labeling
- URLs for the Internet
- Pencil
- Glue and Scissors (if students need to cut and paste labels instead of writing)
- Dictionary for each student or group of students
- Drawing paper

Prep for Teachers

The teacher should preview and cue the video clip as indicated in the Learning Activities section. The streaming video for Sight should be downloaded. Have all handouts ready. These will be used at different times throughout the lesson. The teacher should have the Internet sites book-marked for easier access. Students should have a working knowledge of how to use the Internet.

Introductory Activity

1. Say to the class: “Today we are going to play Color Spy.” It is a variation of the "I Spy" game. Tell the class that they will work as a team to find objects of a certain color. Divide players into teams. Have the colors "blue", "red", "yellow", "orange" and "green" on separate pieces of paper or index cards. Divide the class into equal teams. If you have a large class you may have more than one team of the same color. Have one member of each team pick a paper. The color picked will be the name of the team.

2. When you say, "Go", the teams will have 5 - 10 minutes (depending upon how well your class works in teams) to look around the room for objects that have their team's color. Teams must make a list of all the objects they find. After the 5-minute search period, the teams come back together and the lists of objects are read. Each team gets 1 point for each object found.
3. After the lists are read, each team will get 5 minutes to search the room for colored objects that the ***other*** teams did NOT find. For example, if the red team did not find a red apple, another team that DID find the red apple will get one point. The team with the most total points after both searches is the winner.
4. Ask: "What did you use to find the different colored objects?" (their eyes)
5. Ask: "What can you tell me about the eye?" Make a list on the board of everything they tell you. You may get responses such as, you use your eyes to see, you cry with your eyes, the eye is round etc. Save this list so you can add to it after they learn more.

Learning Activities:

1. Say: "Our eyes are one of the five senses. Your eyes are very important and we should take care of them. We can only see the outside of the eye but there is a lot more to the eye than what we see. Everyone look at your neighbor's eyes. What are some things that you see?" Accept responses such as, the different color, they may say a black hole or they may know some of the correct terms. Take a few minutes to share.

2. To set a **Focus for Media Interaction** say to the class: **"**I am going to show you a video clip that will help you understand the eye. This clip is going to answer two questions for us. One, what is the colored part of the eye called and two, what is the black hole in the center of our eye called. Listen carefully to see if you can here the answers to these two questions." Repeat questions.
3. **START:** At the beginning of the streaming video. **PAUSE**: when the narrator says; "In the center of the iris is a black hole called the pupil." Ask, "What is the colored part of the eye called?" (Iris) "What is the black hole in the center of our eye called?" (Pupil).
4. Provide a **Focus for Media Interaction** by saying to the class, "There is another part of the eye that is there to protect the iris and pupil. It is very important because without it a small dust particle could damage our eyes. Listen carefully to this next part of the video to see if you can find out the part of the eye that protects the iris and pupil." **RESUME PLAY** and **PAUSE** after the narrator says, "The cornea is a clear layer of protection that covers the pupil and iris." Ask: "What is the name of the area called that protects the iris and pupil?" (Cornea)
   Pass out the drawing of the eye.
   Say: "Put your name on your paper."
   Say: "We are going to label the iris, pupil and cornea." Put your transparency of the eye up so you can label the eye as the class labels it. Give the class a few minutes to label the picture. (For students who have difficulty copying words they can cut and paste the words.)

5. Provide a **Focus for Media Interaction** by saying to the class, "Directly behind the iris is a lens that helps to focus the light onto the retina at the back of the eye. Look at your drawing of the eye and find the lens." Point out the lens on your transparency. Label the lens. Find the retina and label it. Make sure that everyone has labeled his or her eyes correctly. Say, "The retina is a special area made up of sensory cells." Write the word sensory cells on the board. Say, "Listen carefully to this next piece of video to see what these sensory cells are called." Repeat question: "What are the sensory cells of the retina called?"
   RESUME PLAY and **PAUSE** when you hear the narrator say, "They also see black and white." Ask: "What are the sensory cells of the retina called?" (Cones and rods)
6. Provide a **Focus for Media Interaction** by saying to the class: "People thousands of years ago thought that eyes sent out rays of light that struck an object and then came back to the eye with an image. They thought this way because of what happens to a cat or dog's eye when they are in a dark area. Listen carefully to this next clip and see if you can tell me what they saw happening to the cat's or dog's eyes in a dark area."
   RESUME PLAY and **PAUSE** as soon as the narrator says, "Today we know that light strikes an object and is then reflected, or bounces off that object and into our eyes." Ask: "What did they see happen to the eyes of the cat and dog in a dark area?" (They appeared to glow.) Ask: "Who has seen a cat or dog's eye glow in dark areas?"
7. Provide a **Focus for Media Interaction** by saying to the class: "We just learned that we see things because lights strikes whatever we are looking at and is then reflected into our eyes. We have also learned the names of some parts of the eye. Look at your sheet with the drawing of the eye. What parts of the eye must a reflected image go through?" (The pupil and lens) Ask: "Who would like to take a guess as to what happens after the image goes through the pupil and lens?" (Accept all possible answers.) Say, "We are going to look at this next clip to first find out if we were right about the light going through the pupil and lens and then we will see if anyone guessed right about the what happens next."
   RESUME PLAY.
   PAUSE when you hear the narrator say, "The brain also flips the image over so that it is right side up." Ask: "Were we right about the reflection of an object passing through the pupil and lens? What happens after it passes through the pupil and lens?" (It forms and upside-down image on the retina and the rods and cones send a message to the brain to figure out what we are looking at. The brain also flips the image over so that it is right side up.)
8. Provide a **Focus for Media Interaction** by saying to the class: "How many of us wear glasses or contacts? Raise your hands." Ask: "Why do we have to wear glasses?" (Accept answers such as because we can't see well, things are blurry etc.) If they do not use the word blurry or out of focus Ask: "Do some people wear glasses because things are blurry or out of focus?" (Yes) "Let's look at this next clip and see why things are blurry or out of focus. Listen carefully for the answer to this question: Why do some people see things out of focus or in a blurred fashion?"
   RESUME PLAY.
   STOP when you hear the narrator say; "The man-made lenses can be used to help the lens of the eye focus the light properly on the retina of the eye."

Ask: “Why do some people see things out of focus or in a blurred fashion?” (The lens doesn’t focus the light on to the retina correctly. Some people are farsighted and some are near sighted.)

Culminating Activity

1. Say to class: “We have been talking about the sense of sight. We have learned about the parts of the eye and we have also learned that some people need glasses to help them see. Ask: “Who has been to an eye doctor? Does anyone know what they call an eye doctor?” Accept some answers if students offer any. Say, “The correct answer is an ophthalmologist although you may have also heard of the word optometrist. They both are called eye doctors but there is a difference.” Write the two words on the board. Say: “I want you to look up these two words so we can see what the differences are.”
2. Give class time to look these up. Ask for a volunteer to read each one and then discuss the differences. (An ophthalmologist is a physician who specializes in the medical and surgical care of the eyes and is qualified to prescribe medication and perform surgery. They can also prescribe glasses. An optometrist is a health care provider who specializes in refractive errors, prescribes eyeglasses and diagnoses and manages conditions of the eye. They cannot perform surgery).

3. Take your class to the computer lab. The sites should already be book-marked. Say to the class, “I want you to open Microsoft Explorer (or Netscape or any browser you are using) and go to the menu bar and click on Favorites, and select Neuroscience for kids – glasses.” **http://faculty.washington.edu/chudler/sight.html**
   “If you have been to an eye doctor you have seen this chart.” Ask a volunteer to read that first paragraph or read it aloud yourself. After they have finished ask: **“**What does it mean if my vision is 20/40? (What I can see at 20 feet most people can see at 40 feet). Ask: “what would it mean if my vision were 20/200? (It would mean that I was legally blind.) Explain to the class that someone who is legally blind may have still see some things or they may only be legally blind in one eye.

4. Tell the class to scroll down to the next section. Have a volunteer read that next section or read it aloud yourself. After they have finished make sure they understand the difference between farsightedness and nearsightedness. Ask: “If I was farsighted what does that mean?” (I have trouble seeing objects close up) Ask: “If I was nearsighted what does that mean?” (I have trouble seeing objects that are at a distance). Ask: “Is anyone in here nearsighted?” Wait for answers. Then ask, “Is anyone in here farsighted?” Wait for answers

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5. Tell the class to take out their notebooks or paper and then to go back to Favorites and select Neuroscience for kids Eye Safety.
   http://faculty.washington.edu/chudler/eyesafe.html Have them make a list of eleven safety tips that they can practice and list six “built in” safety devices that their bodies have.

6. Give them time to write the tips and then go over them as a group. See how many more safety tips they can add.
    1. Walk; don't run, with sharp objects such as scissors, pens, pencils and rulers.
    2. Avoid guns, bow-and-arrows, slingshots and firecrackers.
    3. Use good lighting to avoid tiring your eyes when reading, writing or cruising the Internet.
    4. Learn basic first aid for your eyes in case an injury does occur.
    5. Tell your parents, school nurse or teachers if your eyes are bothering you.
    6. Wear proper eye protection when you are doing hazardous hobbies, chores or mixing chemicals.
    7. Wear proper eye protection when you are playing sports such as racquetball and baseball.
    8. Wear sunglasses that block both ultraviolet-A and ultraviolet-B radiation from the sun.
    9. Never look directly at the sun.
    10. Point chemical sprays away from your face BEFORE spraying.
    11. Wear a helmet when biking, skateboarding or roller-skating and wear your seatbelt in the car.

    Your body has provided some safety devices:
    1. Bony sockets: your eyes are located in bony sockets to protect them from getting hit.
    2. Eyebrows: your eyebrows are used to keep the light out.
    3. Eyelids: your eyelids can close to keep small objects out of your eyes.
    4. Eyelashes: eyelashes also keep small objects out of your eyes.
    5. Tears: tears keep your eyes moist and work to wash small objects out of your eyes.
    6. Blink reflex: the blink reflex automatically closes your eyes.

7. Say to the class: “We have been talking about the parts of the eye and how the brain tells us what we see. What if the brain tricks us? Sometimes what you think you see isn’t what is always there.” Pass out the handout called Visual Illusions. Say: “Look at the visual illusions and answer the questions. After you finish all of the questions go back to the computer and go to Favorites and select Nill.”
   http://faculty.washington.edu/chudler/flash/nill.html
   “You will go to a site called Gallery of Visual Illusions. From there you select Enter and go to each illusion. They will be the same ones on your sheet. Follow the directions on each page. See if you were able to “see” all of the illusions. Make sure you click Go Back To Menu to select the next illusion. Do not click on the back button. After you do the ones on your sheet you may go to the next section called More Illusions on your own.”

8. After students have had an opportunity to complete the given tasks, ask: “How did this activity make you feel?” (Accept all answers. They may have enjoyed it but felt frustrated at times.) Ask: “Do you think that you could draw your own visual illusion? Let’s give it a try.” Allow the students to draw their own visual illusions.

You could assess this lesson by providing the students with a blank eye diagram and having them fill it out. Or they could draw and label their own eyes.

Cross-Curricular Extensions

Art:
- Create eye sculptures using paper or clay.
- Create visual illusions.

Math:
Investigate geometric figures that are used in visual illusions.

Science:
- Research how rods and cones work on the retina.
- Experiment with light refraction and reflection.

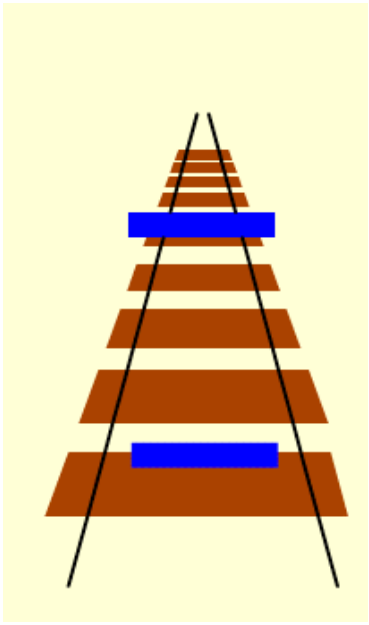
Technology:
- Have the students create a PowerPoint presentation explaining the parts of the eye.
- Create a WebQuest for the Eye

- **http://faculty.washington.edu/chudler/chvision.html**
  This site has fun activities with the eye.
- **http://www.brl.org/**
  Learn Braille online
- **http://www.afb.org/braillebug/Games.asp**
  This site includes the history of Braille, Braille games and activities
- **http://www.keystoneblind.org/wiseweb/eyeknow.htm**
  This site has resources for the eye

Community Connections

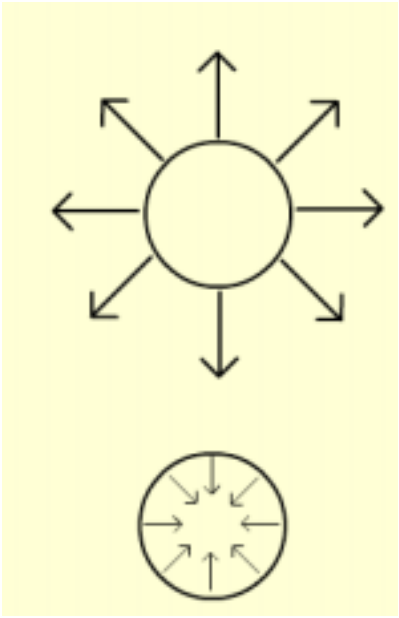
1. Ask an Ophthalmologist to talk to the class.
2. Plan a field trip to the Eye Doctors office.
3. Have someone that is blind come
   and talk to the class.

Visual Illusions



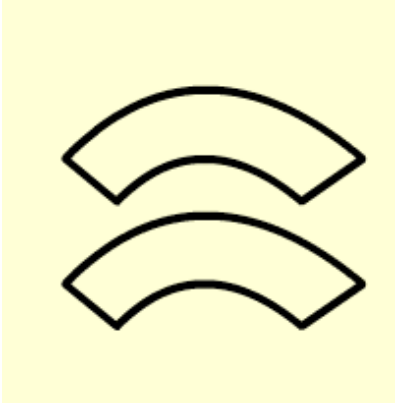
Ponzo Illusion

Which blue rectangle looks larger? The top one or the bottom one?



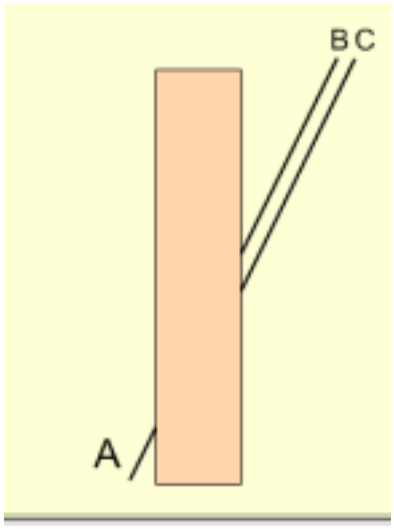
Size Illusion

Which circle looks larger? The top one or the bottom one?



Wundt-Jastrow Illusion

Which picture looks larger? The top picture or the bottom picture?



Poggendorff Illusion

Does line B or line C match up with line A?

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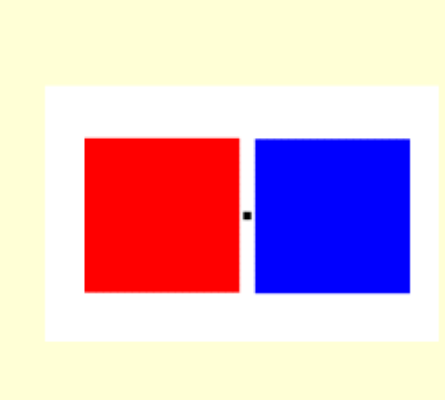

Color Aftereffects

Stare at the small black dot in the picture on the left for about 20 seconds, and then look at the white space below the picture. What colors do you see?

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Shape Illusion

Which of the three arcs would make the largest complete circle?

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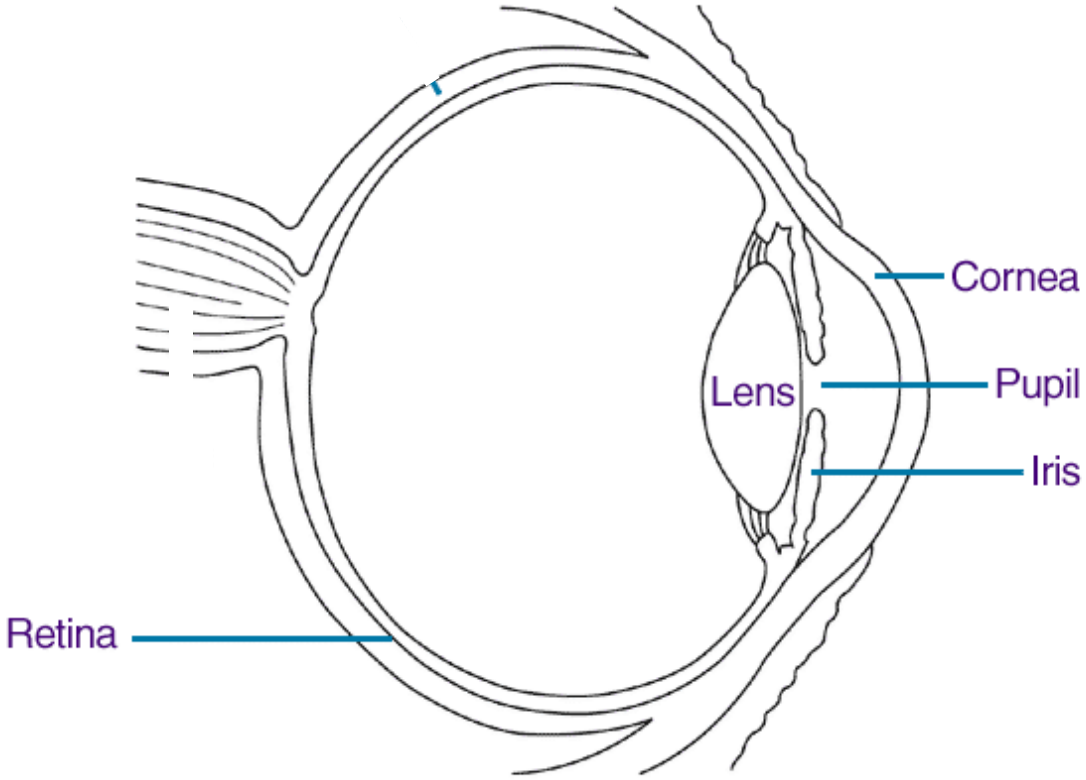
Eye Diagram
Teacher Answer Sheet

Pupil
Iris
Lens
Cornea
Retina



Name_____

Eye Diagram

Pupil
Iris
Lens
Cornea
Retina