

Lesson Ideas: Grades 4 through 5

Grades 4-5

Implement any of the following lesson ideas to teach your students about the eyes, visual system, eye health and safety. Each lesson idea can be completed as an independent learning activity or incorporated into your existing curriculum.

Masters for photocopying a variety of fun Vision Quest materials to help students learn are included in this kit.

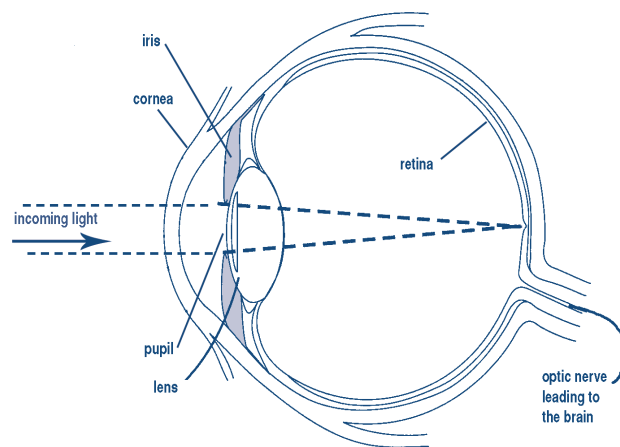
Lesson #1: Optical illusions and how the eyes and visual system work

Suggested Vision Quest materials: "Optical Illusions" and "Diagram of the Eye and Visual System" activity sheets.

Ask students to test their "eye-Q" by completing the "Optical Illusions" activity sheet. Discuss each illusion, explaining that our eyes can play tricks on us because vision is a complicated system requiring, not only our eyes and light, but our brain to interpret what we see.

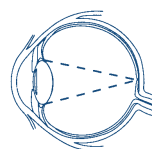
Use these illusions and the "Diagram of the Eye and Visual System" activity sheet to launch a discussion of the parts of the eyes and the workings of the visual system. Include these key points:

- ✓ Vision requires three things: (1) **light** to see objects, (2) **eyes** to absorb light reflected from objects we see, and (3) a **brain** to interpret these light signals and create an image in our mind.
- ✓ Vision begins when light rays enter the eye through the **cornea**, the transparent front surface of the eyeball.
- ✓ The cornea bends (or **refracts**) the light rays so they can pass through the **pupil**, the small black hole in the center of the colored part of the eye.
- ✓ The amount of light passing through the pupil is controlled, in part, by the muscles in the **iris**, the colored part of the eye, that can tighten or relax to make the pupil smaller or larger.
- ✓ The rays flow through the pupil then pass through the eye's **lens** which is very similar to a lens on a camera. The lens further bends (or refracts) the light rays so

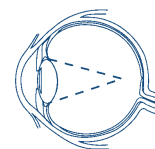


that they focus on the **retina**, the nerve-rich lining at the back of the eye.

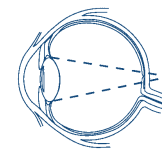
- ✓ The retina contains millions of tiny light-sensitive nerve cells that create a series of electrical impulses that are sent through the **optic nerve** to the brain. The **brain** interprets these impulses allowing a picture to form in the mind.



Good visual acuity



Myopia



Hyperopia

- ✓ Good **visual acuity** (visual sharpness) occurs when the lens focuses light rays precisely on the retina. In some people, the lens of the eye may focus the light rays at a point in front of the retina. This is called **myopia** (or nearsightedness) and makes close objects easier to see clearly than those at a distance.

- ✓ In some people, the lens of the eye may focus the light rays at a point behind the retina. This is called **hyperopia** (or farsightedness) and makes distant objects easier to see clearly than those nearer to the eyes. Myopia, hyperopia and many other visual conditions can be corrected with **prescription eyeglasses** or contact lenses.
- ✓ It is a good idea to visit your doctor of optometry at least once every year for an **eye examination** to make sure your eyes are healthy and working properly.

Conclude the lesson with a final illusion: Demonstrate that a pencil inserted into a glass that is half filled with water appears bent. Have students research and explain why this occurs. (Answer: The pencil will appear to be bent or “refracted” because light waves (necessary for our eyes and brains to interpret what we see) travel at different speeds through different materials. Thus, we see (and interpret) the part of the pencil in the water at a different speed than the part in the air making it appear bent.)

Lesson #2: Animal eyes research project

Suggested Vision Quest materials: “Animal Eyes” activity sheet.

Learn more about how the eyes and visual systems of animals work similarly to and differently from humans by launching the students on a research project using the “Animal Eyes” activity sheet.

Begin the lesson by having students cut out pictures of animals from old magazines and mount them in groups according to animal type on a bulletin board. If magazines are not available, discuss the animal groupings found on the activity sheet.

Divide students into groups and assign an animal (or animal species) to each group. Take students to your school’s library where the librarian can show them how to find information about animal eyes in books, magazine articles, encyclopedias and on the Web.

Have students answer the questions on the activity sheet and post their completed sheets on the bulletin board by the animal’s pictures. Have a representative of each group share some of their findings with the class.

Findings may include:

- Cats, tigers and lions have vertical pupils that close to a slit. These enable them to see up and down which is very important to animals that must jump and leap.
- Horses, cows and other grazing animals have horizontal pupils so they can see well from side to side. Their eyes are located on the sides, rather than the fronts, of their heads helping them to navigate in fields and search for food.
- Birds have three eyelids to protect their eyes from dust, sand and wind and to carry cleansing tears across the surface of their eyes. Owls have huge eyes and the ability to swivel their heads so they can spot food sources such as mice.
- Insects such as house flies, ants and bees have compound eyes that create multiple images of a single object. Compound eyes are very efficient at detecting motion which can help the insect avoid predators.

Lesson #3: Eye health fair

Suggested Vision Quest materials: “Eye Fitness Checklist.”

Help students learn more about the important relationship between their vision and their general health and safety by hosting an eye health

fair in your classroom. Photocopy and distribute the “Eye Fitness Checklist” to guide students in setting up and moving through the fair.

Create several stations in different parts of the classroom where students can learn more about one aspect of vision or eye health. Ideas for stations include:

- A sensory station where students are blindfolded and asked to identify an item (such as a bell, crayon, rock, orange, bar of soap or peppermint) hidden in a box. (This helps students realize that, without vision, we must rely heavily on our other senses to interpret the world around us.)
- A visual awareness station where students are asked to name everything they can see out a window or from a certain view in 15 seconds. (This helps students comprehend how much our eyes are constantly seeing.)
- A visual testing station where students can read letters of various sizes on a board at near and far distances. Students with eye-glasses may want to try to do this with and without their glasses.
- A peripheral vision station where students are asked to look at an object directly in front of them and to inform the tester as soon as a second student (walking in a circle around the student from behind) comes into view.
- A focusing station where students are asked to look a near object (such as a desk) placed in front of a far object (such as a word printed on the board). Students will become aware of the eye's ability to shift

focus when attention is placed on the near or far object and the opposite object appears out of focus.

- A sunglasses station where students can try on different sunglasses in front of a mirror while being reminded of the sun's harmful ultraviolet rays.
- An athletic safety booth where students can try on hockey or catcher's masks, football or biking helmets and swim goggles while a student or coach explains how the equipment helps protect the eyes.
- An eye emergency booth where a school nurse can discuss what students should do if they get something in their eye or if they severely injure their eye. Using a mirror, the school nurse can demonstrate how the eyelid can be gently pulled forward to allow tears to cleanse the eye in the event that dust or dirt gets in the eye. A disconnected telephone can be used to practice calling a parent or 911 in the event of severe eye injury or accident.
- A nutrition station where students can sample carrots, spinach, raisins, blueberries, tomatoes and other foods rich in nutrients that help the eyes.

Ensure that each student has an opportunity to man a station and to visit alternative stations. When the fair is over, have students complete their checklists and discuss what they learned at each station.

Lesson #4: Eye safety art show

Suggested Vision Quest materials: "Book Marks and Mailing Inserts" copy master and "Healthy Eyes for Students and their Families" fact sheet.

Begin the lesson by reminding students that there are many things in the environment that can hurt our eyes, and that we can help protect ourselves by becoming more aware of our surroundings and potential eye hazards.

Ask students to name situations that can be hazardous to the eyes (e.g., playing sports or riding a bike without protective eyewear and/or headgear, running with sharp objects,

poking or rubbing the eyes, spilling or spraying chemicals into the eyes, staring at the sun, and walking or playing in areas with insufficient light). Also think of situations that can tire the eyes (such as watching TV, playing video games or working on the computer for long periods of time).

Make a list of the hazardous and tiring situations on the board and discuss the poten-

tial danger or fatigue it can cause, what one should do if injury or fatigue results, and – most importantly – how the situation can be avoided.

As you review each situation, appoint two students to keep a running list of eye health and safety DOs and DON'Ts. (Remember to add some proactive DOs such as obtaining annual eye examinations, wearing prescription eyeglasses when needed, eating nutritious foods, getting plenty of exercise and sleep, and wearing sunglasses for ultra-

violet protection.)

Challenge students to share this information with others by creating an art exhibit on “The DOs and DON'Ts of Eye Health and Safety” for your school’s hallway, cafeteria or library. Ask each student to create a poster using words and images to communicate a specific DO or DON'T. Students can also decorate a supply of bookmarks and “Healthy Eyes” fact sheets for their schoolmates and parents using the copy masters found in this kit.

Lesson #5: Ask the doctor about vision and sports

Suggested Vision Quest materials: “Sports Vision Safety” activity sheet.

As children become young adults, it is important that they learn to identify individuals who can provide them with accurate information and to become confident in learning how to ask questions.

Help students develop a safety tip sheet for their favorite sport by distributing photocopies of the “Sports Vision Safety” activity sheet at the start of the lesson.

Ask students what sports they play and how they use their eyes when playing these sports. Discuss possible hazards sports present for the eyes. Examples include:

- baseball (possibility of being struck by a ball or bat),
- football and soccer (possibility of being struck by a ball or other players and/or getting dust and debris in the eyes),
- biking or rollerblading (possibility of head trauma in the event of a tumble),
- swimming (possible eye irritation from chlorine and other pool chemicals),
- tennis and racquetball (possibility of being struck by a ball, racquet or other players),
- paintball (possibility of being struck in the eye and/or getting paint in the eye), and
- hockey (danger of flying hockey pucks and accidental blows from sticks).

Next, ask to whom students should go with questions about protecting their eyes when playing sports (e.g., coaches, school nurses, physical education instructors, librarians, eye care professionals or managers of sport-

ing goods stores) and have them practice shaping and asking questions. Assign several students to each sport and, using their activity sheet as a guide, see what kind of information they can bring back to share with the class.

Invite a doctor of optometry to speak with the class about how athletes use their eyes when playing some of the more popular sports and to demonstrate how students can protect their eyes through proper use of equipment, safety habits, and protective eyewear and headgear. Ask the optometrist to bring along some examples of protective eyewear (such as goggles and safety glasses) and to discuss how undiagnosed visual conditions can impact sports performance. Encourage children to prepare any questions they have for the doctor about eye safety and general eye health prior to the visit.

As a follow-up assignment, have students share their completed “Sports Vision Safety” activity sheets with their parents.

Let us help!

The South Dakota Optometric Society offers a video lending library, assistance locating speakers, traveling exhibits and photocopying assistance (where available). Contact the society at 605-224-8199 or www.sdeyes.org for more information.

