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EYE HEALTH AND SAFETY PROGRAM

Teacher Classroom Presentation Guide

This program is recommended for grade levels 6–8

Subject: Eye Health and Safety

Duration: There are three lessons to be presented across three classroom sessions. Each lesson includes a power point presentation, teacher discussion points as well as classroom activity suggestions and homework/ learning assignments.

This curriculum has been aligned with National Health, National Science and National Physical Education Standards

Lesson 1 – The Eye and How We See

Slide 2 Eyes are the most complex organs we possess except for the brain.

Lesson Objectives

- Students will be able to name the parts of the eye and explain their function.
- Students will be able to describe how the visual system works.
- Students will be able to explain how optical illusions work.
- Students will be able to list 5 types of animal eyes and explain the basic function of each.

Discussion Points – PowerPoint

Slide 3 The eye is a complete optical system slightly smaller than a ping-pong ball. It transforms light into the images that we see. Our eyes work as "live cameras" for the brain, gathering up and processing images far better than any high-tech device.

Slide 4 Because the eye is so complex, defects are bound to occur. It is estimated that as many as 90 percent of us have at least slightly imperfect eyesight. About 60 percent of us need corrective lenses sometimes, if not all of the time. The need for corrective lenses after mid-life is nearly universal. Only a few enjoy perfect vision without correction throughout life.

Slide 3 **The Eye's Natural Protection** The parts of our eye that we are most familiar with include the eyelid, eyebrow, and eyelashes. All of these parts of the eye help to protect your eyes. We also wear hats with visors and sunglasses and goggles to protect our eyes.

The **eyebrows** help to shade our eyes. They also help to keep sweat and debris from falling into our eyes.

Eyelids move up and down over our eyes like a window shade. They sweep dirt away when you blink and help spread tears. They help protect our eyes by automatically closing when an object gets too close to our eyes. Blinking helps to lubricate the eyes with a fresh coating of tears. These tears contain bacteria-killing enzymes that protect our eyes from infection. We blink every 2 to 10 seconds. During a blink we keep our eyes shut for approximately 0.3 seconds, a total of 30 minutes a day.

Eyelashes are the tiny row of hairs along the top and lower eyelids. Each eye has approximately 100-150 eyelashes on the upper eyelid and 50-70 on the lower lid. Eyelashes help keep dust and dirt, sweat, water, and other irritants from getting into our eyes.

Tears not only roll down our faces, but tear ducts drain tears from our eyes. Tears draining through tear ducts ultimately drain through our nose. This is why we often need to blow our nose when our eyes tear up or we cry.

The eye rests in bony sockets that protect the eye against impact.

The Eyeball The human eye is an opaque ball with a transparent bulge providing a clear "window" at its front side. It is about an inch in diameter and weighs just a quarter of an ounce. Within the eye is an intricate arrangement of tissues, fluids, nerves, and cells.

Slide 6 **Eye Movement** Our eyes move within our eye sockets (or orbits). Eye movement is controlled by six eye muscles. They work in groups of three to pull the eye in the direction necessary. The muscles cannot push the eye in any direction. In addition, movement is limited because of the optic nerve connected to the back of the eye.

The brain ultimately controls eye movement as it sends signals to the eyes' muscles to make adjustments. The brain also directs the involuntary movements of our eyes. Our eyes are constantly moving. Even when staring at an object, our eyes tremble slightly so that the same cells are not constantly exposed to the light. This trembling also enables our eyes to fill in our blind spot so we do not see a black spot.

Slide 7 **Parts of the Eye**

Aqueous Humor is the water-like fluid filling the space behind the cornea and in front of the crystalline lens (the anterior chamber). It is produced by the ciliary body and drains back into the blood circulation through channels in the chamber angle. Its main function is to provide nutrients to the front portion of the eyeball.

Choroid is the middle layer of the eyeball's casing, positioned between the sclera and retina. It supplies most of the retina's nourishment and has one of the highest blood flows in the body.

Ciliary Body is the extension of the choroid, connecting with the iris. It produces the aqueous humor and contains the muscle system that controls the flexing of the crystalline lens. The ciliary body is connected to the lens by fine fibers called zonules.

Conjunctiva is the membrane lining the inside of the eyelids and the sclera (white part of the eye). It firmly attaches the eyeball to the eyelid and eye socket, but it is flexible enough to permit us to move our eyes up and down and side to side. The conjunctiva protects the eye from foreign particles and some viruses and bacteria.

Cornea is the clear, dome-shaped "front window" of the eye. The cornea is a lens that bends (refracts) light rays as they pass through. The curvature of the cornea accomplishes about 80 percent of the focusing of the eye.

Crystalline Lens is the transparent tissue that acts like a magnifying glass behind the pupil. The crystalline lens flexes when we want to look at something close-up, providing about 30 percent of the eyes' total focusing power. The growth and hardening of the lens causes it to lose its flexibility over time, which is why people 45 and older usually need bifocal contacts or glasses, or reading glasses.

Extraocular Muscles consist of six separate muscles that control eye movement. Five of these muscles originate from the back of the orbit and wrap around the eye to attach within millimeters of the cornea. Four of these muscles move the eye roughly up, down, left, and right. Two of these muscles, one of which originates from the lower rim of the orbit, control the twisting motion of the eye when the head is tilted.

Eyelids serve multiple functions. Reflex closure of the eyelids will keep objects out of the eye and lubricate the cornea by distributing fresh tears.

The Iris is the doughnut-shaped ring of pigmented tissue that determines an eye's color. The iris opens and closes to control the amount of entering light.

Lens is the clear part of the eye behind the iris. It helps to focus light on the retina and focus on far and near objects.

Macula is the area in the middle of the retina responsible for distinguishing fine details and colors. At its center is the fovea, a tiny pit containing the highest concentration of cones and providing the ultimate focal point for the optical system.

Optic Nerve contains visual information from the eye and has 1.2 million nerve fibers that carry impulses from the retina to the brain. The sheath around the optic nerve is continuous with that of the brain and the nerve connects directly into the brain.

Pupil is the hole in the center of the iris that appears black. In dim light, the iris enlarges the pupil, increasing the amount of light entering the eye and improving vision. In bright light, the iris reduces the pupil's size to decrease entering light and avoid eye damage. The pupil looks black because it is very dark inside – that is, almost no light is reflected back out.

Retina is a layer of light-sensitive nerve cells lining much of the inside of the eyeball. The retina contains receptor cells called rods and cones that convert light into electrochemical impulses sent to the brain. Rods aid vision in dim light, while cones help with color perception.

Retinal Blood Vessels supply oxygen to the inner lining of the eye (retina).

Sclera is the "white of the eye." Along with the cornea, it forms a tough protective coating. The sclera continues back over the optic nerve to join with the outer covering of the brain.

Vitreous Humor is the clear, jelly-like substance filling the otherwise empty space behind the crystalline lens. It serves primarily to keep the retina pressed against the inside wall of the eyeball. It tends to liquefy with age.

Slide 8 **The Visual Process** The ability to view an object is dependent upon the light source. As the source is changed, so is the view of the object. Light bounces off of objects and enters the eye through a hole in the eye called the pupil. The light then passes through a clear, curved structure called the lens. The lens bends the light to focus the image on the back section of the eye called the retina. Nerves send the image from the retina to the brain. You see the object when the image reaches the brain. The brain tells us what we see.

Order of Visual Functioning	Layers of the Eye
1	Cornea
2	Pupil
3	Iris
4	Aqueous Humor
5	Crystalline Lens
6	Vitrious Humor
7	Retina
8	Macula
9	Optic Nerve
10	Brain

Slide 9 The order of visual functioning by layer. When light enters our eyes, an image is formed in our brain. Light passes through the cornea, pupil, aqueous humor, lens, and vitreous humor, before reaching the retina. An inverted image of the object is projected on the retina. The retina changes the light rays into signals it sends to the brain.

Slide 10 **The Eye is Like a Camera** As mentioned previously, the process of seeing is often compared to taking pictures with a camera. The photograph is the concrete record of what the eyes see. The retina acts like a camera's film, converting light into a form that can be made into pictures. "Film processing" is accomplished in the brain—at a pace much faster than any high-tech photo lab. The eye and the camera have a basic fact in common: a good finished image requires precision-made parts that are well aligned. In both cases, light rays reflected from objects within view are gathered up, focused and converted into images.

Primary mechanical parts of the eye and the camera are particularly comparable. The cornea and crystalline lens work together to provide focusing power similar to that of a camera lens. The iris operates as a diaphragm, reacting to brightness or darkness of incoming light. The iris uses settings like those made to change a camera's shutter speed. The crystalline lens flexes to sharpen the focus comparable to adjusting a camera lens backward and forward. The retina converts light into a form that can be made into pictures, like a camera's film. The processing of the film occurs in the brain. Refraction is critical to the quality of the final image in both vision and photography.

Slide 11 **Light** Light is the only thing we can really see. It comes to us in the form of a combination of magnetic and electrical energy traveling at very high speeds. Light is composed of small particles of energy called photons. Light travels in waves that progress as straight lines. The light waves bounce or bend as they travel. The result is reflection or refraction. Different wavelengths produce different colors. Without light, color would not be possible.

Visual light is the combination of seven wavelengths. We cannot see these wavelengths separately, but instead see a combination of the seven that represent white light. The more sensitive the eye is to varying sizes of wavelengths, the more colors can be seen. Visible light, that can be seen by the human eye, ranges between ultraviolet and infrared. They include (from shortest to longest wavelength): violet, indigo, blue, green, yellow, orange, and red. These seven colors are represented in the rainbow. The rain has separated the colors for us to see all seven. These colors also can be seen by shining white light through a glass prism. It is estimated that the human eye can see as many as 150 different hues or shades of color. The color seen depends on the wavelengths the eye can absorb and how you perceive it.

Slide 12 **The Eye and Brain Connection** Our eyes and our brain are responsible for taking in and interpreting images. Visually we take in a tremendous amount of information. It is our brain that must sort the information in order of importance and make sense of what we see. The brain makes educated guesses from the information by using simple assumptions. The brain wants to create a single interpretation of an image that we recognize by grouping the information received. The final image is constructed unconsciously and quickly.

Slide 13 **Optical Illusions** Our eyes and brain, however, can play tricks on us. Some images won't let our brain create a single interpretation. Our brain groups the information we see in four ways.

1. SIMILARITY: we will group dots of a similar color together to form shapes.
2. PROXIMITY: when items are placed close together, we will see them different from if they were equally spaced.
3. CONTINUITY: although dots might appear random on a page, our brain will group the dots together to see a pattern.
4. CLOSURE: our brain will fill in gaps to form objects that are familiar.

Slide 14 We see in three dimensions. We use clues of depth, shading, lighting, and position to interpret 3-dimensional images. In 2-dimensional images when such information is absent, our brains use the rules of perception described above.

Slide 15 In image formation, we have already mentioned that we "see" with our brain, not just with our eyes. When an image falls onto the retina, nerve impulses are sent to the brain where the actual perception takes place. The brain pieces together bits and pieces of information, matches the retinal image with the images stored in our visual memory, so that we know what the object is, and interpret visual clues so that we know where the object is.

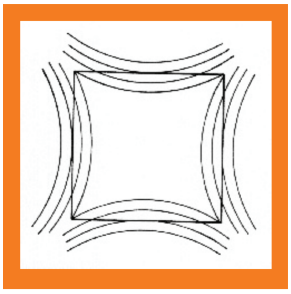
However, there are times when the visual stimuli received causes the brain to make a wrong interpretation, so that what we see is different from the actual reality. This erroneous perception is called a visual illusion.

There are many types of optical illusions: some are everyday natural phenomenon, some are created for psychologists to interpret how our visual system works, some are used for artistic and architectural purposes, and others provide pure visual pleasure.

The following are selections from famous yet simple visual illusions.

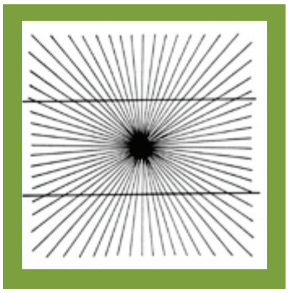
Slide 16 **Influence of background / surrounding objects**

IS THAT A SQUARE YOU SEE IN THE DIAGRAM?



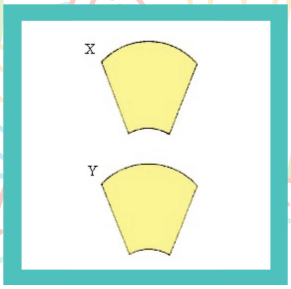
THE RADIAL LINES MAKE THE STRAIGHT EDGES OF THE SQUARE CURVED BY CONTRAST.

THE TWO LINES SHOULD BE PARALLEL. OR SHOULD THEY?



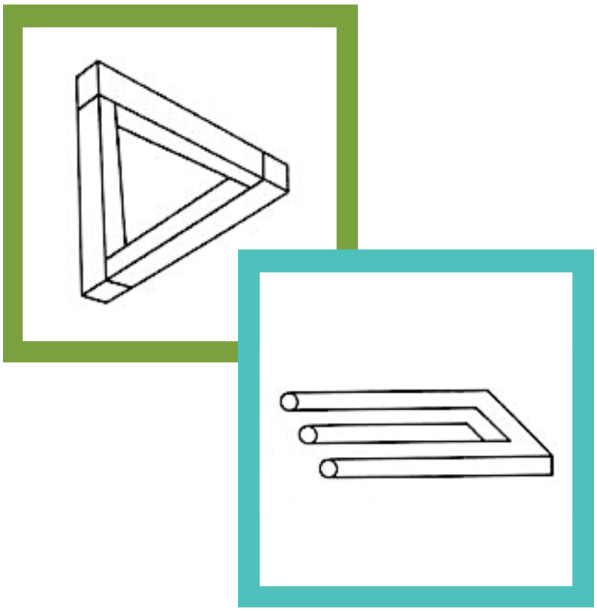
WHICH FAN IS LARGER?

Viewers tend to compare the bottom curve of X to the top curve of Y. The bottom curve of X is longer, making the area of X looks smaller than Y.



Slide 17 **Impossible figures**

CAN WHAT YOU ARE SEEING BE TRUE?



Based on our experiences in life, many objects we come across are three-dimensional. So on looking at these two 2-D diagrams, our brain tends to interpret them as 3-D.

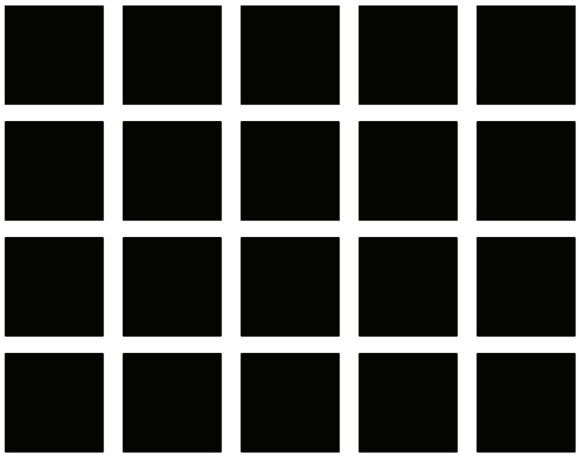
Also, when we look at a picture, our eyes move constantly and take quick glimpses of the more important parts of the picture to look for visual information - fixation.

These images are then successively formed onto the retina's fovea, where the visual acuity is the greatest and the images are seen most detailed. This separate information then correlates with each other to form a single picture in our brain.

However, on looking at these two diagrams, the information extracted from the quick glimpses cannot form a sensible 3-D diagram, hence the name — impossible figures.

But if these diagrams were to be reduced in size such that the whole image can be focused on the fovea, we would just see them as pure 2-D line images.

Slide 18 **Color and Brightness illusions**

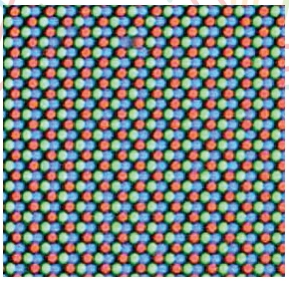


In the set of black squares, you'll see shades of grey at the intersections. This is because the contrast between black and white is great and lateral antagonism exhibits its effects. However, when you focus specifically on one intersection, the shades of grey in that spot will disappear.

Slide 19 **Daily life illusions**

You are also facing visual illusions in your daily life:

- **TV**–All the colors you see on TV are just due to 3 colors (red, green and blue). If you look close enough, you can only see many closely packed dots of 3 colors. Because they are so close, the retinal images overlap and different colors result.



- The bent spoon in your cup of water and the apparently shallow swimming pool—are due to refraction i.e. light travelling with different speeds in different media.
- Clothes with vertical stripes make a person look thinner than clothes with horizontal stripes.
- The moon racing through the clouds—we tend to view large objects (the large clouds) as stationary and the smaller object (the moon) as the one moving.
- A red car looks larger than a green car of the same model when viewed from far above, because of different speeds of light.

Slide 20 **Animal Eyes** Human eyes are weak in comparison to some animals. Some animals see similar to humans, using binocular vision. Some animals can see more color, some do not see color, some have more than two eyes, and others have their best vision at night. The location of animals' eyes are often due to a need of that classification.

Animals and their vision can be classified as: predator, prey, nocturnal, aquatic, or insect.

Slide 21 **Predators** have 3-dimensional vision resulting from two slightly different views, one from each eye (binocular vision). The vision of a predator is the most like human sight. Each of our eyes sees a slightly different picture. Our brain "overlaps" the images to create one scene. This allows for excellent depth and clarity of vision. Animals with binocular vision tend to be predators. Some examples are dogs, wolves, hawks, and falcons.

Slide 22 **Prey** animals have a wide field of vision because of the placement of their eyes; their eyes are on the sides of their head. Most prey animals have large eyes. These allow for a broad range of vision and detection of movement, but their vision lacks definition. They have fewer cones, for color vision, and more rods for sensitivity to light. Prey animals include rabbits, mice, and antelope.

Slide 23 Most **nocturnal animals** have eyes that are well adapted to seeing at night. Nocturnal animals have very large eyes for admitting lots of light; they have more rods than cones and often no cones at all. Most nocturnal animals also have a layer behind the retina called the tapetum lucidum. This reflective layer of tissue acts like a mirror by reflecting light that enters the eye back into the eye. The tapetum lucidum allows more light to hit the retina, enabling the animal to see better in low light conditions. Cats, dogs, owls, and raccoons are nocturnal animals.

Slide 24 The eyes of **aquatic animals** are adapted for seeing through a medium other than air. Aquatic animals do not have eyelids or tear ducts because they live in a watery environment. They don't need to worry about their eyes drying out. Aquatic animals also don't have ciliary bodies (tiny projections that secret fluid to keep our eyeballs from drying out and collapsing). Instead, the eyes of aquatic animals absorb water directly through the cornea; that's what keeps the eyeball's shape. Aquatic animals' eyes also are especially sensitive to blue light, because that is the color that most deeply penetrates the water.

Aquatic animals include: fish, crabs, and sharks.

Slide 25 **Insects** have compound eyes. Compound eyes are made up of many separate units called ommatidia. Each ommatidium has its own lens, cone, pigment cells, and retinal cells. Each one works like a miniature eye. These eyes form many images and allow for a very short range of vision. What the vision lacks in depth it makes up for through very broad range. The near- sightedness of insects is so extreme that they see detail where we would need a microscope to see. However, the insect cannot change focus, but is required to move closer or further away from the object. The fly, horsefly, and mosquito have compound eyes. Insects also can have single lens eyes and more than two. Ladybugs have 9 or 10 eyes, whereas, the bee and dragonfly have many thousands of eyes.

Slide 26 There are other specialized animal eyes worth mentioning. For instance, the chameleon can look in opposite directions at the same time; crabs and crayfish have eyes on stalks that can be moved around to look 360 degrees; some insects (like the bee) can see polarized light; and some aquatic animals have eyes that are split in half -(one half sees above water and the other half sees under water.

Learning Assignment: Eye Anatomy

Materials Needed:

- One copy of *The Eye and How We See* activity sheet per student
- Pencils/pens

Instructions:

1. Distribute *The Eye and How We See* student activity sheet and allow time for students to complete the worksheet in the classroom, or for homework assignment.
2. Review answers with class.

Learning Assignment: Eye Exploration Terms

Materials Needed:

- One copy of *Eye Exploration* activity sheet per student
- Pencils/pens

Instructions:

1. Distribute *Eye Exploration Terms* activity sheet and allow time for students to complete the worksheet in the classroom, or for homework assignment.
2. Review answers with class

Learning Assignment: Fun Facts

Materials Needed:

- One copy of *Fun Facts* activity sheet per student
- Pencils/pens

Instructions:

1. Distribute *Fun Facts* activity sheet and instruct students to do research to add 10 more fun facts to the list.
2. Have each student report their findings to the class.

Learning Assignment: Animal Eyes

Materials Needed:

- One copy of *Animal Eyes* activity sheet per student
- Pencils/pens

Instructions:

1. Distribute *Animal Eyes* activity sheet and instruct students to research the answers.
2. Discuss answers with students in class.

Classroom Activity: Eye Q Game

Students will learn important and interesting concepts about eyes by playing a question and answer game.

Materials Needed:

- An overhead projector and screen
- Small sticky notes
- Paper for students
- A clock or watch with a second hand
- Copy of "Eye Q" game board and answers

Instructions:

1. Players will be presented with clues that answer a question. They must think of the question that goes with each answer.
2. Project the game board onto the screen. Cover each clue with a piece of paper.
3. Divide the class into teams. Distribute paper. Explain the rules.
4. Rules: Teams take turns choosing the category and point level of the next clue. Each clue relates to the subject category at the top of the column.
5. Whichever team has the most points when all the clues have been revealed, wins the game.

Classroom Activity: Animal Eyes

Students will gain understanding of animal vision.

Students will study predatory birds (hawks, eagles, owls), insects, bats, and opossums.

Materials Needed:

- Pictures of animals
- Binoculars
- Kaleidoscope/Bug eye viewers
- Small plastic mirrors
- Tape

Predatory Birds Activity:

1. Hawks, owls, and eagles have binocular-type vision. A red tailed hawk can see a mouse from almost 75 feet away. That is why hawks are often seen perched high in a tree, looking down at the ground for signs of mice. They can actually see the mouse by looking down from the tree. They have acute distance and depth of vision similar to telescopic vision. They also have exceptional peripheral vision.
2. To demonstrate this, have a station set-up with pictures of hawks, owls, and eagles.
3. Have each student look around the room using binoculars. Even better, allow the students to take an excursion outside to look at objects far away.

Insects Activity:

1. Insects have compound eyes. Each facet of their eye functions like a separate eye and allows them to have awesome peripheral vision. A house fly can almost see behind him because of his huge eyes.
2. To demonstrate a fly eye, have a station set up with different pictures of insect eyes.
3. Have the students look at each other and items in the room with honey bee lens viewers.
4. Honey bee lens' viewers will give the students an idea of how insects see.

Prey Animals Activity:

1. Prey animals generally have large eyes on the sides of their head. This gives them a broad range of vision and helps them to see movement coming from many directions.
2. To demonstrate prey animals' vision, have a station set up with pictures of rabbits, deer, mice, antelope, etc.
3. At the station, have several pairs of small, unbreakable mirrors taped together so they open and shut like a book.
4. Have students hold the crease of the mirrors just in front of the bridge of their nose with reflective surfaces facing them.
5. Students will be able to see to the sides like a prey animal.

Discussion:

- What advantages/disadvantages exist with each type of vision?
- Why do insects/prey animals need a broad range of vision?
- Why do predators need good depth perception?
- What kind of eyes do you have?

Note: Bug viewers may be found in novelty or toy stores. (To find on-line, search "bug viewer" or "bug magnifier")

Homework Activity Extensions:

- Have students classify the eyes of various animals and graph or chart the data.
- Have students create a graphic organizer or dichotomous key of animal eyes.

Additional Homework/Research Activities:

- Have students research optical illusions further and present one to the class with explanation of how it tricks the brain.
- Go to optical illusion Web sites or let students explore pictures of optical illusions.
- Experiment with light.
- Simulate types of vision through adapted glasses/materials
- Have students develop a research question related to eyes. Have students research the question through interviews or Internet research and indicate data in visual form (i.e. bar chart). This can be done as a class or in groups and present information to the class.

Reading List:

Eyes and Their Care by Brian Ward, F. Watts, 1990,

Describes the construction of the human eye and discusses problems with sight, infections and injuries, and how these may be corrected with eyeglasses or medicines.

Eyes by Aleksander Jedrosz, Troll, 1992,.

Discusses the parts of the eye, how they function to produce the phenomenon of vision in humans and animals, and other aspects of the act of seeing.

Lenses Take a Closer Look by Siegfried Aust, Lerner Publications, 1991,

Explains all about lenses, magnifying glasses, telescopes, microscopes, eyeglasses, vision, and eye care.

Lesson 2 – Common Vision Problems

Lesson Objectives:

- Students will be able to explain refractive errors
- Students will be able to list possible causes of amblyopia
- Students will be able to describe different types of ocular infections

Discussion Points/Power Point

Slide 28 Because the eye is so complex, defects are bound to occur. It is estimated that as many as 90 percent of us have at least slightly imperfect eyesight. About 60 percent of us need corrective lenses sometimes, if not all of the time. Only a few enjoy perfect vision without correction throughout life.

More than 50 percent of all people in the United States use some type of lens to correct their vision. More than 12 million school-age student, or one in four, needs glasses.

If not detected early, vision problems in children can lead to a variety of problems. Untreated vision problems can lead to loss of vision, learning difficulties, and delays in development. It's important to combine vision screenings and complete eye examinations throughout your lifetime.

Slide 29 Types of Eye Care Professionals:

There are three primary types of eye care professionals:

An **ophthalmologist** is a physician (doctor of medicine or doctor of osteopathy) who specializes in the comprehensive care of the eyes and visual system in the prevention of eye injury and disease. The ophthalmologist has completed four or more years of college premedical education, four or more years of medical school, one year of internship, three or more years of specialized medical and surgical training, and clinical experience in eye care. The ophthalmologist is a physician who is qualified by lengthy medical education, training, and experience to diagnose, treat, and manage all eye and visual system problems and is licensed by a state regulatory board to practice medicine and surgery. The ophthalmologist is the medically trained specialist who can delivery total eye care: primary, secondary, and tertiary care services and diagnose general diseases of the body.

Doctors of optometry (optometrists) are independent primary health care providers who specialize in the examination, diagnosis, treatment and management of diseases and disorders of the visual system, the eye and associated structures, as well as the diagnosis of related systemic conditions. The optometrist has completed pre professional education at a college or university, four years at a college of optometry, and in some cases, a residency. Doctors of optometry are specifically trained and state licensed to provide primary eye care services. These services include comprehensive eye health and vision examinations; diagnosis and treatment of eye diseases and vision disorders; the prescribing of glasses, contact lenses, low vision rehabilitation, vision therapy, drugs and medications; and the counseling of patients regarding their vision needs as related to their occupation, avocations and lifestyles.

Opticians are professionals in the field of designing, finishing, fitting, and dispensing of eyeglasses and contact lenses, based on an eye doctor's prescription. The optician also may dispense colored and specialty lenses for particular needs, as well as, low-vision aids and artificial eyes.

Slide 30 Visual Acuity:

Vision may be tested in a number of ways. Visual acuity testing is the primary measure of the visual system. Visual acuity is the keenness of perception or the ability to discern fine visual differences. Visual acuity testing is performed to determine the integrity of the eye's neural elements, the accuracy of retinal focus, and the interpretive faculty of the brain. Visual acuity is recorded as a fraction, i.e. 20/20. The larger the bottom number the worse the vision. The top number represents the distance from the person to the chart. The bottom number indicates the smallest line a subject could read correctly from the chart.

The term 20/20 vision describes how a person sees at a distance. With 20/20 vision an individual sees clearly at 20 feet what the person with average vision sees at 20 feet. If someone is described as having 20/200 vision, they must be as close as 20 feet to see what a person with normal vision clearly sees at 200 feet.

Many individuals with less than normal vision can achieve 20/20 vision through the use of contact lenses or glasses. Twenty/twenty vision does not necessarily indicate perfect vision. Additional factors such as near vision, peripheral vision, eye muscle coordination, depth perception, and color distinction are included in the determination of perfect vision.

Slide 31 A Bit of History:

The first eyeglasses were two magnifying glasses connected together at the end and hung over the nose. They date back to the late 13th century. The invention of the printing press in 1440 increased the number of reading materials available and thus the need for eyeglasses for many. By the mid-1500s eyeglasses had become a trend and were worn even by those who could not read. In 1508 Leonardo daVinci developed the concept of contact lenses, but they were not produced until 1887. These lenses, however, were made of glass and were extremely uncomfortable and impractical. Practical lenses appeared in 1938.

Recently some people are opting for laser surgery for the permanent correction of their vision. The surgery, however, is not for everyone; it does have risks.

Slide 32 Refractive Errors:

Refractive error is a defect in the optics of the eye that results in a lack of precise focus of the light rays on the retina, causing a blurred image. Light rays entering the eye cannot be brought to a single focus. Instead they may focus in front of, in back of, or irregularly on the retina.

Slide 33 Myopia

Myopic or nearsighted people generally can see near objects clearly, but distant objects are out of focus. This is the result of a refractive error of the eye in which the image of a distant object is formed in front of the retina and cannot be seen distinctly; near objects are seen more clearly than distant objects.

- Myopia is thought to be primarily hereditary in nature.
- Myopia, the most common refractive error, affects more than 25% of the population.
- Myopia usually becomes evident in children between the ages of 8 and 12 and worsens until early adulthood.
- Myopia is rare in infants and toddlers.
- Myopia that starts in infancy can be more severe than in school-age children.

Slide 34 Hyperopia

Hyperopia occurs when the eyeball is too short. The reduced length means the point of focus lies beyond the back wall of the eye, and light rays are not yet in focus when they arrive at the retina. Hyperopic or farsighted people generally can see distant objects clearly, but near objects are out of focus. In more severe cases of hyperopia, even distant objects can be blurred.

- Hyperopia usually exists in infancy – as the child grows, so does the size of the eye. Most children lose much of their hyperopia by the time they are teenagers.
- Despite have hyperopia, most children can see well at all distances because the accommodation provided by the lens is enough to counteract minor refractive errors.

Slide 35 Astigmatism:

The curvature of the cornea and/or the lens prevents light rays from focusing on a single point on the retina, resulting in a blurred image. Visual acuity is poor for near and far objects.

- Astigmatism is an overall inability of the eye to focus clearly at any distance, usually because of uneven curvatures of the cornea. Essentially, the cornea is oval, having a surface shaped more like a football or the back of a spoon, rather than being rounded like a basketball.
- Virtually all corneas have at least a mild degree of astigmatism. For many, the resulting distortion is not discernible. But as the curvature of the cornea becomes more uneven, image distortion increases.
- Astigmatism often is inherited.

Slide 36 Strabismus (Cross-Eye):

Strabismus refers to eyes that are not straight or properly aligned. As a result of eye muscles not working together, one eye may turn in (crossed eye), turn out (wall eye), turn up, or turn down. The deviation, or eye turn, may be constant or come and go. In some instances, it alternates eyes – first one eye turns and then the other.

It is critical for strabismus to be diagnosed and corrected at an early age because children with uncorrected strabismus may go on to develop amblyopia, a loss of vision in an eye that has not been used. In young children, strabismus may vary not only from one day to the next, but during the course of a single day. The condition usually will worsen if the child is ill, upset, or tired.

The preschool years are critical in the development of a child's eyes. In addition to hindering the development of useful vision, strabismus may affect a child's personality. Children with strabismus may become embarrassed by their problem, feeling that they look different.

- Strabismus affects approximately 3 to 5% of children in the U.S. Half of those with strabismus are born with the condition or usually develop it within the first six months of life.
- Some of the most common causes of strabismus are birth injuries, hereditary, faulty muscle attachments, need for glasses, and illness.
- Strabismus sometimes can be found in conjunction with cerebral palsy, prematurity, and neurodevelopmental conditions. Three out of four children with cerebral palsy have strabismus.

Slide 37 Amblyopia (Lazy Eye):

Amblyopia is reduced vision in an eye that has not received adequate use during early childhood. An estimated 2 to 5% of the general population suffers from this visual impairment. If not treated early enough, an amblyopic eye may never develop good vision and may become functionally blind. A condition that causes amblyopia and is left untreated until about the age of 6 most often will result in some permanent visual impairment. However, it is important that the treatment of amblyopia be pursued until at least age 10. The critical age for treatment to prevent permanent vision impairment varies from individual to individual. The earlier treatment is started, the more likely it will be easy and successful.

CAUSES OF AMBLYOPIA:

Strabismus - Amblyopia may be caused by several conditions. When one eye turns while the other is in straight gaze, a double image is sent to the brain. The brain solves the confusion by ignoring the message from the turned eye, which weakens from lack of use. However, early diagnosis and treatment can restore sight. As with visual acuity problems, generally, the earlier the treatment, the better the opportunity to prevent permanent vision loss. If the strabismus requires a surgical correction, the amblyopia must be corrected first.

Anisometropia (unequal refractive error) Both eyes may be nearsighted or farsighted, but to differing degrees. Alternately, one eye may be farsighted and the other nearsighted. When there is a marked difference in refractive error between the eyes, the brain sees differing images from the two eyes and eventually ignores the eye with the poorest image.

Other factors causing a difference in image quality between the eyes, such as cataracts or drooping eyelids (ptosis), can cause amblyopia. The brain suppresses the image of poorer quality, causing permanent vision loss in the affected eye, unless treated. Any condition that causes the brain to receive images of unequal quality from the two eyes can lead to amblyopia.

Slide 38 Color Deficiency:

Children with so-called "color blindness" are not blind to color but have difficulty identifying certain colors.

Classroom Activity: Discussion

Lead a discussion with students using the following questions:

- Why do people wear glasses? How do they help people?
  - Glasses can help people see better. Special coating on glasses protect our eyes from the sun. Special lenses can be made to protect our eyes from injuries.
- What different kinds of glasses do people wear?
  - Sunglasses, safety glasses, swimming goggles...
- Have you ever had to wear a patch over an eye? Do you know anyone that has? Why do you think the patch was worn?

Homework/Research Activities

- Develop research question related to the students' eyes, such as how many students are near-sighted versus farsighted? Have students use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation research) to answer the question. Students should indicate data in visual form (i.e. bar chart) and present their research to the class. Establish the mean, median, and mode for data gathered. Review these math terms with students before you continue.

- Have students develop a research question related to vision problems. Have students research the question through interviews or Internet research and indicate data in visual form (i.e. bar chart). This can be done as a class or in groups and present information to the class.

- Have students research other vision problems and choose one to report on. Report should include what it is, the causes, signs and symptoms and treatment and prevention strategies.

Reading List

Eyes and Their Care by Brian Ward, F. Watts, 1990.

Describes the construction of the human eye and discusses problems with sight, infections and injuries, and how these may be corrected with eyeglasses or medicines.

Lenses Take a Closer Look by Siegfried Aust, Lerner Publications, 1991.

Explains all about lenses, magnifying glasses, telescopes, microscopes, eyeglasses, vision and eye care.

Can You See the Chalkboard? By Dr. Alvin Silverstein, V. Silverstein and L. Silverstein Nunn, 2001, Grolier Publishing

Describes the human eye and how it functions, various visual problems and how they are corrected, and how to take care of one's eyes.

1000 Facts of Human Body by John Farndon, 2002, New York: Barnes & Noble Books.

See pages 126-129 for fascinating facts on the eye and color vision.

Lesson 3–Take Care of your Eyes– You Only Have Two

Lesson Objectives:

- Students will be able to name at least four hazards to eyes and discuss eye injury prevention strategies for each.
- Students will be able to explain basic first aid steps for eye injuries
- Students will be able to list the three most common eye infections

Discussion Points/Power Point

Slide 40 Did you know that approximately 90% of eye injuries are preventable? There are all sorts of hazards that can injure your eyes, sometimes so severely that it can result in vision loss. Let's explore the potential hazards and learn about ways to protect our eyes.

Slide 41 **Ultraviolet Radiation**

Sun, sand, water, snow, and wind can hurt your eyes if you don't protect them. The sun can be particularly harmful. The sun emits many types of rays, including visible light, which lets you see; infrared radiation, which is invisible, but felt as heat; and ultraviolet (UV) radiation which, also is invisible is often called the "sunburn" ray. The weather can fool you as UV radiation is as bad on cloudy days as it is on sunny days.

Exposure to UV rays can damage your eyes and contribute to vision loss from macular degeneration and cataracts. Corneal sunburn can result from bright sunlight reflected off of beaches and ski slopes. Long-term exposure can lead to cataracts, skin cancer around the eyelids, and macular degeneration.

Sunglasses with 99-100% UV protection of both types of ultraviolet rays: UVA and UVB can protect your eyes from invisible UV rays that can harm your eyes, as well as eliminate glare and squinting. Sunglasses without UV protection shade the eyes from bright sun, but cause the pupils to dilate, allowing in more harmful rays. You should not wear sunglasses if they are scratched, have bubbles, or have distortions because damage to your eyes can occur. Lenses also should be large enough to shield the eyes from most angles and to block light that enters in around the frames. The sunglasses also should fit snugly against the bridge of your nose.

For maximum protection add a wide-brimmed hat; a wide-brimmed hat can protect you from as much as 50% of UV radiation. Hats also reduce the sunlight that can enter your eyes from the sides or top of sunglasses. Adults and children are both at risk for eye damage caused by UV radiation.

Slide 42 **Eye Injuries**

A large number of eye injuries occur each year in the United States. A good number of those are to children 17 years old and younger. The most common eye injury reported is a foreign body in the eye, followed by open wounds and contusions, and then burns. Nearly one million Americans have lost some degree of sight due to an eye injury, with most individuals becoming blind in one eye. The highest number of eye injuries occurred at home.

Most injuries can be prevented. In others, the effects can be minimized. If an eye injury occurs, immediately tell someone and have that individual take you to see an eye doctor, or take you to the closest emergency room. Serious injury is not always immediately seen or felt, or as minor as it first appears. Delaying medical attention can result in more extensive injury, and possibly permanent vision loss or blindness.

Slide 43 The most common causes of eye injuries to children include:

- Misuse of toys or altering toys.
- Falls involving home furnishings and fixtures such as beds, stairs, tables, and toys.
- Misuse of everyday objects like home repair and yard care products, personal-use items, kitchen utensils, silverware, pens and pencils.
- Accidental exposure to harmful household and cleaning products such as detergents, paints, pesticides, glues, and adhesives.
- Automobile accidents (which are the leading cause of death and serious injuries, including eye injuries, to young children).
- Fireworks
- Not using eye protection while playing sports

Slide 44 **Eye Hazards Around the Home**

Classroom Discussion

Ask the students to list hazards to the eyes that can be found around the home. Compare to this list of the most hazardous products to children's vision:

1. Toys (excluding bicycles and guns)
2. Pens & pencils
3. Baseball and Softball
4. Water and Pool Activities
5. Adhesives
6. Guns (air, spring, BB)
7. General purpose household cleaners
8. Furniture (sofas, beds, tables)
9. Basketball
10. Flatware and Table settings
11. Bleaches (non-cosmetic)
12. Cigarettes, Cigars, Pipes, Lighters
13. Grooming, Cosmetics (hair care, makeup)
14. Paper and Cardboard products
15. Gasoline and Gas cans
16. Desk Supplies
17. Chemicals (unspecified)
18. Bathroom-related (fixtures, soap)
19. Bicycles
20. Manual hand tools (screwdrivers, hammers, etc.)

Next ask students to list toys that may be hazardous to eyes and compare to this list of the top most dangerous toys:

Toy Weapons:

- Guns: BB, pellet, gas, air, & spring
- Toy weapons (combined types)
- Slingshots & sling propelled toys

Other Toy Products:

- Playground equipment
- Bicycles
- Balloons (toy)
- Scooters, skates, skateboards
- Toy sports equipment
- Flying toys
- Trampolines

Slide 45 **Chemicals and Eye Injuries**

Chemicals used in the science lab or found in cleaning products around the home can cause damage to the cornea that is irreversible and often requires surgery. Damaging chemicals include alkalis, acids, irritants, and fumes.

The higher the pH level in a chemical, the more damage the chemical can cause to the eye. These chemicals penetrate the surface of the eye and destroy the cell structure. Strong alkalis can penetrate the cornea for up to six weeks. Common alkalis are hydroxides of ammonia, potassium, sodium, calcium, and magnesium. Household items such as lye, cement, lime, and ammonia also contain alkalis.

Acids have a low pH. All but hydrofluoric acid tend to cause less severe burns to the eye. Acids generally damage the front of the eye. Acid burns are typically the result of sulfuric acid (from automobile battery explosions), sulfurous acid, hydrochloric acid, nitric acid, chromic acid, and hydrofluoric acid.

Irritants have a neutral pH. Most are detergents that simply cause discomfort to the eye. Chemical fumes are irritants and can cause burns on the eye.

Slide 7 If you or someone else gets a chemical in the eyes, immediately flush the eye or eyes with water. Keep the eye open and flush the eye for at least 15 minutes. The longer the chemical remains in the eye, the more extensive the damage will be to the eye. After flushing, go to see an eye doctor or to the emergency room. Take the chemical and/or information pamphlet with you.

Always wear goggles when working with chemicals. Safety glasses, even those with side shields, aren't enough. Goggles fit snugly to the face to protect the eyes and skin around the eyes from splashes.

Slide 47 Heat Eye Injuries

Heat eye injuries result from exposure to high temperature splashes of molten metal or hot sparks. In addition, laser induced eye injuries are the result of intense concentrations of heat, ultraviolet (UVA, UVB, and UVC), infrared, and reflected light radiation. Both direct and indirect laser light can damage the eye. For example, laser pointers can create intensities greater than those experienced by looking directly at the sun. Ultraviolet induced eye injuries consist of UVA, UVB, and UVC.

For heat induced eye injuries, seek medical attention or go directly to the emergency room if exposed to intense laser and ultraviolet light.

Always wear appropriate eye protection to help to prevent eye injuries and never point lasers at anyone's eyes.

Slide 48 Sports Eye Injuries

If your eyes are not protected during sports activities, you are at risk of eye injury and vision loss.

The sports associated with the most eye injuries are:

- Basketball
- Water Sports
- Baseball/Softball
- Soccer
- Paintball

It's important to wear the appropriate safety eyewear and know that regular glasses don't provide enough protection.

Slide 49 Baseball

RECOMMENDED PROTECTION:

- Faceguard (attached to helmet) made of polycarbonate material
- Sports eyeguards

INJURIES PREVENTED:

- Scratches on the cornea
- Inflamed iris
- Blood spilling into the eye's anterior chamber
- Traumatic cataract
- Swollen retina

Slide 50 Basketball

RECOMMENDED PROTECTION:

- Sports eyeguards

INJURIES PREVENTED:

- Fracture of the eye socket
- Scratches on the cornea
- Inflamed iris
- Blood spilling into the eye's anterior chamber
- Swollen retina

Slide 51 Soccer

RECOMMENDED PROTECTION:

- Sports eyeguards

INJURIES PREVENTED:

- Inflamed iris
- Blood spilling into the eye's anterior chamber
- Swollen retina

Slide 52 Football

RECOMMENDED PROTECTION:

- Polycarbonate shield attached to a faceguard
- Sports eyeguards

INJURIES PREVENTED:

- Scratches on the cornea
- Inflamed iris
- Blood spilling into the eye's anterior chamber
- Swollen retina

Slide 53 Hockey

RECOMMENDED PROTECTION:

- Wire or polycarbonate mask
- Sports eyeguards

INJURIES PREVENTED:

- Scratches on the cornea
- Inflamed iris
- Blood spilling into the eye's anterior chamber
- Traumatic cataract
- Swollen retina

Slide 54 Fireworks and Eye Injuries

Eyes are the second most commonly injured part of the body as the result of fireworks. The greatest estimated number of eye injuries reported were associated with bottle rockets, firecrackers, and sparklers. Bruises and lacerations are the most common eye injuries, whereas burns were the most frequent injury to the rest of the body. Almost half of the injuries resulting from fireworks are to children age 15 and younger. Sparkers caused about one third of the injuries in children age 5 and younger. Sparklers burn at up to 1800 degrees Fahrenheit and are a leading cause of fireworks-related injuries. In addition, bystanders are more often injured by fireworks than the operator. Fireworks can explode in the hand, throw sparks in the face, cast hot fragments onto limbs, and ignite clothing.

Don't play with sparklers or fireworks! Instead watch professional fireworks displays.

Slide 55 Contacts Lenses and Eye Injuries

Contact lenses are an alternative to glasses for vision correction. According to the American Optical Association, over 30 million Americans wear contact lenses. Ten percent of contact wearers are under the age of 18. Most contact lens wearers are female and nearsighted.

Some people prefer contact lenses to glasses because they move with your eye; there are no frames with contacts to obstruct your vision; contacts do not fog up; contacts do not get in the way of activities; people feel they look better in contacts; and, contact lenses generally offer better sight. However, without the proper care and caution, contact lenses can be hazardous to your eyes.

Important activities for you to add to your list of Do's and Do Not's associated with contact lens wear.

DO	DO NOT
Follow Instructions	**Purchase lenses from beauty supply stores, nail and hair salons, convenience stores; do not purchase lenses through the Internet without a valid doctor's prescription.**
Schedule follow-up visits with your eye doctor.	**Use cream soaps or moisturizers before handling contacts.**
Wash hands thoroughly before handling contacts.	**Moisten lenses with saliva.**
Store in a contact case.	**Use homemade saline solutions.**
Clean or discard dirty lens cases.	**Share contacts.**
Check lenses periodically for damage.	**Sleep in your contacts.**
Dispose of expired solutions.	

Slide 56 Tell your parents, teacher or the school nurse if your vision becomes blurred or fuzzy, eyes are red and irritated, lenses are uncomfortable, or you experience pain in and around the eyes. You should be taken to see your eye doctor.

Slide 57 Cosmetic Lenses

The growth and improvement in technology has led to improvements and developments in contact lenses. Lenses now are not only being produced to correct vision, but to change eye color and change the appearance of the eyes. However, The Food and Drug Administration cautions against the use of decorative contact lenses that have not been prescribed and fitted by a qualified eye care professional. Cosmetic lenses purchased through beauty supply stores, nail and hair salons, convenience stores, and the Internet can result in corneal ulcers that can lead to infection; infection can cause corneal scarring and vision impairment and in extreme cases blindness and eye loss. The use of improperly prescribed lenses also can result in conjunctivitis, corneal edema, allergic reaction, abrasion from a poor fit, and reduced visual acuity, contrast sensitivity, and can affect other visual functions, interfering with daily activities.

Slide 58 Symptoms of an Eye Injury

Any of the following symptoms may indicate a serious eye injury. If any of the following injuries occur, you should tell your parents, teacher or school nurse and get immediate medical attention:

1. Obvious pain or vision problems;
2. Cut or torn eyelid;
3. One eye that does not move as completely as the other;
4. One eye that sticks out in comparison to the other;
5. Abnormal pupil size or shape;
6. Blood in the clear portion of the eye; and
7. Something in the eye or under the eyelid that cannot be easily removed.

Slide 59 What to do if an Eye Injury Occurs

FIND AN ADULT IMMEDIATELY TO HELP.

- Do not rub the eye. Rubbing can lead to more damage.
- Protect the eye from the pressure of rubbing by taping a foam cup or similar shielding object against the bones surrounding the eye (brow, check, and bridge of nose).
- Do not apply ointment or medication to the eye. These products can slow the doctor 's examination. They also may not be sterile.
- For punctures or cuts, bandage the eye preventing any pressure on the eye. Do not attempt to wash the eye or remove any object stuck in the eye. A paper cup can be used to protect the eye until an eye doctor is seen or the emergency room is visited.

- Immediately flush the eye with clean water for up to 15 minutes if a chemical burn occurs. Take the chemical and/or information on the chemical to the medical facility.
- Gentle application of small cold compresses will reduce swelling and pain from a blow to the eye until a medical professional is seen.
- Eyewash can be used to flush sand or small debris from the eye. If flushing does not remove the debris, lightly bandage the eye and seek the assistance of a medical professional. Do not rub the eye.
- Avoid the use of aspirin, ibuprofen, or other nonsteroidal, anti-inflammatory drugs. These medications thin blood and can increase bleeding. They also may have no affect on the eye pain. Immediately see an eye care professional or go to the emergency room.

Slide 60 Eye Infections

Although the eye has four natural defenses against infection: the eyelid, conjunctiva, cornea, and tears, eye infections do occur. The three most common eye infections are **conjunctivitis**, **sties**, and **blepharitis**. **Conjunctivitis**, also referred to as pink eye, causes a watery discharge or pus and crust on the eyelashes.

Sties are pimple-like growths that appear at the base of the eyelashes. Blepharitis is an inflammation of the eyelids that appears as red scaly skin on the eyelids.

Slide 61 These infections result from viral infections, bacterial infections, foreign substances, improperly fitted contact lenses, improper contact lens usage, and the use of cosmetic contact lenses that have not been purchased through a licensed eye care professional.

Slide 62 Eye infections appear as redness, tearing, pain, sensitivity to light, blurry vision, the feeling of something in the eye, and/or a scratchy feeling in the eye. If you are experiencing these symptoms, tell your parents, a teacher or the school nurse. You should see an eye care professional or visit the emergency room.

You can help to prevent eye infections by keeping clean hands, keeping your hands away from your eyes, and not sharing washcloths.

Slide 63 Nutrition and the Eye

Healthy nutrition also is a means of protecting yourself from eye diseases. What you eat can help to protect you from having problems with your eyes later in life. The risk of some age-related vision problems can be reduced through the consumption of fruits and vegetables, such as spinach or collard greens, kale, turnip greens, broccoli, orange peppers, yellow corn, green peas, persimmons, and tangerines. These fruits and vegetables increase the carotenoids, lutein and zeaxanthin. In addition, fruits and vegetables high in antioxidants are believed to prevent some vision problems. Key vitamins including Vitamin A (Beta Carotene), Vitamin C (ascorbic acid), Vitamin E, Folic Acid, Selenium, and Zinc found in leafy green vegetables, carrots, citrus fruits, and melons also appear beneficial to eye health.

Slide 64 Ways to Protect Your Eyes

- When working on the computer, you should take a break from looking at the computer screen every 30 minutes to give your eyes a rest. Sufficient sleep and rest allow you to use your eyes to the fullest. Tired eyes will affect your vision.
- Use care to wash your hands. If you rub your eyes with dirty hands, you can cause infection. Pink eye (conjunctivitis) is transferred through touch.

- If you get an eye injury, get immediate attention. Go to see an eye doctor or go to the emergency room.
- Only wear contact lenses you get from an eye doctor.
- Wear eye protection when playing sports – especially basketball, water sports, baseball, soccer, hockey and football.
- Eat healthy foods–especially fruits and vegetables.
- Protect your eyes from the sun with 98-100% UVA & UVB sunglasses or wide brimmed hats.
- Don't smoke. Smoking can increase your risk for cataract and age-related macular degeneration.

Classroom Activity: Discussion

LEAD A DISCUSSION WITH STUDENTS USING THE FOLLOWING QUESTIONS:

- What things do you see in the classroom that could potentially injure your eyes?
- What things could happen on the playground to injure your eyes? How could you protect yourself from injury?
  - Keep fingers and any objects away from your eyes. Don't get too close to other children on the playground.
- What things could happen at home to injure your eyes? How could you protect yourself from injury?
  - Do not run with forks, knives, combs, or toothbrushes.
  - Carry scissors blade down.
  - Keep all sharp and/or pointed objects away from your eyes, such as scissors, pencils, sticks, etc.
- Read the *Eyes and Their Care* and discuss as a class.

Classroom Activity: All About Eyes Brochure

- Have the students work in small groups to create a brochure to disseminate throughout the school that is all about eyes and eye safety.
- Have each team member share a brochure with another student in a different class or to a teacher and have them ask for feedback
- Have each group present their brochure to the class and report on feedback they received.

Classroom Activity: Educating the Parents

- Have the students work in small groups to create a poster or flyer for parents or guardians on eye safety and taking care of our eyes.
- Have each group present their poster or flyer to the class
- Make copies and instruct students to share with their parents (guardians)

Classroom Activity: Ad Execs

- Have the students work in small groups to develop a magazine advertisement or commercial directing others to be wise about their eyes.
- Have each group "pitch" their ad to the class.

Learning Assignment: Safety Eye-Q Quiz

Materials Needed:

- One copy of Safety Eye-Q Quiz per student
- Pencils/pens

Instructions:

1. Distribute quiz and instruct students to answer the True/False questions.
2. Students may need to do some research to find the correct answers as some material was not covered.
3. Review answers with students in class.

Learning Assignment: Eye Spy

Materials Needed:

- Computer with Internet access

Instructions:

1. Provide web link and instruct students to play the Eye Spy game. This activity may be done in the classroom or as a homework assignment to do with parents.
2. Instruct the students to print and submit the certificate of completion.

   http://eyespy.preventblindness.org

Reading List

Eyes and Their Care by Brian Ward, F. Watts, 1990.

Describes the construction of the human eye and discusses problems with sight, infections and injuries, and how these may be corrected with eyeglasses or medicines.

Body Talk, Sound and Vision by Jenny Bryan, 1993, Dillon Press

See pages 22-23 for discussion on taking care of our eyes and first aid for eyes. This book also explains how the eye works, descriptions of some common eye problems and an explanation of an eye examination.

Star Pupils is a Program of Prevent Blindness

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