

## Lesson Ideas: Grades 9 through 12

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 completely as an independent learning activity or incorporated into your existing curriculum.

Masters for photocopying a variety of fun activity sheets to help students learn are included in the Vision Quest kit.

### Lesson #1: Vision and driving

Suggested Vision Quest materials: “Vision and Driving Lesson Notes” activity sheet and “Vision and Driving Safety Quiz.”

Good vision is essential to good driving, and teenagers anxious to take the wheel may not fully realize the importance of developing good visual skills, visual awareness and eye-hand-foot coordination.

The following lecture points were designed to prompt classroom discussion about the role of good vision in driving and the importance of developing life-long eye health and visual care habits for better road safety. To help students record key points during your lecture, duplicate the “Vision and Driving Lesson Notes” activity sheet found in this kit and distribute copies at the start of your lecture.

Then, use the “Vision and Driving Safety Quiz” copy master to test students’ recall of principle concepts covered in the lesson.

Key lecture points include:

- **Ninety percent of driving decisions are based on what the driver sees.** If you are going to drive, you must be responsible for having your vision checked and using any eyewear recommended by your eye health professional.
- **Raising visual awareness and concentration on the road is especially important for teenagers** because car crashes are the leading cause of death for young people (more than 35 percent).
- **A 16-year-old driver is 10 times more likely than other drivers to have an auto**

**accident.** Why do you think this is? (Answers include lack of driving experience; distractions with music/radio, cell phones and friends; speeding; fatigue; and use of alcohol or drugs.)

- **Obtaining and using required prescription eyewear is critical for teenage drivers** because nearly 1 in 5 folks under age 19 require prescription eyewear, and, as a young adult, the eyes can change rapidly with growth.
- **A “visual screening” administered by the department of motor vehicles in not a substitute for an eye examination.** It cannot identify underlying eye health problems or specify visual conditions. According to the South Dakota Optometric Society, the best way for teens to maximize their visual abilities and protect the health of their eyes is to obtain a comprehensive eye examination from an eye care professional every year.
- **Twenty/twenty visual acuity (visual sharpness) does not mean perfect vision.** The term “20/20” is a measurement of visual acuity, that is, your ability to see detail clearly and sharply at a distance. A person with 20/20 vision can see at 20 feet what should normally be seen at that distance. Drivers also need many other visual skills (such as depth and color perception and eye coordination) to process and respond to visual stimuli.

- **Good peripheral (or side) vision is especially important to drivers.** Peripheral vision is your ability to notice and respond to objects that enter your field of vision from the side while you are looking straight ahead. Peripheral vision can be measured with a “visual field test” administered by your doctor of optometry. This test requires you to look at the center point of a screen and identify bright blinking lights that appear in the periphery. Has any student taken this test?
- **Two types of eye movements are essential for alert drivers: saccadic and pursuit.** Saccadic eye movements are the voluntary shift of the your eyes as you scan from one object to another. You use saccadic eye movements when you gaze from the view in front of you, to your mirrors, to traffic lights and road signs, to your speedometer and control panel. Pursuit eye movements are used to follow moving objects such as the car driving in front of you, a parked car’s door opening in front of you or a ball rolling into your path.
- **Surprise! Computer and video games can be good for your on-the-road vision.** Playing computer and video games require both saccadic and pursuit eye movements and can challenge your eye-hand coordination and response time. Some games also simulate driving environments giving you a safe way to experience the negative impact that driving fast can have on negotiating curves, turns and road hazards. The South Dakota Optometric Society recommends resting your eyes periodically when playing such games to avoid fatigue.
- **Common symptoms that may indicate you need to see your eye doctor include:** blurred or foggy vision, difficulty in focusing on near or distant objects, double vision, trouble seeing at night, light flashes, rainbow rings around lights, vertical lines that look wavy or distorted, and eye pain or constant headaches.

### Things you can do for yourself to enhance your driving vision include . . .

- ✓ Visit your doctor of optometry every year for a comprehensive eye examination;
- ✓ Always wear required prescription eyeglasses or contact lenses;
- ✓ Wear sunglasses on bright days for ultra-violet protection and to reduce glare;
- ✓ Focus your concentration on the road and not on friends, music, etc.;
- ✓ Avoid cell phones and eating while driving;
- ✓ Don’t use alcohol or drugs (even some prescription drugs require you to refrain from driving);
- ✓ Become familiar with road signs and negotiating traffic hazards (such as rain, fog and snow);
- ✓ Keep your speed under the legal limit and in check with road conditions and other vehicles; and
- ✓ Get enough sleep to reduce drowsiness behind the wheel.

### Things you can do to your car to enhance your driving vision . . .

- ✓ Make sure mirrors are clean and positioned to give you the best view;
- ✓ Adjust your seat and steering column to maximize your view and comfort;
- ✓ Check head, tail, brake, dash and interior lights to make sure they are working;
- ✓ Keep your windshield clean and have an adequate supply of washer fluid;
- ✓ Replace windshield wiper blades as recommended;
- ✓ Don’t keep papers or maps on the dashboard because their reflection in the windshield can be distracting;
- ✓ Keep a spare pair of eyeglasses and/or sunglasses in the car; and
- ✓ Choose a car with daytime running lights to provide maximum visibility.

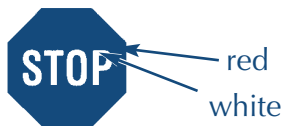
**The importance of road signs:** Students also need good vision to monitor road signs that provide directions, driving instructions and road hazard warnings. Review the shapes

and colors of common road signs by drawing a simple diagram of the following on the board (or referring to them on the “Vision and Driving Lesson Notes Activity Sheet”).

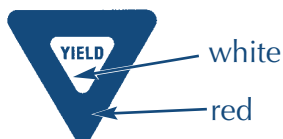
(a) School crossing or school zone



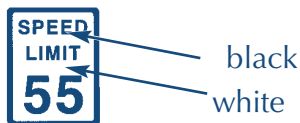
(f) Stop



(b) Yield the right of way



(g) Speed limit



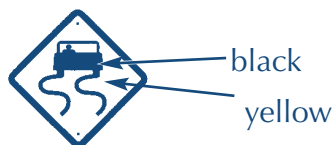
(c) One way



(h) Do not enter



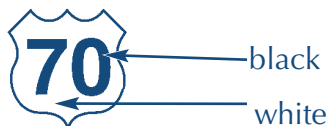
(d) Slippery ahead



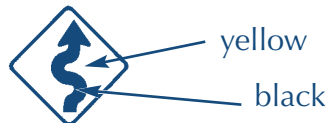
(i) Railroad crossing



(e) U.S. route number



(j) S-curve ahead



**Answers to the “Driving and Vision Safety Quiz:”** 1-D, 2-B, 3-C, 4-B, 5-E, 6-D, 7-B, 8-any discussed in lesson, 9-any discussed in lesson, 10-any discussed in lesson. **Traffic signs:** 11-H, 12-G, 13-D, 14-I, 15-B, 16-A, 17-F, 18-E, 19-C, 20-J.

## Lesson #2: Conquering computer vision syndrome

Suggested Vision Quest materials: “Computer Vision Syndrome Inspection Checklist” activity sheet.

Computer use by students continues to increase at school, home and on the job. Using a computer for long periods of time can stress and tire the eyes, a condition doctors of optometry call “computer vision syndrome.”

The impact of computer vision syndrome can be significantly lessened by using a correctly positioned work station, proper lighting and effective work habits.

Help students learn more about preventing

computer user discomfort by charging them with the duty of being “computer vision syndrome inspectors.” Assign each student to investigate a computer work station (with a user at work) in various areas of the school (classroom, library and administrative offices), in the home or on the job. (Note: Some workplace computers may not meet the design recommendations discussed here because they are created for use in a standing position (e.g., a computerized cash register in a fast food restau-

rant) or for short periods of use. Students should consider these factors when making evaluations and recommendations.)

Give each student a “Computer Vision Syndrome Inspection Checklist” (copy master found in this kit) to use as a guide when taking notes on site. Ask students to write a short report or make an oral presentation on their findings including any recommendations they shared with the computer user.

Before dispatching students, discuss the following recommendations for conquering computer vision syndrome, and review the diagram of a properly-positioned work station found on the checklist and below.

### Work station design

- Chair and desk should be at heights that allow the user to sit straight with arms extended at a 90-100 degree angle and knees bent at a 90 degree angle. Most people need about 26 inches of leg room below their work surface.
- Computer monitor (screen) should be approximately 16 to 30 inches from the user’s eyes (20 to 26 inches is comfortable for most people) with the monitor’s top slightly below the user’s horizontal eye level. The top should also be tilted



slightly away from the user at a 10 to 20 degree angle.

- Eye, neck and shoulder strain can be reduced by positioning a document holder to the side of the monitor at the same viewing distance as the screen.
- A slight upward tilt of the keyboard (often built into the keyboard’s design) helps the wrists stay straight during typing and data entry.

### Lighting

- The monitor should be adjusted to a comfortable intensity for the user – not too bright and not too dim. Since the preferred intensity varies from user to user, it is a good idea to ask if he or she knows how to adjust the monitor’s brightness.
- Likewise, the contrast (the difference between the intensity of the characters on the screen and the background) can be adjusted. Question the user to see if the current level is optimal.
- Minimize reflected glare from windows and lights by positioning the monitor perpendicular (at a right angle) from the lighting source if possible. One way to reduce uncontrollable sources of glare is to recommend the addition of a glare reduction filter that fits over the screen.

### Work habits

- The correct working posture for computer users is to sit with the back straight, knees bent at a right angle and feet resting flat on the floor.
- Computer users should take frequent breaks (at least five minutes every half hour) to rest the eyes by looking away from the screen or devoting short periods of time to less visually intensive tasks.
- At least once an hour, computer workers should get up to stretch or walk around for a few seconds to relieve tension in the back, neck, shoulders and wrists.
- Computer users should, of course, wear any prescription eyewear required. (Some people wear special glasses for computer or close work.)

## Lesson #3: Eye and visual care consumerism

Suggested Vision Quest materials: “Healthy Eyes for Students and their Families” fact sheet and “Bettering your Consumer Eye-Q” activity sheet.

As the cost of health care in the United States continues to climb, it is important for students to become informed purchasers of eye care products and services. Introduce students to eye care basics by distributing the “Healthy Eyes for Students and their Families” fact sheet (copy master found in this kit) and discussing the following consumer considerations:

- the differences between eye care “needs” (such as eye examinations, treatment for disease and prescription eyewear) and eye care “wants” (such as expensive frames, designer sunglasses and contact lenses with cosmetic tints);
- factors that influence the unique eye care needs of each individual (such as age, overall health, family history of eye disease, work situation or sports involvement (protective eyewear needs), and daily exposure to sunlight/ultraviolet radiation); and
- the importance of making informed and cost-effective purchase decisions (that is, researching options in the marketplace and selecting a product or service that offers the features and quality needed at a fair price). Discuss why the lowest-price option is not always the best bargain.

Help students discover tools for empowering themselves with information by engaging in the research projects found on the “Bettering your Consumer Eye-Q” activity sheet (copy master found in this kit). Topics include:

- Eye care providers,
- Eye examinations,
- Insurance coverage of visual care,
- Contact lens options,
- Eyeglass frames,
- Eyeglass lenses,
- Sunglasses,
- Protective eyewear for athletes, and
- Safety glasses.

In small groups of two or three, have students follow the project steps outlined on the activity sheet to ensure every student participates in researching and reporting on an assigned topic. The group’s findings can be shared with the class through a collectively-prepared written report or an oral presentation.

**Note:** An excellent source of information on eye and visual care is the Web site of the American Optometric Association (<http://www.aoanet.org>). Topics can be researched within the site by entering key words into the site’s “search” bar.

## Lesson #4: Parts of the eye and workings of the visual system

Suggested Vision Quest materials: “Schematic of the Eye and Visual System” activity sheet and “Basic Eye Anatomy Quiz.”

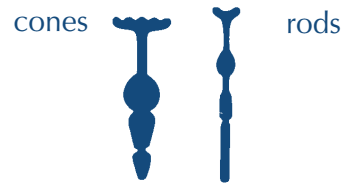
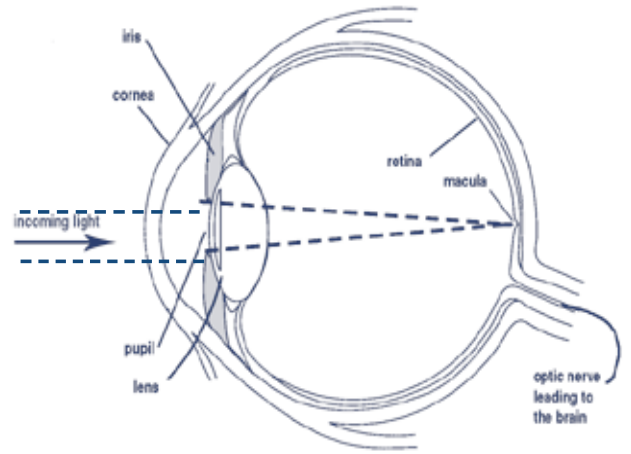
Help students improve their note-taking abilities while studying the workings of the eyes and visual system by giving each a “Schematic of the Eye and Visual System” activity sheet (copy master included in this kit) to complete while you lecture or show the video, “A Journey Through Your Eyes” (available on loan from the South Dakota Optometric Society by calling

605-224-8199).

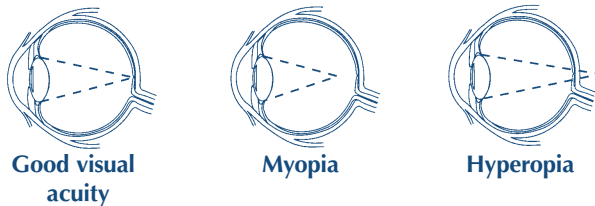
Key lecture points include:

- 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 perceive an image in our minds.

- 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.
- Good **visual acuity** (visual sharpness) occurs when the eye's 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.



Some of these cells are cone-shaped and concentrated in the **macula**, the center of the retina. Others are rod-shaped and located outside the macula.



- 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**.
- When light rays hit the retina, they stimulate millions of light-sensitive nerve cells that create electrical impulses.

- **Cones** create impulses that allow the brain to perceive clear, sharp central vision and an awareness of color and fine detail. **Rods** transmit signals for peripheral (side) vision and allow the eyes to detect motion and see in dim light.

- Impulses from both cones and rods are sent to the brain via the **optic nerve**. The **brain** interprets these impulses allowing a picture to form in the mind.
- It is a good idea to visit your doctor of optometry for an **eye examination** once a year to make sure your eyes are healthy and working properly.

A copy master for a "Basic Eye Anatomy Quiz" covering this lesson is included in this kit. **Quiz answers: 1-F (change hyperopia to brain), 2-T, 3-T, 4-F (change cornea to retina), 5-F (change rods to cones), 6-T, 7-F (change blocked to bent), 8-T, 9-F (change hyperopia to myopia or nearsightedness), 10-T.**

## Lesson #5: Oral presentations on visual conditions and eye diseases

Suggested Vision Quest materials: "Vision and Eye Health Presentation Worksheet."

Begin the lesson by discussing the difference between a visual screening and an eye examination. Include these key points:

- A visual screening is a quick test to see how well a person can read letters or symbols at a distance. Visual screenings are often given in schools and to drivers at the motor vehicle department. These screenings help detect obvious visual problems, but they cannot identify complex visual conditions or underlying health problems.
- For that reason, a comprehensive eye examination (which includes a thorough examination of the internal and external structures of the eye and a series of sophisticated tests) performed at the office of an eye care professional is the best way to diagnose visual conditions and eye health problems and ensure they are treated promptly.
- Eye care professionals include doctors of optometry (O.D.s) who diagnose and treat eye health and visual conditions and prescribe medications, contact lenses, eyeglasses and other therapies. They also include ophthalmologists (M.D.s) who specialize in performing eye surgery. Visual screenings are often performed by school nurses and others who make referrals to eye care professionals.
- Because the eyes are constantly growing and changing, doctors of optometry recommend that you obtain a comprehensive eye examination every year.

Encourage students to build their public speaking skills while becoming more aware of conditions that can affect their vision and eye health. Distribute copies of the "Vision and Eye Health Presentation Worksheet" (copy master found in this kit) and review basic elements of an oral presentation including:

- A short **introduction** that gets the attention of the audience and introduces the topic;
- A **statement of credibility** that describes

how the student gathered his or her information and the resources that were used;

- The **body** of the speech which presents three to five main points about the topic (such as a definition of the disease or condition, its prevalence, symptoms, how it can be diagnosed by eye care professionals and treatment options);
- A **visual aid** (such as computer-generated slide presentation, chart, poster, diagram or model) to help illustrate key points; and
- A **conclusion** which wraps up the main points and presents any recommendations for avoiding the condition or obtaining an early diagnosis.

Assign a topic from the following list to each student and ask him or her to research it (at the library or on the Web) and prepare a three-minute speech (including a visual aid) to be presented to classmates. (An excellent information resource for vision and eye health topics is the Web site of the American Optometric Association at <http://www.aoa.org>.)

Suggested topics include:

- **Myopia** (nearsightedness)
- **Hyperopia** (farsightedness)
- **Astigmatism**
- **Presbyopia**
- **Strabismus** (crossed eyes)
- **Amblyopia** (lazy eye)
- **Color deficiency** (color blindness)
- **Conjunctivitis** (pink eye)
- **Sties**
- **Cataracts**
- **Glaucoma**
- **Diabetic retinopathy**
- **Hypertensive retinopathy**
- **Retinitis pigmentosa**
- **Macular degeneration**
- **Vitamin A and other nutritional deficiencies**
- **UV radiation and the eyes** (and the importance of wearing UV protective sunglasses)
- **Impact of alcohol consumption on vision**

- **Computer vision syndrome** (eye fatigue caused by computer use)
- **Trauma: blows to the eye** (black eye)
- **Trauma: lacerations of the eye**
- **Impact of allergies on the eyes**

- **Blindness** (common causes, treatment, prevention)

Encourage students to ask questions and share information after each presentation.

## Lesson #6: Publishing *The Eye Health Tribune*

Suggested Vision Quest materials: (All program materials can be used as informational resources.)

Teach students about eye safety and visual care while introducing them to journalism basics by publishing a newsletter called *The Eye Health Tribune* (or another name chosen by your class).

Discuss your newsletter's mission (to inform readers about the importance of maintaining the health of their eyes and visual system) and target audiences (students, their parents and teachers).

As a group, brainstorm a list of eye and vision-related articles, and assign them to student reporters and editors who will research, write and edit them. Excellent sources of information include materials in this kit, your school library, your local doctor of optometry and the Internet (including the American Optometric Society Web site (<http://www.sdeyes.org>)).

Some possibilities include:

- A story about the importance of caring for the health and safety of the eyes including a sidebar column of "person-on-the-street" interviews posing a question (such as, "What is your favorite way to use your eyes?") to random students and teachers at your school;
- A list of common visual conditions and eye diseases, their symptoms and treatments (see Lesson #2 for topics);
- An "Ask-the-Optometrist" column featuring questions submitted by several students and answered by a local optometrist;
- A list of interesting facts and statistics about the eyes and vision;
- A story about a teacher who wears eyeglasses or contact lenses and the difference they have made in his or her life;
- A chart showing a recommended schedule for obtaining eye examinations at different ages;
- A description of the main parts of an eye examination and the differences between an eye examination and a visual screening;
- A story about how the eyes and visual system work (with a simple diagram);
- An article about the importance of wearing eyeglasses with ultraviolet protection (and a photo showing several students modeling their sunglasses);
- A story about how animal or insect eyes (e.g., cats, birds, houseflies) differ from human eyes;
- An interview with your school nurse about how to remove dust and dirt safely from the eyes;
- An interview with your physical education teacher or coach about sports eye-wear and headgear that can protect the eyes and head from injury;
- A list of the pros and cons of wearing contact lenses including an interview with a contact lens wearer;
- A description of common instruments found at the eye doctor's office and their purposes (e.g., a phoropter, ophthalmoscope, slit lamp and fundus camera);
- A story about how one would go about becoming a doctor of optometry or a paraoptometric assistant;
- A short biography about a person who has contributed to the visual welfare of others (e.g., Benjamin Franklin, inventor of bifocals) or who has raised public awareness about visual disabilities (e.g., Helen Keller);



- A list of famous people who wear eyeglasses;
- A column of eye health and safety DOs and DON'Ts; and
- A story about nutrients that are essential to the visual system (such as vitamin A) and recipes featuring foods high in these nutrients.

Be sure to introduce students to some basic journalism terminology along the way including:

- **flag** (name of your newsletter in type as it appears across the top of the first page),
- **masthead** (a small box, often appearing on the second page, that contains information about the newsletter's name, place of publication and editors),
- **headline** (title in large type used to announce each story),
- **by-line** (credit given to the author under the headline),

- **lead** (first sentence of a story containing the most essential information),
- **pics** (photos and illustrations),
- **captions** (wording that appears under pics describing how they relate to stories),
- **sidebar** (a smaller story with supporting information which appears next to a related larger story),
- **cub** (a novice reporter),
- **assignment** (a specific story or job given to a reporter),
- **deadline** (the last opportunity to finish a story), and
- **dummy** (a diagram showing the basic layout planned for the newsletter).

As a team, work on the final layout and the duplication of your newsletter and distribute it to other students in your school encouraging them to share it with their parents (or consider enclosing it in a routine school mailing to parents).

## Lesson #7: Vision and sports performance

Recommended Vision Quest materials: "Sports Vision Performance" activity sheet.

Ask students what sports they play and make a list of the most popular ones. Discuss how athletes use their eyes when playing these sports noting all that they must watch and consider during the game or event.

Emphasize that, in addition to doing exercises to increase their speed, muscle strength and manual dexterity, athletes can improve their performance by engaging in activities that enhance their visual abilities. Invite students to create a "sports vision clinic" with stations where they can try out some of these activities.

Prepare by distributing photocopies of the "Sports Vision Performance" activity sheet and assigning groups of students to bring in the necessary items to recreate activities for improving eye-hand coordination, visual concentration, eye tracking and depth perception. On the day of the clinic, have the students take turns manning these stations

and participating in each event. Encourage students to recreate and practice the activities they find most helpful on a daily basis for one week.

You might also want to include a safety station where a physical education instructor or coach can show students different types of sporting equipment that protect the eyes and head (such as masks, helmets and goggles) and the proper way to wear them.

As a follow-up assignment, ask students to write a short paper about sports vision describing:

- how they use their vision in their favorite sport and the visual skills they'd like to improve,
- how they can protect their eyes when participating in the sport, and
- one or two of the techniques for enhancing visual performance and how they recreated and practiced these techniques.

## Lesson #8: Optometry as a career (guest speaker or field trip)

Explore the eye care professions with your students by inviting a doctor of optometry to speak in your classroom or by arranging a field trip to the doctor's office. (You can get referrals for optometrists in your area who enjoy speaking to students by calling the South Dakota Optometric Society at 605-224-8199).

Work with your students, in advance, to prepare a list of questions for the optometrist such as:

- Why did you want to be a doctor of optometry?
- What is your job like on a day to day basis?
- What kinds of eye and visual problems do you see in your practice and how do you treat them?
- What are some of the elements of an eye exam and why are they important?
- How is an eye exam different from a visual screening?
- What kind of education is required to be a doctor of optometry?
- How does being an optometrist differ from being an ophthalmologist or an optician?
- What is a paraoptometric? What do they do and what kind of education is required?
- In what settings do doctors of optometry work (e.g., private practice, hospitals, research, the military, and public health service)?
- Are there optometric practices that have a particular focus (e.g., sports vision, low vision, visual therapy) and what services do they offer?
- What is the best thing about being a doctor of optometry?

- How can a person my age best prepare for a career in eye care?

Follow up the visit by dividing students into teams and asking them to collect information on optometry as a career from any of the following sources:

- your school's guidance office,
- school library,
- public library,
- Internet,
- guidance/academic advising offices of colleges and universities in your area,
- schools and colleges of optometry,
- the South Dakota Optometric Society,
- the American Optometric Association, and
- doctors of optometry (and their staffs) in private practices, hospitals, the military, and public health service.

Create a collage on "Eye Care as a Career" and post some of the findings on a bulletin board in your school's library or cafeteria.

### 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](http://www.sdeyes.org) for more information.



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