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Instructional curriculum for vision grades 6 - 8

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Abstract
This curriculum is designed to teach sixth through eighth grade students about vision. It is broken down into five sections. The first section teaches about the structure and function of the eyes. The second section covers the meaning of 20/20 and refractive anomalies. The third section discusses vision in the animal kingdom. The fourth section has a focus on diseases of the eye. The fifth section is a teacher directed section where the class can take a field trip, learn more about a topic the students enjoyed, or have the students give oral reports. A movie list and a packet of optical illusions is also included.

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INSTRUCTIONAL CURRICULUM FOR VISION GRADES 6 - 8

By

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A thesis submitted to the faculty of the
College of Optometry
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Biographical Sketch

Sara Diane Richart

I was born on April 30, 1965 and raised in Eugene, Oregon. My father was an elementary teacher, my mother is a certified nurse-midwife. In 1983 I graduated from Marist high school and then went on to the University of Oregon where I graduated with a Bachelor of Science degree in general science in 1987. I am married to Mark Wees who has a masters degree in music education and is a high school band director.

I entered Pacific University College of Optometry in August of 1987. In September of 1989 I was one of 25 optometry students nationwide to receive a full scholarship through the army in their Health Professions Scholarship Program. I will be graduating from Pacific University College of Optometry in May 1991, and will be stationed at Madigan Army Hospital at Fort Lewis Washington. After three years in the army I plan to work in private practice with a concentration on children and the needs of the handicapped. Community education is important to me and I plan to be very involved with the local school system, PTA, and other local organizations.
ABSTRACT

INSTRUCTIONAL CURRICULUM FOR VISION GRADES 6 - 8

This curriculum is designed to teach sixth through eighth grade students about vision. It is broken down into five sections. The first section teaches about the structure and function of the eyes. The second section covers the meaning of 20/20 and refractive anomalies. The third section discusses vision in the animal kingdom. The fourth section has a focus on diseases of the eye. The fifth section is a teacher directed section where the class can take a field trip, learn more about a topic the students enjoyed, or have the students give oral reports. A movie list and a packet of optical illusions is also included.
Instructional Curriculum For Vision

Preface

As a preoptometry student attending the University of Oregon I was struck by how little I knew about vision. My total life knowledge consisted of about a fifteen minute lecture on the basic structure of the eye. I might be able to bluff myself through definitions of nearsighted and farsightedness, but I had no clue what an astigmatism was (for all I knew it could have been a life threatening ocular deformity!) My lack of knowledge was not a result of inattention in class. The lack of good curriculum dealing with vision in elementary and secondary education is astounding. Most people are interested in the visual process once they start learning about it because it is so fascinating. A common response to their new knowledge is, “I had no idea vision was so complex.”

The need for educational curriculum for both children and adults in vision is great. An increase in knowledge translates into a more relaxed attitude when a problem arises compared to the common panic response often seen. Knowledge about visual problems also helps some people to act in a more caring manner toward visually handicapped people.

My goal for this curriculum was to try to find a way for junior high level students, and their teachers, to learn about their eyes and vision in a fun, interactive way, that helps to build an interest for science. My longtime practice goal is to promote vision education in schools and community centers. I plan to begin by expanding this curriculum and by spending lots of time myself in the classroom showing how intriguing vision can be.
Instructional Curriculum For Vision

Curriculum Review

This curriculum is designed to teach sixth through eighth grade students about vision. The goal is to make the information easily applied by the teacher, interesting for the student as well as stimulating to the students imagination. Following completion the curriculum packet was sent to various teachers for review. Overall the results were favorable and the teachers enjoyed the information presented.

The curriculum format is designed to allow the teacher flexibility in the use of classroom time and the subjects covered. This format was chosen through research into curriculum design and investigation of existing science based curriculum. Subject areas are divided into sections. Each section delineates approximate teaching time, materials needed, advanced preparations required and the factual information necessary to teach the lesson. Further topics can be added to the curriculum base by a knowledgeable person with a minimum of difficulty.

SECTION ONE

The first section covers the structure and function of the eye. A large color poster of the eye is displayed in front of the classroom for reference. The session begins with each student receiving a worksheet of the eyes components. The students are asked to match each component they can with its name. The students then check their results and correct their papers which can now be used as a reference. The definition and function of each structure is then given so students can assimilate how the structures function together. The structures covered are: eyelids, eyelashes, tears, puncta, cornea, aqueous humor, iris, lens, sclera, retina, vitreous humor, optic nerve, macula, and the occipital lobe. The students have demonstrations to perform to better understand the optic nerve and the macula.
SECTION TWO

Definitions of refractive anomalies and the meaning of 20/20 are the goals of the second session. Nearsighted and farsighted are defined as well as being given the scientific terms of myopia and hyperopia. Astigmatism and its correction in terms of the shape of the cornea. Finally the definition of 20/20 is explained with many examples given for the students to study and work on. The parameters of this session may be taught by an optometrist visiting the school, solely by the teacher, or partially, by the use of movies.

SECTION THREE

Vision in the animal kingdom is stressed in the third session. The visual needs of many species is outlined including the differences between birds of prey, nocturnal animals, predators, prey, and a few specific animals. An emphasis is placed on independent study in this session. The students are encouraged to choose an animal they are interested in and writing a paper about the visual needs of the animals.

SECTION FOUR

Cataracts, glaucoma, and strabismus, is the focus of the fourth session. In-class demonstrations are used to augment the students learning. The cataract demonstration uses a piece of clear acetate partially covered with clear nail polish to imitate what a person with a cataract ‘sees.’ A balloon in a bottle model is used to demonstrate how high pressure in the eye can damage the optic nerve in glaucoma. Two ping pong balls with the pupils drawn on them are used to graphically show both esotropia and exotropia deviations in strabismus.

SECTION FIVE

The last session in the current curriculum is teacher directed. The purpose is to allow the teacher to decide what further topics to pursue. Some ideas suggested are: have students present oral reports on the previous topics, visit an ophthalmologist's office, have a round table discussion about what was learned, watch another movie on variable subjects such as cataract surgery, Helen Keller, color, light or lasers, or even to contact a butcher about fresh cow’s eyes for dissection. Middle schools have a wide range in science/health class training. Some teachers may only want to deal with oral reports and movies while other teachers may want to tackle a field trip
or a class dissection. Session five gives the teacher some leverage on what subjects the students are ready for.

A movie list encompassing over 100 movies on different subjects was compiled to aid the teacher in movie selection. The main drawback of this list is that many of the movies are old and not as exciting to junior high students. A search of references did not show any newer movies, however.

Optical illusions are fun and exciting for both teachers and students. At the end of the curriculum an extensive collection of optical illusions is enclosed. The illusions can be used to ignite imagination, have some fun in the fifth session, or to take home.

In order to review the curriculum a ten item questionnaire was produced. A packet of the curriculum guide and a questionnaire was sent to teachers in the Gresham and Eugene, Oregon areas. Fifteen packets were sent out and five questionnaires were returned. The returned questionnaires are included.

The results of the questionnaire were positive. The teachers were excited to teach about vision. The teachers often noted that they learned along with the students about vision and were now interested in more advanced curricula. A few of the responses indicated that they could not spend this amount of time on vision, and that the time allotment for some of the sessions is too short due to high student involvement. Most teachers indicated that they would use parts of the curriculum at a time but not the entire curriculum due to time restraints. The age of the movie list was brought up as one of the things liked least about the curriculum. ‘Single stitch’ cataract removal and radial keratometry were some of the topics teachers mentioned they would like to see added.

The instructional curriculum for vision gives junior high school students a good knowledge base for the eyes and vision, and gives the teachers some choices on which topics to teach. The students enjoy the lessons and have fun activities to participate in. The objectives of the curriculum (to teach students about vision, to make the sessions uncomplicated to teach, to let all involved have fun, and to format the curriculum in such a way as to make additional topics easy to add) were met.
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**ACTIVITY SYNOPSIS:**

Students will learn about the different components in the eye, and what their functions are in vision. They will learn the reasons glasses, contact lenses, and other visual aids are important. They will learn the function of eyes and vision in the animal kingdom. Finally some of the basic disease processes, and abnormalities found in the eye will be taught.

To aid in the learning process the students will participate in some or all of these activities: 1) Visiting an optometrist's office, or having the optometrist come to the classroom 2) Classroom demonstrations 3) Special or independent studies on various subjects 4) Watch movies on various subjects 5) Classroom participation activities.

**ACTIVITY OUTCOMES:**

Students will be able to identify various structures in the eye and how they work to produce vision. Students will have a basic understanding of visual problems and diseases. The students will have a basic understanding of vision in general.

**ACTIVITY TERMINOLOGY:**

- Eyelids
- Eyelashes
- Tears
- Puncta
- Cornea
- Aqueous humor
- Iris
- Lens
- Sclera
- Retina
- Vitreous humor
- Optic Nerve
- Macula
- Occipital lobe
Your Eye

Aqueous Humor
Cornea
Eyelash
Eyelid
Iris
Lens
Optic Nerve
Retina
Sclera
Vitreous Humor
Your Eye (Key)

5. Aqueous Humor
3. Cornea
2. Eyelash
1. Eyelid
6. Iris
7. Lens
10. Optic Nerve
9. Retina
8. Sclera
4. Vitreous Humor
Optic Nerve Demonstration
Macula Demonstration

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ESTIMATED TEACHING TIME:
Five class periods (approximately one hour each)

TEACHING MATERIALS: (First Session)
Teacher:
Poster (color) outlining components of the eye
Student:
Your Eye - worksheet

ADVANCE PREPARATION: (First Session)
Duplicate the Your Eye worksheet (one per student.)
Hang the color poster of the eye, so it is visible to all students.

TEACHING PLAN: (First Session)
Ask the students: Have you ever thought about your eyes?
   How do your eyes work?
   What are the different parts of your eyes called?

Distribute a copy of Your Eye the worksheet to each student. Inform students that for every arrow on the drawing of the eye is one part of the eye. The name for each part of the eye is in the list below. Give the students 3-5 minutes to try and fill in as many parts as they know.

Have the students check and correct their worksheets as you explain the different parts. Suggest that the students take notes on the different structures for future knowledge.

As you explain the structures be sure to point them out on the poster.

EYELIDS: Ask the class what they think the purpose of the eyelids are. The eyelids help to spread tears evenly on the eye, protect and lubricate while sleeping, and help to protect the eye from dust and other debris in the air.
EYELASHES: The lashes also help to protect the eye from dust floating in the air, as well as protecting from moving objects that brush the lids.

TEARS: Ask the class what tears are and what they do. Tears are always on our eyes, not just when we cry or have something in them. Tears are made up of water and oils. The water and oils work together on your eyes to moisturize your eyes and to keep the tears themselves from evaporating off of the eyes too quickly. Every time you blink your lids give your eyes a brand new layer of tears and the old tears drain away. To see the tears, gently pull the lower lid away from your partner's eye, you should see a small puddle of tears.

PUNCTA: Have students look at the eyes of someone near them. Look at the lower lid towards the nose (the lower lid may need to be GENTLY pulled away slightly from the eye,) a small hole can be seen here. This is called the puncta. This hole is where your tears drain out of your eye and into your nose. That is why when you cry really hard you need to blow your nose, the tears you are crying are being drained into your nose.

CORNEA: The cornea in your eye is like the window that lets all of the light in. The cornea is the clear round part of your eye that your lids close over. The cornea holds all the fluids in while still allowing light into the eye. As light goes into the eye the cornea bends the light to help focus it on the back of the eye. The cornea is curved and therefore is able to bend light towards the back of the eye (the retina.)

AQUEOUS HUMOR: The aqueous is a watery fluid that is found only in the very front part of the eye. The aqueous is between the cornea and the lens.
IRIS: Have students name as many different eye colors as they can. The part of the eye that makes these colors is called the iris. All sorts of different colors exist such as blue, brown, green, and gray. Most babies are born with blue eyes and change colors during their first year of life. The iris has a job to do, however, besides giving you pretty eyes. The iris has lots of muscles in it to make it change sizes. The black part in the center of the iris is called the pupil. If the iris was a doughnut the pupil would be a hole in the doughnut, because that is just what the pupil is, a hole formed by the edges of the iris. The pupil allows light to go back to the retina, and the iris, with all its muscles, regulates how much light gets to the back of the eye by making the pupil larger or smaller. When the pupil gets smaller less light gets to the back of the eye and when the pupil is bigger more light gets to the back of the eye.

ask the class: In bright light would the pupil get bigger or smaller? What would happen in dim light?``

Have the class partner up and have one person in each group close their eyes for 15-20 seconds. Then have the other person watch the pupils of their partners eyes as the eyes are opened. (You need to watch very closely) Then have the partners switch so the other one can witness it.

When your eyes are closed, your pupils get very big to let in as much light as possible. Then when you open your eyes, there is a whole bunch of light and the pupils get smaller so that less light is taken in.

Therefore, in bright light your pupils get smaller so that less light is let in and in dim light your pupils get larger to let in more light. Our retina needs a certain amount of light in order to function properly. Too much light bleaches the retina out so you cannot see well and not enough light does not give the retina enough light to function.

LENS: The lens is found directly behind the pupil and iris. It's job, like the cornea, is to bend light to help focus the light on the back of the eye. The lens is able to move and change its shape, to help you focus better between objects that are far away and objects that are close to you.

SCLERA: The sclera is the white part of the eye and is very strong. The sclera acts to hold the eye together and to keep the round shape of the eyeball.
RETINA: The retina is a thin layer on the back of the eye. If light is focused on the retina, the object that you are looking at will look clear. If the light rays do not focus on the retina then the object that you are looking at will look blurry to you. People wear glasses when the light does not focus on their retina, the glasses help to refocus the light back onto the retina.

VITREOUS HUMOR: The vitreous is a clear jelly-like substance in the shape of a ball that is in the large open space between the lens and the retina. The vitreous along with the sclera help to keep the round shape of the eyeball.

OPTIC NERVE: In the back of the eye there is a large nerve that connects the eyes to the brain. The optic nerve connects all parts of the retina to the brain, so the brain can interpret what the eyes see.

DEMONSTRATION: Pass out a copy of the Optic Nerve Demonstration

Have each student close their right eye and hold the paper at arms length. Look only at the circle on the paper but be aware of the cross without actually looking at it. Slowly bring the paper towards you and stop when you can no longer see the cross.

At this point we cannot see anything. This is called a blind spot because we have no vision or are "blind" in that one spot. We do not usually notice this, even though it is always there, because our brains get used to it, and with the two eyes working together the blind spot is "masked by the other eye."

MACULA: The macula is the spot in our retina with the most nerve endings. Our macula is the point on our retina where we get the clearest and most accurate information. When we move our eyes to look at something we are actually pointing our maculas at the object we want to see clearly.
DEMONSTRATION: Pass out a copy of the demonstration Macula

Have the students keep the demonstration sheet turned over until you give instruction and say "go."

Have the students close one eye and hold the paper as close to them as they can and still see the numbers clearly (3-6 inches.) Again look at the spot in the middle ONLY and just be aware of the surrounding numbers. While looking only at the spot how many numbers are you able to read.

Not very many letters are clear; are they? You are looking at the spot with your macula. Your macula has the clearest vision in your retina. This demonstration shows that when you do not look at something with your macula the clearness of it falls off very quickly.

OCCIPITAL LOBE: The occipital lobe is the part of the brain that translates what the eyes are seeing. The optic nerve goes from the retina to the occipital lobe.

Feel the back of your head for the part that sticks out the most. This is the occipital lobe.

INDEPENDENT ACTIVITY: (options)

- Have each student pick at least one independent study topic found throughout this lesson. Students may also pick their own topic if their idea is sound.

- Make a color drawing of the eye with each structure being a different color and explain the function of each structure.

- Present an oral report describing all parts of the eye.

- Build a model of an eye with all structures present.

- Write a song or poem describing all parts of the eye and their function.
**TEACHING PLAN:** (Second Session)

**Advance Preparation:**

**OPTIONS:** Choose one, or more

1.) **Contact a local Optometrist, explain that you are giving your class a lesson on vision and the eyes.**

Negotiate to either visit the optometrist's office or have the optometrist come and speak to your class.

Topics for discussion by the optometrist:
- **Myopia (near sightedness)** show students high plus lenses - to mimic myopia
- **Hyperopia (far sightedness)** show students high minus lenses - to mimic hyperopia
- **Astigmatism**
- Discuss how a normal exam works, and what is tested in a normal exam
- Show some of the equipment used in testing, and explain how it is used and what it tests
- Explain what 20/20 means

2.) **Obtain an eye chart from the school nurse. Mark off twenty feet on the floor and have each student stand on the twenty foot line and look at the chart with both eyes open and then with one eye closed. Students that wear glasses can also try this with their glasses off. Take five to ten minutes for this exercise.**
3.) Again use the eye chart (snellen chart) as described in option two above. Discuss the basic problems eyes have and why some people have to wear glasses.

Ask students why some people have to wear glasses.

We need light in order to see. The cornea and lens bend the light and bring it to a focus. If you see clearly the light focuses on your retina. Just like if you focus a camera correctly the picture will be clear. If the light does not focus on the retina then you see things as being blurry. People wear glasses when light does not focus on their retina and they see the world around them looking blurry.

MYOPIA: (my-op-ee-a) This is the scientific term for being nearsighted.

Ask the students what it means to be nearsighted.

Nearsightedness or myopia means that you can see well up close but you cannot see very well far away. Things far away look fuzzy and blurry. The light does not focus on the retina but instead the light comes to a focus before it hits the retina.
HYPEROPIA: (hi-per-op-ee-a) This is the scientific term for being farsighted.

Ask the students what it means to be farsighted or hyperopic.

Hyperopia is when everything looks clear far away but gets blurry when you try to read a book or do anything close to you. Again the light does not come to focus on the retina but instead comes to focus behind the retina.

When you wear glasses the lenses in your glasses moves the focus point of the light back onto the retina.

Draw these drawings on the board:
ASTIGMATISM: ( a-stig-ma-tiz-m ) Astigmatism is when your cornea is not completely round. A person without astigmatism has a cornea shaped more like a basketball, whereas a person with astigmatism has a cornea shaped more like a football. Almost everyone has a little bit of astigmatism, in that their corneas are not completely round but not everyone needs to get their astigmatism corrected. Astigmatism correction is put into the glasses correction along with any correction you might need for myopia or hyperopia.

VISUAL ACUITY:

Ask the class: Have you ever wondered what it means to have 20/20 vision?

20/20 is the average vision of someone who does not need glasses. 20/20 also means that from a distance of 20 feet, a letter 1/4 inch high can be seen.

Visual acuity is a measure of how well each eye is seeing. The top number is how far away from an object you stand (in feet) to see a line of letters clearly. The bottom number is the distance away from an object the person who has no visual problems has to stand.

If you have 20/70 vision in your right eye then you have to stand 20 feet away from an object to see it clearly whereas someone who does not need glasses could still see the object at 70 feet. You have to stand closer to an object in order to see it clearly than does a person with 20/20 vision.

Have different people in the class explain what each of these acuities means:

20/30: Average person sees letters at 30 ft. but you must move to 20 ft. to see the letters.
20/1000: Average stands at 1000 ft. you stand at 20 ft.
20/200: Average stands at 200 ft. you stand at 20 ft.
20/100: Average stands at 100 ft. you stand at 20 ft.
20/15: Normal stands at 15 ft. you stand at 20 ft.
20/10: Average stands at 10 ft. you stand at 20 ft. better than average.
4.) Watch a movie from the selected list.

INDEPENDENT ACTIVITY:

- Write a report about contact lenses. What are they made of, what are the advantages of wearing them, how do they work.

- Write up an oral report explaining the reasons glasses are needed. The reasons have been discussed.

- Interview the people you know who wear glasses and find out who wears glasses for what problems. If they do not know if they are hyperopic or myopic have them take off their glasses and ask them if they see better far or near. If they cannot see far or near then they may be corrected for astigmatism. Ask them when they wear their glasses (all day, for reading,...) or if they like their glasses.

- Write a story or poem about what it would be like to see everything as blurry and what a difference it makes when everything looks clear again.
TEACHING PLAN: (Third Session)

Have each student name a different animal and write the name of the animal on the board.

Ask the class if different animals have different visual needs.

Animals do have different visual needs.

Fish need to be able to see under water.
Frogs need to see both under water and above.
Birds need to see very fine detail to find food.

Why would some animals have eyes on top of their head or pointing downward? Why would some have eyes on the front of their heads while others have eyes on the sides of their heads. Where the eye is placed and where the eye is pointing is an adaptation the animal has found that works for them and helps them to survive.

What would happen if a lion was myopic? How easy would it be for that lion to find and catch food. The lion would not be able to pick out any prey that was very small and would have a very difficult time chasing the animal because the animal would be a blur to him. That lion probably would not survive very long not being able to hunt efficiently. Eye sight is very important to the animal kingdom.

Birds of prey (or accipiters) have very unique visual needs. Hawks, ospreys, and eagles must be able to spot rodents or fish while soaring high above. Birds also have another visual need. They need to have extremely accurate depth perception or they will not be able to accurately "grab" their prey, giving the prey time to get away. Birds of prey are very unique in that they have two maculas (remember that is the point on the retina of sharpest vision.) One macula is used for the keen vision needed to spot their prey while soaring and the other macula is used for the precise depth perception needed while they are diving for their prey.
Some animals need color vision and others do not. Animals that can see colors have a good reason for being able to see colors.

What are some reasons for needing to see colors?

Birds are not color blind, they use their colors for identification and to find a mate. Usually the most colorful birds are males. The peacock, for instance, is male while the female peahen is a drab gray color.

Color is also important to bees. Bees do not see color the way humans do but they find the nectar they need from flowers by being able to identify the different flower colors.

Most fish are also able to distinguish colors.

The main reasons certain animals see color are 1) to find food 2) to find a mate 3) to stay safe from other animals.

Eyes are placed differently on different heads for different reasons. Predators tend to have their eyes on the front of their head. This allows for better depth perception so they can be more successful as hunters. Prey tend to have their eyes placed on the sides of their heads so that when they are being chased they can see somewhat behind them to see what is chasing them, where they are and how close they are. Eye placement on prey helps them to escape, while on predators it helps make better hunters.

Name some animals that are predators and some that are prey:

<table>
<thead>
<tr>
<th>PREDATORS</th>
<th>PREY</th>
</tr>
</thead>
<tbody>
<tr>
<td>lions</td>
<td>rabbits</td>
</tr>
<tr>
<td>tigers</td>
<td>deer</td>
</tr>
<tr>
<td>eagles</td>
<td>worms</td>
</tr>
<tr>
<td>hawks</td>
<td>horses</td>
</tr>
<tr>
<td>cats</td>
<td>cows</td>
</tr>
<tr>
<td>some dogs</td>
<td>smaller dogs</td>
</tr>
<tr>
<td>humans</td>
<td>antelope</td>
</tr>
</tbody>
</table>
Some animals such as trout have eyes placed on the top of their head. This is so that the trout can lie on the bottom of the riverbed and see everything that is going on above. On the other hand anteaters and cattle have eyes placed looking down so they can see what is going on below them. This way the anteater can find the ants walking around and the cattle can see what kind of grass it is eating or even if there is any grass to eat.

The flounder is a saltwater flat fish. The young flounder looks like a normal fish with an eye on each side of the head. As the flounder grows however one eye slowly migrates so the adult flounder has both eyes on the same side of the head. Can you think of any other animal with interesting visual traits?

**INDEPENDENT STUDY:**

- What animals are awake and active in the dark and what is special about their eyes.

- Pick an animal and write about the visual needs of this animal ie: predator or prey, does animal need or have color vision...

- Write about an aspect of vision in animals that you find interesting

- Write about how animals vision could be better - talk about possible future adaptations that would help in the survival of this animal.

- Write a poem about vision and/or vision in animals or be more specific and write a poem or story about a specific animal and how they use their vision. You can even use your own pet.

- Come up with your own topic, but be sure to get your teachers approval.
TEACHING PLAN: (Fourth Session)

Materials Needed:

- clear piece of acetate (blank transparency)
- bottle of clear nail polish
- empty balloon
- smallish clear glass/plastic jar/bottle
- two golf or ping pong balls (optional)

ADVANCE PREPARATION:

CATARACT DEMONSTRATION:
Apply a circle approximately three to four inches in diameter of nail polish on clear acetate and let dry. Be sure there is enough acetate left over so students can look both through clear acetate and also through nail polish covered acetate.

GLAUCOMA DEMONSTRATION:
Insert empty balloon into clear smallish jar. This is a demonstration of high pressure so first you want to blow the balloon up so it is not touching the sides of the jar. Then you will want to blow more air into the balloon to show how high pressure in the eye can put a lot of pressure on the nerves of the eyeball, especially the optic nerve. Be sure to point out the amount of pressure that gets placed on the neck of the balloon by the neck of the bottle.
STRABISMUS DEMONSTRATION: (optional)
Get two golf, ping pong balls, or white styrofoam balls. Paint a general eye outline on each one, or even just a black spot representing the pupil on each one.

Each ball is going to represent an eyeball. You hold one looking straight forward and turn the other one either in towards your nose or out towards your ear.

PLAN:

Does anyone know what cataracts are?

Cataracts are when the lens in the eye becomes clouded.

There are many reasons why cataracts form; some people are born with them, some people get cataracts after injuring their eyes but mostly people get cataracts just from living a normal healthy life as a normal aging process. The lens in your eye is like your fingernails or your hair in that they grow all through life. The difference is that you cut your fingernails and your hair periodically but the lens never loses anything (the lens never gets a trim, or even a full blown cut for that matter.)

Your hair and fingernails would grow really long if you never cut them. Your lens on the other hand gets thicker. At birth your lens looks like this:

Throughout life your lens looks more like this:
[Please draw these diagrams on the board]
Because of the extra width the very center of the lens becomes very dense and this causes the lens to become a little yellowish or milky. This process happens in everyone. By the time someone is 70 years old, a cataract can almost always be found. Very few cataracts end up needing to be removed. Most progress slowly and have little effect on vision. When a cataract has to be removed the person has greatly decreased vision. An ophthalmologist (write word on board) makes a small incision in the sclera, removes the entire lens, and usually puts a manmade lens in to replace it so the person can see well again.

Now pass around the piece of acetate with clear nail polish on it and tell the students to look through it and then through the clear acetate.

Looking through the nail polish covered acetate is like looking through a cataract.

Write the word GLAUCOMA on the board

Does anyone know what glaucoma is?

Does anyone know someone who has glaucoma?

Glaucoma is when the pressure in the eye is too high. When the pressure in the eye is too high a lot of pressure is put on the optic nerve and some nerve fibers die.

Do the glaucoma demonstration now. The neck of the balloon is just like the optic nerve.
When people have glaucoma they do not ‘feel’ a lot of pressure in or around their eyes. When the pressure in your eyes is high the nerve cells in the optic nerve start to die. The longer the pressure is high the more nerves are killed. Every time nerves die you lose a small amount of vision and you start to have more little blind spots like you saw before. But just like the blind spot that everyone has, the blind spots that form from glaucoma are not noticed. Usually people with glaucoma put drops in their eyes to keep the pressures in their eyes down. Sometimes people have surgery done. This consists of making a hole in the iris to allow the fluids in the eye to drain easily, helping to keep the pressures down.

Write the word STRABISMUS on the board

Unlike cataracts and glaucoma, strabismus is not a problem that is partially associated with the aging process. Often strabismus is noticed in the first two years of life. Strabismus is when the brain only uses information coming from one eye. The other eye is “turned off” and as a result turns either toward the nose or toward an ear. If the eye is turned in, this is called ESOTROPIA (write on board.) If the eye is turned out, this is called EXOTROPIA (write on board.)

There are many reasons why people become strabismic, the most common reason is that the eye that is not used is very hyperopic and the other eye sees clearly with no correction. The brain “sees” one eye clearly and the other eye as blurry so starts to receive information only from the clear eye and slowly, through a long process, the blurry eye can get turned off.

This process can sometimes be reversed along the way but is easier to reverse the earlier it is diagnosed and treated.

Strabismus is treated by optometrists through the use of vision training. Vision training is the use of many techniques and procedures whereby the brain is re-taught how to receive information from the blurry eye and use that eye along with the other eye using the two eyes together.
A person with strabismus looks different when you see them. When they look at you and talk to you they often will not look like they are looking at you. They may look kind of funny but they are not doing it on purpose and there is nothing they can do to fix it.

INDEPENDENT STUDY:

- Interview a grandparent or someone you know that has had cataract surgery and write a paper on the experience.

- Interview a relative or friend who has glaucoma and find out everything you can about what this person is going through and what medications are taken and how often.

- If a relative or friend has a problem with their eyes find out all about this problem and about how this person deals with their problem and write a report all about it.
TEACHING PLAN: (Fifth Session)

This last session is teacher directed. Here are some options:

- Have students present their oral reports / projects
- Show a film from the list below
- Make copies of the visual illusion packet and have students play with that
- Have a round table discussion on what was learned
- Contact a butcher and see if you can get some fresh cow eyes to dissect
- Have the music teacher come in and everyone try to write a song together about eyes and vision
- Take another field trip to an optometrist's office and learn more in depth about vision training or something that the students found interesting
- Watch a National Geographic movie showing animals hunting and discuss how vision is used in the specific cases shown
- Watch a movie showing a cataract surgery
MOVIE LIST

STRUCTURE AND FUNCTION OF THE EYES:

**Exploring The Body: The Eye**
color 11 min sd 16 mm

Combines technical animation with live-action sequences to explain structure and function of the human eye. Compares the eye to a camera - each receives light rays, adjusts exposure and focus, and forms an image. Discusses nearsightedness and farsightedness, and explains how these defects can be corrected through properly prescribed eyeglasses. Stresses the importance of good eye care, including reasonable attention, adequate light during long use, and protection from physical injury.
1972

**The Eye: An Inside Story**
color 10 min sd 16 mm

Skillful dissection and detailed examination of a cow's eye show the various parts - lens, pupil, iris, retina, cornea, sclera, choroid, vitreous humor, and ciliary body - and the functions of each. Photographs through the eye itself and other unique demonstrations reveal the mechanics of this complex organ, and how the phenomenon of vision is accomplished.
1978

**Eyes and Their Care**
b&w 11 min sd 16 mm

Examines the eye in terms of structure, functions, disorders, and hygiene. Reveals, with animated drawings, the various parts of the eye and explains the physiology of sight. Illustrates such eye defects as nearsightedness, farsightedness, and astigmatism, and describes their correction with proper glasses. Calls attention to eye infections, the removal of foreign bodies, and damage by radiation.
1941
**Eyes and Vision**
color / b&w 9 min sd 16 mm

Presents an animated explanation of the structure and function of the human eye. Clarifies the complex mechanism of vision and shows the similarities and differences between the eye and a box camera. 1963

**Eyes - Seeing the Light**
color 16 min sd 16 mm

This instructive film examines the structure and functioning of the human eye. The viewer learns how eyelids, eyebrows, eyelashes and tears provide protection for eyes, and discovers how six muscles control eye movements. The film clearly illustrates the sight process and identifies the sclera, retina, vitreous humor, cornea, aqueous humor, choroid, iris, pupil, lens, ciliary muscle, rods, cones, and optic nerve. 1981

**Eyes, Their Structure and Care**
color / b&w 11 min sd 16 mm

Shows how Ed's low grades, headaches, and poor baseball playing prompt him to visit an optometrist. Animated drawings show the parts of the eye and the path of light rays though these structures in myopia, hyperopia, and astigmatism. Pictures Ed being referred to an ophthalmologist by his optometrist and shows him going to the optician who grinds his glasses. Concludes by showing that wearing glasses has helped Ed and by discussing the proper care of the eyes. 1956
Human Eye
color 14 min   sd   16 mm / v-u

Human binocular vision is compared to the vision of animals. The structures and functions of the eye are examined in detail with particular attention given to the iris, the rods and cones of the retina, and the optic nerve. Models, animated diagrams, and directed photography of the living eye portray the most important physical structures.
1978

Save Your Sight
color 23 min   sd   16 mm

Explains how the eye works and shows its structure by use of models and drawings. Describes various eye problems correctable with glasses as well as those which cause blindness.
1958

You and Your Eyes
color 8 min   sd   16 mm

Jiminy Cricket explains the structure and anatomy of the eye by comparing it with a camera. Stresses the safety features designed by nature to protect the eyes and the simple health rules for taking care of the eyes.
1957

Your Eyes
color / b&w   7 min   sd   16 mm

Explains the functions of the eyes and stresses ways in which the delicate organs should be cared for. Employs animation and close-up photography to illustrate the parts of the eye - the iris, lens, lens fluid, and optic nerve. Uses live-action sequences to stress the importance of good vision and proper eye care, explaining the natural protection of the eye as provided by the skull, eyelashes, and tears.
1964
Your Eyes
b&w 11 min sd 16 mm

Live action and animation are used successively in this film to illustrate the structure and function of the eye and its component parts. Diagrams are used to explain certain of the causes and corrections of nearsightedness and farsightedness. This film explains how the eyeball is protected by eyebrow, eyelash, eyelid, and tears.

1947

HOW THE BLIND AND SIGHTED DEAL WITH BLINDNESS:

As A Blind Person
color 30 min sd 16 mm

A definitive profile of Bill Schmidt, a blind school teacher and principal of an elementary school. Illustrates how a blind person works at a job many consider difficult for a sighted person. Scenes of Mr. Schmidt at work and at home reveal how completely he has overcome his visual handicap and how focusing on his other senses has made him uniquely suited to the responsibilities of his job.

1975

The Blind: An Emerging Minority
color 28 min sd 16 mm

Shows the blind as people, a clearly identifiable minority group within our society, and documents the mass social movement, the National Federation of the Blind, through which the blind of America collectively voice their hopes, fears, frustrations and dreams. Film shows the blind assembled in convention, in orderly demonstrations on the streets, using the tools of organization and collective self-expression to gain meaningful participation in decision making. Their fight against attitudes which deny them their basic human and civil rights and competitive employment. We see successfully employed blind people- a company executive, a school teacher, a hardware store manager, a sheet metal worker, etc., but we also see others facing innumerable closed doors.

1975
Blind Love

The story of a blind man and a homely woman, in a 1940's setting, who fall in love and get married. Conflict arises when the blind man decides to have a cornea transplant which may give him his sight. His wife who considers herself very unattractive is afraid her husband will be disappointed when he sees her. Based on a true story by Ray H. Walton. 1979

Blind Sunday

Eileen, a self-reliant high school student, accepts her blindness very well, refusing all charity. Jeff encounters Eileen at a neighborhood swimming pool where her abilities startle him and eventually draw him to a profound relationship. In order to understand what it is like to be blind he blindfolds himself for a day. His new sensitivity helps him to move beyond clumsy overprotectiveness to a richer friendship. An excellent introduction and guide to blindness for the normally sighted. The development of self-confidence and assertiveness are shown to be helpful for the blind. 1976

Blindness Is

Interprets the facts of blindness for the benefit of sighted persons, and explains the perspective of persons who must perceive by touch and hearing. How the blind can adapt to their limitations and achieve reasonable normal lives. Work of the Iowa Braille and Sight Saving School in adapting educational methods to needs of the visually handicapped. 1966
Eyes of a Child: Teaching Blind Children
b & w  30 min  sd  16 mm

This film follows blind children through a typical day at a school in England which attempts to give them a good education as well as equipping them to lead normal lives. Their behavior is so normal that we almost forget they cannot see.
1967

In This Dark World
b & w  29 min  sd  16 mm

Shows techniques employed in the education of the blind demonstrated by a supervisor of home teaching services in Ontario, Canada.

Laurie
color  14 min  sd  16 mm

Designed to help students get to know Laurie, a disabled person, to help them reflect on the different and not-so-different life styles of the handicapped, to ask questions, and to meet, accept, and befriend new handicapped students who may be coming into their own classrooms. Despite her blindness, Laurie has a determination to live independently. She practices with a cane to negotiate obstacles on the street, and uses a special device to read books that haven't been put into Braille.
1978

Regina: Gift of Vision
color  8 min  sd  16 mm

Regina, an eleven-year-old, is practicing piano in a darkened room. Her brother places music on the instrument which she touches, for it is printed in Braille. Regina is blind. While she does things sighted people take for granted—shopping, crossing a street, attending a regular school, playing with friends—she describes how she lives in the everyday world. She is mainstreaming, and it works.
1979
See What I Feel
color 6 min sd 16 mm

Laura, who is blind, tells Jill about her trip to the zoo, describing the animals and events through her senses of smell, touch, and hearing. The high point of the visit came when her father and the zookeeper had to retrieve Laura's hat from an angry ostrich. In animation.

1977

Seeing Eye Dog (Canine Eyes For The Blind)
color 10 min sd 16 mm

Step-by-step photography of training sequences in developing "seeing eye" dogs, or canine eyes for the blind. Shows training sequence from puppyhood to one-month training with blind master. Excellent story of blind emancipation through trained dogs.

1948

Seven Minute Lesson
color 7 min sd 16 mm

Shows the proper techniques most commonly involved in acting as a sighted guide for one who is blind.

1980

The Truly Exceptional Dan Haley
color 11 min sd 16 mm

Dan Haley is 16-years old. He has lost 80% of his vision and will eventually be totally blind. "I do a lot of things by myself," he says. "Blind people do not have to be helpless." He has made sure that he is anything but helpless. He moves about freely, plays guitar with a high school band and leads an active social life.

1979
What Do You Do When You See A Blind Person?
color 13 min sd 16 mm

Shows, lightheartedly, the mistakes commonly made by individuals as they associate with blind persons for the first time. Dramatizes the activities of a man and a blind person as they cross streets, walk up steps, converse, and eat together. Demonstrates proper and acceptable behavior.

HOW GLASSES HELP PEOPLE:

Four Eyes
color 15 min sd 16 mm

Heywood needs glasses, but he has some very negative ideas about people who wear glasses, so he hides his problem by clowning. His teacher finds him out, but Heywood has a nice surprise coming: once he can see, he can become a baseball star.
1978

Glasses For Susan: A New Day
color 13 min sd 16 mm

A non-narrated film which tells the story of a little girl whose life is changed when her distorted vision is corrected with glasses. Stresses the importance of sight in communicating and learning effectively.
1972

Health - Eye Care
color 9 min sd 16 mm

A galaxy of important eye care reminders are presented, including: regular eye check-ups, wearing glasses, proper lighting, and rules for eye safety.
1973
**Health - Eyecare Fantasy**
color 9 min sd 16 mm

A golden-gowned fairy escorts children through a filmed journey showing eyecare hygiene and ways to avoid eye injuries.  
1971

**How To Say Good Buy**
color 11 min sd 16 mm

Debbie is sick of wearing glasses. She offers to pay any difference if her parents will let her replace her broken glasses with contact lenses. Her folks won't agree unless she can furnish more specific information. Debbie shows us how to dig out the facts before making a major purchase. She researches the subject in consumer magazines, picks the brains of a friend who wears contacts, and interviews an eye doctor. She gathers data on prices, warranties, and alternatives. Finally she searches her own value system to decide what is important to her, and what her priorities should be. When she makes her decision, she feels certain that she is making a good buy.  
1981

**See Better: Healthy Eyes (first and second editions)**
color b & w 11 min sd 16 mm

Presents a classroom situation in which Peter sees distinctly only with glasses, Mary squints, Alice strains, and Marvin's eyes are crossed. Miss Bender names the parts of the eye as they function individually and as a total mechanism. Prescribes the following rules for eye care: good food, plenty of sleep, cleanliness, keeping sharp points away from the face, proper removal of foreign particles lodged in the eye, correct posture and lighting when reading, and regular check-ups by the eye doctor.  
1950

**Describes eye structure, function and care. Illustrates the importance of protecting the eyes from infection, strain, intense light and flying objects. Emphasizes the value of getting annual check-ups from an eye doctor, and wearing eyeglasses when needed.**  
1973
The Two Foot World of Paul Jackson
color  28 min  sd  16 mm

Story about the problems a young child faces due to poor eyesight and the relief that a pair of glasses provides, enabling him to take full delight in the world around him. Cannes Festival Award Winner.

VISION AND ANIMALS:

Animals See In Many Ways
color  12 min  sd  16 mm

Illustrates the likenesses and differences in the eyes of various animals. Uses animated drawings to show parts and functions of simple, compound, and camera-like eyes. Points out how the position of the eyes on the head tells about the animal's way of life. Describes the eyes of snails, spiders, grasshoppers, flies, horses, owls, alligators, cats, squirrels, and frogs. 1962

Blind As A Bat
color  7 min  sd  16 mm

Shows the habitat and various characteristics of bats, including their method of flying without collision. Pictures several kinds of bats and how they are captured for laboratory study. Shows an experiment in which a blindfolded bat avoids certain obstacles in flight but fails to navigate properly when its mouth is tied shut. Demonstrates the bat's inaudible sounds of extremely high pitch by using a special radio receiver. 1954

Blind Bird
color  45 min  sd  16 mm

The delightful story centers around a young Russian boy, Vassia, and his friend Pelka, a pink pelican that is blind. After much trouble the pelican has an operation to restore his sight only to have it turn out a failure. Through some miracle, Pelka's sight is restored and he flies to join his brothers. 1969
Colors Are Useful

Illustrates the practical uses of color in traffic signals, on overseas aircraft, in identifying electronic parts, and for increasing heat reflection and absorption qualities of clothing. Points out the facts that brightly colored blossoms attract insects and fishermen’s flies attract fish to a line; explains the adaptive colors of deer, prairie dogs, lions, peafowls and peacocks, cockatoos, polar bears, black bears, and zebras.

1961

Eyes

Traces the evolutionary development of sight organs from the primitive red-eye-spot of the one-celled Euglena through the compound eyes of insects, spiders, fish, chameleon, birds and mammals, to the highly complex visual system of humans. Explains how the eyes of humans and other animals work, and demonstrates the importance of eyes as instruments of survival in all species. Imaginative photography provides the unique experience of actually seeing the world through the eyes of different creatures.

1975

A Thousand Eyes

Describes the human eye and the organs of sight of various animals. Shows ways to protect eyes against accidents and strain.

1967
LIGHT, LASERS AND COLOR:

Color
color 10 min sd 16 mm

Compares the colors in nature to those which an artist might use to demonstrate the sensuous and emotional effects color has on the way one perceives things. Uses drawings to depict the effect colors may have on perception of size, the way in which the background-foreground relationship can be influenced by color, and how the arrangement and rearrangement of color can change a specific pattern. Identifies the reds and yellows as warm colors used in paintings to create bold and active forms while the blues and greens, which are considered cool, are used for subtle, quiet effects.

Color
color 6 min sd 16 mm

In this film, children will explore new wonders of color in nature, in pigments, in yarn, clay, wood, and other art materials. Avoiding formal color harmonies, the film stimulates interest in experimentation, encourages children to, "put colors together in your own way. Make them say what you want them to say." This film emphasized seeing color in nature, brilliant and subdued; how artists use this color; differences in mood of warm and cool colors; optical illusions caused by changing color; how color helps organize daily life and bring pleasure. This lesson examines the place of color in interior design. It explains what color is, the color wheel, and color schemes and contrasts. The effects of color on space, and the exploitation of a color scheme in interior design, are also discussed.

1954

Color: A First Film
color 14 min sd 16 mm

Explains the importance of color, using everyday examples. Color brightens our world, warns us of danger, and helps us identify and enjoy the things around us. Shows the relationship between color and light, and demonstrates how a prism separates white light into a spectrum of colors.

1979
Color and Light: an Introduction
color 11 min sd 16 mm

Dramatizes the importance of color in our world. Develops the concept that color comes from light and illustrates several uses of color. Demonstrates the spectrum of white light, the combination of light of different colors to produce white, reflection and absorption of light, and the effects of red and blue filters.
1961

Color and Light: an Introduction (Revised Edition)
color 11 min sd 16 mm

Dramatizes the importance of color in our world. A prism spreading white light into a band of colors, or "spectrum," demonstrates the relationship between color and light. Describes and gives examples of opaque, translucent, and transparent materials; and also of materials that absorb, transmit or reflect light. Shows the effects of red and blue filters.
1977

Colorful Ray
color 11 min sd 16 mm

A broken stovepipe becomes an instrument for exploring the nature of light. By fitting the pipe with mirrors. Boy uses it as a periscope to see over the piles of snow that cover his house. Chunks of ice act as prisms, splitting light rays into a rainbow of color. Boy discovers that by placing the ice into the stovepipe, he can make a telescope to magnify images. Animated.
1982

Colour
color 16 min sd 16 mm

Explores the use of color in art and nature and develops the concept of color as the reflection and absorption of white light. The film explains hue, value, chroma, and complementary colors. The illusions, emotional impact, and optical effects of color are examined in detail.
1976
Colour of Life
color 24 min sd 16 mm

Presented in magnified dimension, the maple leaf and segments of the tree serve as illustration of the physiological processes that go on in all plants. The silent, methodical way in which nature clothes her woodlands: the verdant green of springtime and the flaming riot of autumn is revealed in detailed time-lapse photography and animated diagrams.
1955

Eyes are for Seeing
color 9 min sd 16 mm

This beautiful photographed film is designed to develop an awareness and perception of the common and uncommon things we can see everyday. It is a purely visual experience in which marvelous things seem to happen on the screen. Familiar and extraordinary visuals are integrated throughout the film to make repeated statements about color, mass and form. The film can lead to numerous language art activities including painting, model construction, mobile construction, experiments with light, and cutouts of geometric shapes.
1967

The Eyes Have It, Or Do They?
color 11 min sd 16 mm

The role of the eye in perception is explored. The parts of the eye perform functions similar to those carried out by a camera. What a person perceives in reality, dreams, or hallucinations is determined by physical conditions and past personal experiences.
1970
How To Bend Light
color b & w  10 min  sd  16 mm

Uses diagrams and demonstrations to show how light is reflected explaining how mirrors, lenses, and prisms function. Demonstrates that light travels in straight lines and illustrates the camera obscura in operation. Presents reflectors in the form of flat mirrors and curved mirrors and pictures a solar reflector in operation. Reveals how light bends as it passes from one medium into another and observes this in water, a prism, and a lens. 1961

An Introduction To Visual Illusions
color  18 min  sd  16 mm

Illustrates, through the use of animation and special effects, how the human eye views an object and how the brain perceives distance, perspective, and movement. Uses over twenty visual illusions to explain the illusion of depth, diversion, extent, after-image, reverse relief, and perceived movement. Illustrates the size variance related to the vertical-horizontal positioning and gamma movement caused by variation in light intensity. 1968

Laser
color  11 min  sd  16 mm

Introduces audiences to the laser age by going to Bell Labs where research is conducted. The scene shifts to places across the country where the laser is being used particularly and experimentally to improve the communications network, destroy cancer cells and relieve arthritis, restore damaged artwork, etc. Ends with suggestions of future technical marvels to come. 1979
The Laser: A Light Fantastic
color 20 min sd 16 mm

Shows the many uses of the laser, an organized beam of light. Explains the laser's potential as a tool in industry, medical science, communication, and photography. Describes coherent light as light waves traveling simultaneously in the same direction at the same frequency.
1968

The Laser Beam
color 16 min sd 16 mm

Uses wave theory to explain the operation of monochromatic coherent light in a laser. Discusses the 1961 experiment to hit the moon with a laser beam to illustrate the tightness of the beam. Gives many examples of practical applications for the laser including three dimensional laser holograms.
1968

Lasers
color 15 min sd v-u

In 1954 scientists invented a new sort of light - laser light. Now as its breathtaking potential for visual entertainment is being realized, the laser is rapidly establishing itself as the world's most versatile industrial tool. As lasers develop, their uses become more sophisticated, this program explores the widening world of the laser.
1974

Lasers: An Introduction
color 14 min sd 16 mm

Illustrates the principles of laser operation, including concepts of coherent and incoherent light, continuous and discrete spectra, stimulation of atoms, and resonance. Shows how gaseous and crystalline lasers are being used in holography, communications, medicine, science and industry.
1970
Lasers And Your Eyes
color 12 min sd 16 mm

Discusses the basics of lasers and the dangers to one's eyes they can pose without proper protection. Diagrams both continuous and pulsed lasers in the ocular focus and in the non-ocular focus regions of the spectrum. Demonstrates the simple, completely effective special glasses used to avoid eye damage.
1979

Light All About Us: Exploring Science
color b & w 11 min sd 16 mm

Shows David learning about the forms and characteristics of light as he and his parents visit the airport early one morning before sunrise. Pictures the spotlight in action and increasing visibility as the sun rises. Shows David discovering the principles of refraction and diffraction in the airport restaurant and uses animation to explain them. Describes the use of the principle of diffraction as a magnifier and as used in binoculars.
1954

Light And Color
color b & w 13 min sd 16 mm

Looks at light as it is reflected, refracted, or absorbed, and the colors produced by these actions. Uses experiments and illustrations to explore the science of color. Illustrates how color mixtures may be effected through reflected and transmitted light. Relates brightness to color in terms of reflected or absorbed light. Shows reflectance of pure colors and demonstrates how a spectroscope operates.
1961

Light and Its Relation to Color
color 19 min sd 16 mm

Demonstrates the concepts of reflection, refraction and dispersion. Defines transparent, translucent, and opaque objects, explains how natural rainbows form and then shows how to produce artificial ones.
1977
Light and Its Story
color 13 min sd 16 mm

Demonstrates and explains the nature of light, the history of illumination, and some of the physical properties of light. Follows development of lamps to present development of electric lighting in its many forms. Illustrates the concepts involved in mirrors and reflections; lenses and refraction; and use of both concave lenses and mirrors in controlling and directing light.
1961

Light and Lenses
color 9 min sd 16 mm

States that there has always been one basic form of energy necessary for the survival of all living things - light. Utilizing simple diagrams and examples in the world around us, this film demonstrates the basic properties of light and the application of various optical systems for photographic purposes.
1973

Light and Shadow
b & w (11 min) color (7 min) sd 16 mm

Uses a number of classroom demonstrations to present the elementary principles of light. The experiments are performed by a boy using readily available materials.
1950 & 1967

More Than Meets The Eye
color 26 min sd 16 mm

Investigates the difference between seeing and perception, portraying the complex interaction of experience, memory and prejudice with sight. Treats the role of light and the physiology of sight as well as the psychology of perception.
1970
Optical Illusions
b & w  11 min  sd  16 mm

Explains how the eye functions and shows its similarity to a camera. Describes how the brain puts together the flat images from a pair of eyes to form a three-dimensional image. Discusses the persistence of vision and the cause of the "blind spot." Demonstrates experiments with optical illusions.
1957

Seeing Color
color  18 min  sd  16 mm

Shows how the eye sees color and the effects of lighting on color vision. Describes complicated instruments which function on the same principles as the eye.
1965

Seeing is Believing?
color  14 min  sd  16 mm

By provocative examples of confusing activity, optical illusion, and misdirection of movement, this film presentation graphically illustrates how the human eye may be confused and deceived. Dispels the old assumption that seeing is always believing. Written and narrated by Bob Falkner, Head of Media Production at Northern Illinois University.
1976

Sight, Light, and Color
color  14 min  sd  16 mm

Investigates the nature of sight, light, and color. A doctor explains the analogy of the eye and the camera. A physicist describes principles of light. Additive, subtractive, scattering, and temperature principles of color are shown and discussed.
1971
DISEASES:

Cataract
color 14 min sd 16 mm

The personal story of actress Sylvia Sidney as she faced loss of sight from cataracts, sought help, and regained her vision. Describes early warning signs and reinforces importance of early treatment and the needlessness of cataract blindness.
1973

Eyes That Live Again
color 12 min sd 16mm

Provides an incentive for leaving your eyes to an eye bank. Shows how one man was motivated to become an eye donor when he saw a little blind girl playing in the park. It then shows a woman receiving his eyes and being able to see for the first time in her life.
1970

Glaucoma: Silent Threat To Sight
color 10 min sd 16 mm

With regular check-ups and early diagnosis, no one need suffer blindness from glaucoma. This film demonstrates the tests used to diagnose and the treatment.
1972

Glaucoma - Sneak Thief Of Sight
color 27 min sd 16 mm

Presents a case history of a glaucoma victim. Outlines the structure and workings of the human eye. Discusses how glaucoma causes blindness and points out ways this needless loss of sight can be prevented.
1965
The Glaucomas - Early Diagnosis and Management

color 23 min sd 16 mm

Examines in detail the nature of the glaucoma disease. With illustrations and microphotography, primary and secondary glaucoma are investigated, explaining intraocular pressure, drainage block, etc. Shows how glaucoma can be detected and checked before blindness with proper treatment.
1972

An Investment In Sight

color 19 min sd 16 mm

Explains the purpose and operation of the Iowa Lions Eye Bank, and new techniques which make possible the preservation of corneas; shows the experiences of a young boy, David, who has impaired vision because of a scarred cornea, and the corneal transplant surgery which greatly improves his vision. Shows that David's operation was made possible by many people - surgeons, amateur radio operators, Lions Club members, and especially the citizens who donate their time, their money, and their eyes.
1964

Sight: The Priceless Gift

color 11 min sd 16 mm

Using a news-documentary style of presentation, cornea transplantation is explained and demonstrated at the University of Iowa Hospitals and Clinics. Cornea transplant recipients emotionally relate their experiences of regaining their sight.
1978

So Others May See

color 17 min sd 16 mm

The Iowa Lions Eye bank project, how a corneal transplant is made, organization of the eye bank project, what it achieves, and how the program is supported by the Iowa Lions Club. A young girl's experience with corneal surgery reveals the entire sequence of events.
1965
THE FAMOUS BLIND:

**Helen Keller**
color 16 min sd 16 mm

Uses Helen Keller's own words to give an overview of her life and that of her teacher, Annie Sullivan. Dramatizes Helen's early childhood and includes her learning how to read and write, play and laugh. Depicts through still shots, Helen as a lecturer, writer, teacher, innovator, and friend of the famous.
1965

**Helen Keller**
b & w 23 min sd 16 mm

The biography of Helen Keller, using actual motion picture footage of her activities.
1966

**Helen Keller and Her Teacher**
color 28 min sd 16 mm

From Perkins Institute for the Blind, Annie Sullivan came to teach Helen Keller. Sullivan taught her to know, feel, read and write, and finally to teach others. This film is a recreation of that miracle.
1970

**Helen Keller in Her Story**
color / b & w 45 min sd 16 mm

Helen Keller plays herself as this film traces her career from birth to age seventy-six, showing in detail how the blind, deaf, and mute child overcame almost insuperable handicaps to become one of the world's great figures. Some of Miss Keller's famous friends appear.
1953
The Triumph of Louis Braille
b & w 26 min sd 16 mm

Uses a dramatized "on the scene" news type of interviewing and documentary reporting to present the story of Louis Braille, a blind instructor in the National Institute for the Young Blind in Paris. Portrays how he developed a new method for reading and writing for the blind despite criticism from many sources.
1956

EYE SAFETY:

Eye Emergency
color 23 min sd 16 mm

Shows how to prevent eye accidents and how to treat them. Using real workers and real rescue personnel, the film shows simple, step by step treatment for foreign bodies in the eye, sharp injury, penetrating injury, blunt injury, and chemical burn. Animation shows how the eye is structured and how it can be protected. Accidents are dramatized at factories, at home, and during sports activities, while case histories drive home the fact that 95% of all eye injuries could have been prevented.
1979

Eyes
color 4 min sd 16 mm

Emphasizes, without narration, the importance of taking care of the eyes while working. A young woman puts on a pair of glasses just as she is hit by a popped champagne cork, a fishing fly, welder's sparks, an exploding fire cracker, and other objects.
1970

The Eyes Have It
color 26 min sd 16 mm

Introduces students to basic principles of eye safety.
**Sight For A Lifetime**
color 17 min sd 16 mm

An overview of the work of the National Society for the Prevention of Blindness to help prevent eye injury and disease. Demonstrates the effectiveness of protective equipment. Discusses medical research into diseases like glaucoma and cataracts.
1971

**The Senses**
color / b & w 18 min sd 16 mm

Uses animation, live-action photography, and microcinematography to illustrate the physiology of the five senses. Shows the various sense organs and explains their function to the organism.
1965

**Sense Perception, Part 1: The Wonder of the Senses**
color 27 min sd 16 mm

Concentrates on the functions of the brain and the senses. Dr. Irwin Moon wears a pair of inverting spectacles for two weeks and, following his period of adjustment, he is shown doing ordinary tasks plus riding a motorcycle and flying a plane. Seen also is another readjustment period following the removal of the glasses. Follows with a series of experiments to show how each of the five senses work.
1960

**Sense Perception, Part 2: The Limitations of the Senses**
color 27 min sd 16 mm

Points out that the entire electromagnetic spectrum consisting of radio waves, infrared, visible light, ultra-violet, X-rays, and cosmic rays all have properties in common with visible light we can see but that our eyes are not sensitive to these radiations. Compares the sensitivity to hearing in which some animals can hear in the ultra-sonic range beyond the human hearing limits. Interrelates the senses of taste and smell. Features a series of demonstrations such as the revolving trapezoid and distorted room to show how our senses interpret information in the context of past experience.
1960
You and Your Five Senses
color 8 min sd 16 mm

Jiminy Cricket explains the five senses: hearing, smell, taste, sight, and touch. Compares the development of the senses in man and in animals, shows why some of man's five senses are more highly developed than others, and points out how man has been able to compensate accordingly. 1955

OPTOMETRISTS AND VISION:

Dr. Tom and His Magic Tree
color 14 min sd 16 mm

In this lively animated cartoon Dr. Tom, the optometrist, explains three Good Vision habits: getting enough rest, using the proper lighting, and eating a balanced diet. He also tells us about the importance of regular eye examinations and eye protection. Produced through the auspices of the Southern Association of Optometry.

Your Vision, Your Life - Introduction To The Meaning Of Optometric Care
color 25 min sd 16 mm

Reveals full scope of optometric care, ranging from how the professional deals with a child with a vision problem that interferes with learning to the old person with a potentially blinding disease. 1978
OPTICAL

ILLUSIONS
YOUNG WOMAN OR OLD HAG?
IS MAN READING OR WATCHING GIRL?

HAPPY OR SAD?

TURN UPSIDE DOWN AND LOOK AGAIN!!

YOUNG GIRL OR OLD HAC

TABLE OR TWO FACES?
HOLD BELOW LINE OF SIGHT AND TILT AWAY FROM YOU TO READ

LINES OR LETTERS?
BLACK FIGURES OR WHITE LETTERS?

HOLD CLOSE THEN FAR AWAY - DO LINES CHANGE?
1) HOW THE PARTHENON LOOKS IN REAL LIFE
2) HOW THE PARTHENON WOULD LOOK IF MADE WITH ONLY HORIZONTAL AND VERTICAL LINES
3) THE LINES ACTUALLY USED TO BUILD THE PARTHENON
FROM HOW MANY ASPECTS CAN YOU SEE THESE FIGURES?
YOUR EYE follows the arrows

USED IN MARKETING

USE STARDUST

The soap the stars use!

YOUR EYE goes toward the product

CIRCLE looks larger when arrows point away from center
Squares are equal in size

Diagonal stripes make room look larger - vertical stripes make room look smaller

Skyscrapers make eyes move up
Ranch houses make eyes move across

Vertical stripes make you look taller and thinner
THE MOON LOOKS LARGER ON THE HORIZON - BUT IS IT?
HOW WE SEE MIRAGES

WHAT THE ARAB SEES

WHAT IS TRUE

WHAT THE SAILOR SEES

WHAT IS TRUE

WHAT THE MOTORIST SEES

WHAT IS TRUE
ROTATE IN CIRCLES AND SEE MOVEMENT
ROTATE IN CIRCLES AND SEE MOVEMENT
ROTATE IN CIRCLES AND SEE MOVEMENT
ALL CIRCLES ARE PERFECT
WHICH IS THE PERFECT SQUARE?

CENTER ARCHES ARE IDENTICAL

SE A COMPASS TO FIND OUT WHICH DOT IS IN THE CENTER

DIAGONAL LINES ARE STRAIGHT

THE TRIANGLE IS PERFECT
THE HORIZONTAL LINES ARE PARALLEL

FIGURE IS PARALLEL DOES NOT WIDEN AT CENTER

LOOK AT THE STAR FOR 20 SEC. THE DIAGONAL LINES WILL APPEAR BOWED

THE VERTICAL LINES ARE PARALLEL

FIGURE MADE ONLY WITH STRAIGHT LINES
FIGURE THESE PATTERNS OUT
CENTRAL TWO BOXES ARE EQUAL

SQUARES ARE IDENTICAL

RECTANGLE USES ONLY STRAIGHT LINES

FIGURE MADE ONLY OF STRAIGHT LINES
A saucer is wider than a glass is tall. Height and width are equal.

Can a dime fit?

Find the two right angles.

Figures are identical.
DOES LINE A MEET UP WITH LINE B?

TELL THE MEN TO STRAIGHTEN F AND YOU CAN SEE IT HAPPEN

WHICH LINE IS CONTINUATION BETWEEN AB
ALL LINES ARE STRAIGHT AND PARALLEL
FIGURE THESE PATTERNS OUT
ALL LINES ARE EQUAL

LAMP POSTS ARE SAME SIZE - FIRST AND LAST FENCE POST ARE SAME SIZE

ALL CENTRAL LINES ARE EQUAL

TOP LINE ON TOP FIGURE EQUALS BOTTOM LINE ON BOTTOM FIGURE
WHITE RECTANGLES ARE SAME SIZE

ALL MEN ARE SAME SIZE
FIGURES MADE OF CONCENTRIC CIRCLES
FIGURE MADE OF CONCENTRIC CIRCLES
PENCILS EQUAL

\[ AB = BC \]

\[ A = B \]

\[ CD = DE \]
INNER CIRCLES EQUAL

CIRCLES EQUAL

BLACK CIRCLES EQUAL

DOTTED CIRCLES EQUAL
ALL LAMP POSTS ARE IDENTICAL
ALL SQUARES ARE PERFECT
HAND AND LIGHT ILLUSIONS