

# EYES ON STEAM IN THE REAL WORLD

## CONCEPTS AND SKILLS

- |                                                                                                                                                                                       |                                                                                                                                    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Math — Measurement and Computation</li> <li>• Health Science and Medical Career Exploration</li> <li>• Collaboration and Teamwork</li> </ul> | <ul style="list-style-type: none"> <li>• Critical Thinking</li> <li>• Vocabulary Development</li> <li>• Problem-Solving</li> </ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|

## HOW TO USE THE PROGRAM

Photocopy the activity sheets for each student. Computer access for viewing videos is needed for Activities 1 and 3. Activity 1 also requires colored pencils.

## ACTIVITY 1: EYE ON SCIENCE

To start, have students write “How Eyes Work” at the top of a sheet of paper. Under it, they should create three columns labeled:

1. Three things I **know**;
2. Three things I **learned**; and
3. Three **questions** I have.

After completing the first category, have students watch the National Eye Institute’s video, *The Visual System: How Your Eyes Work*, at [youtube.com/watch?v=TY1giZgddAs](https://www.youtube.com/watch?v=TY1giZgddAs), to learn how the eye and the brain work together for vision. Repeat the viewing if needed.

After viewing the video, ask students to complete columns 2 and 3 and discuss similarities and differences among their responses and what they learned from the video, then compile the questions they listed in column 3 to research answers.

Next, distribute the activity sheet and review the directions and answers with students.

**Answers:** 1. retina, 2. pupil, 3. iris, 4. lens, 5. cornea, 6. optic nerve

Have students work in teams to research their questions about how the eye works and share their results.

**Extension:** Have students use their completed activity sheet as reference and work in small groups to make and label a 3D model of the eye using mixed media materials such as construction paper, cardboard, modeling clay, tape, glue, paint, etc.

## ACTIVITY 2: EYEING THE MATH

Review the activity sheet with students and explain the following before students solve the word problems:

- If the second number of the 20/20 fraction is larger than 20, that person requires a corrective lens prescription written by the optometrist or ophthalmologist, which an optician will then fill. If the second part of the fraction is less than 20, the person has better vision than normal.
- A diopter is an optical unit of measurement. It measures the distance at which an object is brought into focus when a person is looking through the center of a lens. Positive numbers with a plus (+) sign reflect farsightedness (a person can see far away but need their near vision corrected). Negative numbers with a minus sign reflect nearsightedness (a person can see close but need their distant vision corrected). The larger the number in either direction, the stronger the lens prescription. For example, a +2.00 prescription means you have +2.00 diopters of farsightedness and need glasses to help read. A -2.00 prescription means you have -2.00 diopters of nearsightedness and need glasses to see objects that are further away. Prescriptions for +3.00 diopters or -3.50 would be stronger corrective lenses for close up and distance respectively. The further you get from zero in either direction, the stronger prescription you need. (Share the diopter measurement chart on page 5 with students for reference.)

**Answers: Part 1.** 1.  $40 \div 2 = 20$  feet, 2.  $18 \times 2 = 36$  feet, 3.  $3 \times 129 = 387$  feet

**Part 2.** 1. 2.25 diopters. 2. 0.75 diopter increase. 3. Power of Lens A:  $P = 1 \div 0.25$  meters,  $P = 4$  diopters (D). Power of Lens B:  $P = 1 \div 0.5$  meters,  $P = 2$  diopters (D). Lens A (4 D) has greater power than Lens B (2 D). Difference in Power =  $4D - 2D = 2$  diopters.

## ACTIVITY 3: EYEING THE ROLE OF AN OPTICIAN

Screen the five videos featuring messages from opticians about their careers available at [ymiclassroom.com/transitions](https://www.ymiclassroom.com/transitions). While viewing, have students take notes about something they learn and something they find interesting.

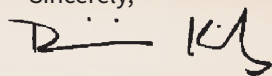
Next, distribute the activity sheet. Have students read the optician career path information and then write their reflections to the “Think About It” prompts. Engage students in a class discussion to share their responses.

Dear Educator,

If you are eyeing new resources for STEAM education, look no further! Eyewear specialists *Transitions*®, in collaboration with curriculum specialists Young Minds Inspired, are pleased to bring you this free teaching kit that features ready-to-use activities focusing on how the eye and corrective lenses work, while also introducing students to careers in opticianry.

We hope you enjoy this program and will share it with other teachers. Please visit [ymiclassroom.com/feedback-transitions](https://ymiclassroom.com/feedback-transitions) to let us know your thoughts on this program. We look forward to receiving your comments.

Sincerely,



Dominic Kinsley, PhD  
Editor in Chief  
Young Minds Inspired

## TARGET AUDIENCE

Grades 6-8

## PROGRAM COMPONENTS

Available at [ymiclassroom.com/transitions](https://ymiclassroom.com/transitions):

- This one-page teacher’s guide
- Three reproducible activity sheets
- A bonus eyewear design activity
- An education standards chart
- A feedback form

**Transitions®**

©2026 Transitions Optical Limited  
Transitions is a registered trademark, and the Transitions logo is a trademark of Transitions Optical, Inc., used under license by Transitions Optical Ltd. GEN S is a trademark of Transitions Optical Limited.  
©2026 Transitions Optical Limited.



Questions? Contact YMI toll-free at 1-800-859-8005, or by email at [feedback@ymiclassroom.com](mailto:feedback@ymiclassroom.com).



# EYE ON SCIENCE

Opticianry is an exciting field of vision science. Opticians are eye care specialists who fill eye prescriptions and help people select proper eyeglass frames, contact lenses, or other corrective eyewear as prescribed by an optometrist or ophthalmologist.

## PART 1: EYE SCIENCE

Watch *The Visual System: How Your Eyes Work* at [youtube.com/watch?v=TY1giZgddAs](https://youtube.com/watch?v=TY1giZgddAs) to find out how light is processed through the eye and how the brain makes sense of patterns from that light to help us understand what we see.

## PART 2: LABEL THE EYE

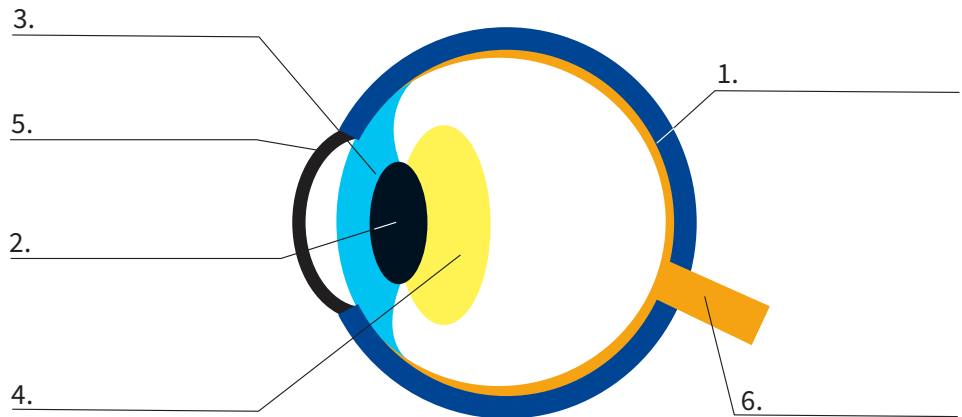
Read the prompts below to determine which eye part is being described. Then find the part on the model and write its name on the matching numbered line. Use colored pencils to lightly color each eye part a different color of your choice.

### EYE PARTS:

cornea      iris      lens  
optic nerve      pupil      retina

### WHAT AM I?

1. I receive light patterns that trigger millions of photoreceptor cells to send messages to your brain that detect light and dark as well as color.
2. I am the dark round circle in the colored part of your eye. I am actually an opening that lets light through. The iris adjusts my size to control the amount of light that passes through your eye.
3. I am the colored part of your eye that surrounds the pupil. In bright light I automatically narrow the pupil, while in dim light I make the pupil wider.
4. I am located behind the iris. I bend and focus light to create a sharp image on the retina.
5. I am clear and dome-shaped. I am what could be called front and center because I cover the front of your eye.
6. I am like a cable or wire that connects the retina to your brain. I take in sensory information from light patterns and send them to your brain to “make sense” of it. Each of your eyes has one of me.



## OPTICIAN CAREER SPOTLIGHT

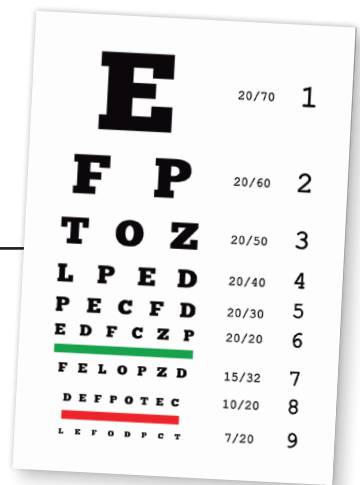
“Every day as an optician, I rely on all the sciences — and even a touch of art. From calculating lens decentration for precise pupil alignment to styling frames with the right color and shape, the entire STEAM framework is essential to my success.”

— Ric Peralta, Lab/Frame Manager, Focal Point Optometry; Educator/Consultant, OpticalJedi



# EYEING THE MATH

Opticians are also mathematicians! Check out some math vocabulary and special tools that opticians work with every day as you solve the real-world situations below. Write the answers in the space provided.



## PART 1: SNELLEN CHART OPTICAL TOOL

Created by Dutch ophthalmologist Dr. Hermann Snellen in 1862, this chart measures visual acuity (clarity of vision), based on how well you can see from 20 feet away without glasses compared to what someone else with normal vision would see. Normal vision is 20/20.

The first number represents your distance in feet from the chart. The second number is the distance from which someone else with normal vision can read the same line. Results are based on the smallest line of letters you can identify without glasses. The larger the second number, the weaker the eyesight.

1. A patient's vision changes from 20/20 to 20/40. This means they have to be twice as close to an object as a person with normal vision in order to see it clearly. If a person with uncorrected vision can see the chart from 40 feet away, how far away can the patient with 20/40 vision see it clearly? \_\_\_\_\_
2. You have 20/20 vision and your friend has 20/40 vision. If your friend can read the movie theater sign from 18 feet away, how far can you read it? \_\_\_\_\_
3. Another friend has 20/60 vision and can read a scoreboard sign from 129 feet away. How far away can you read the scoreboard? \_\_\_\_\_

## PART 2: LENSOMETER OPTICAL TOOL

Opticians use a Lensometer to check the accuracy of a corrective eyewear prescription by measuring lens focus power in units called *diopters*. Negative diopter measurement indicates nearsightedness (you see well up close but not at a distance), while positive diopter measurement indicates farsightedness (you see well from a distance but not up close).

1. An optician dispenses contact lenses and must understand numbers featured in lens prescriptions. For example: One lens has a power of +1.75 diopters, and the other has a power of -0.50 diopters. What is the difference in diopters between the two lenses? \_\_\_\_\_
2. A student is nearsighted. Their current corrective eyewear prescription for the left eye is -2.5 diopters. The optometrist prescribes a new lens of -3.25 diopters. By how much did the prescription increase in strength? \_\_\_\_\_ diopters
3. An optician is testing the power of two different lenses. Lens power is measured in diopters (D) by dividing 1 by the lens focal length measured in meters:  $P = 1 \div f$ . Which of the lenses has more optical power? Write a greater than (>) or less than (<) symbol to show your answer.

Lens A: focal length 0.25 meters \_\_\_\_\_ Lens B: focal length 0.5 meters

What is the difference in power between the two? \_\_\_\_\_ diopters

**Did you know?** Millimeters are used to measure eyeglass frames including *lens width*, *bridge width* (distance between the lenses where eyeglasses balance on the nose), and *temple length* (distance from the lens to the back of the ear, the "arm"). Here are sample measurements: child: 39 15 120; adult: 50 18 150.

## OPTICIAN CAREER SPOTLIGHT

"Math is woven into every aspect of vision care and everyday life as an optician. It wasn't always my strength, but vision math is different — it's practical and makes sense. The numbers directly translate into meeting your patient's visual needs."

— Rachel Hill, Optician and Owner, Personal Optical



# EYEING THE ROLE OF AN OPTICIAN

If you enjoy STEAM-related skills and helping others, then opticianry might be the career for you. Read the information below and view the videos that your teacher shares. Then follow the prompts to write reflections on the information that you learn.

## AN OPTICIAN'S MAIN RESPONSIBILITIES

- Improve people's vision by properly fitting glasses and contact lens prescriptions given by optometrists and ophthalmologists.
- Advise on eyeglass frames, lenses, and coatings based on a person's needs, preferences, and occupation.
- Adjust eyeglass frames that have become uncomfortable or crooked.

## EDUCATION AND TRAINING

Opticians may get experience through an apprenticeship, on-the-job-training, a 1-year certificate program, or college, such as a 2-year associate degree in Ophthalmic Dispensing.

If you're interested in becoming an optician, consider taking these classes in high school:

- Science (biology, chemistry, physics) – to understand human biology and vision science
- Math (algebra I & II, geometry) – precision and measurement are key in fitting eyewear
- Additional recommendations – business/marketing, public speaking, computers

## TYPES OF OPTICIANS

- Dispensing opticians
- Contact lens opticians
- Ophthalmic laboratory technicians
- Fashion opticians
- Low-vision opticians

## WHERE OPTICIANS WORK

- Optical retail stores
- Optical stores independently owned
- Healthcare settings such as optometrist or ophthalmologist offices or eye clinics
- Television and movie production sets

## LEARN MORE

Check out these resources to find out more about careers in optometry:

- Career Explorer: [careereexplorer.com/careers/optician](https://careereexplorer.com/careers/optician)
- ExploreHealthCareers.org: [explorehealthcareers.org/careers/technologists-and-technicians/optician-dispensing](https://explorehealthcareers.org/careers/technologists-and-technicians/optician-dispensing)
- OpticianEDU.org: [opticianedu.org](https://opticianedu.org)
- United Optician Association - Requirements by state to become an optician: [opticians.quorum.us/InYourState/](https://opticians.quorum.us/InYourState/)

## THINK ABOUT IT!

On the back of this sheet:

1. List five skills you think a successful optician needs.
2. Provide one aspect of the career that sounds fun.
3. Provide one aspect of the career that sounds challenging.

## OPTICIAN CAREER SPOTLIGHT

"As an optician, I have the privilege of changing lives in the simplest yet most powerful way, by helping people see. There's nothing more rewarding or meaningful than that."

— Tyjia Sherman, Optician and Development Coordinator, Vision To Learn



# DIOPTER MEASUREMENT CHART

