

STEM Sims™

Vision

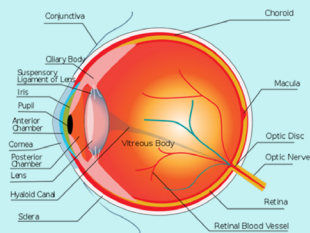


Vision

Do you need an idea for a scientific study? Try out one of our ideas or make one of your own.

Vision is one of the most important human senses. Take the following brief quiz to see how much you already know about how you see things. See the bottom of page 4 to check your answers.

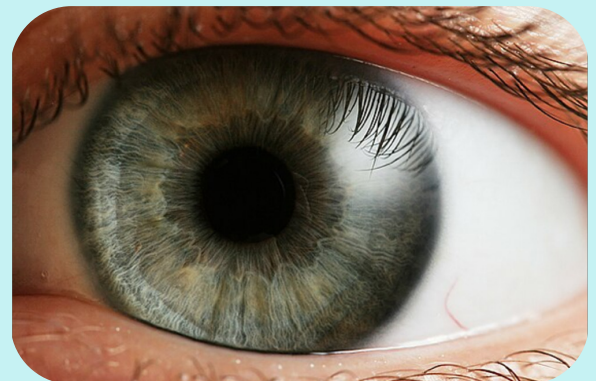
1. When a person sees an object, the image of the object received on the back of the eye is upside down.
 - a. true
 - b. false
2. Which eye color is the *least* common in people?
 - a. brown
 - b. blue
 - c. green
 - d. all three eye colors occur in about the same frequency



3. In a study completed years ago, people wore eyeglasses that made the world appear upside down. After a couple of days of wearing the glasses, what happened?
 - a. Their eyes stopped working for a couple of days.
 - b. Nothing, the people still saw the world up-side down.
 - c. Their brains turned the world right-side up even though they were still wearing the glasses.

Eyeball Dissection

4. About how many light sensitive cells are in a typical human eye?
 - a. 100,000
 - b. 1 million
 - c. 10 million
 - d. 100 million
5. About how fast can the human eye change its focus?
 - a. 1 time/second
 - b. 5 times/second
 - c. 50 times/second
 - d. 500 times/second



Making New Colors

The human eye can detect more than one million different colors of light. How can this large number of colors be created and how can eyes detect such a large number of different colors? Get started now investigating light and colors.

Materials Required

- 1- bright flashlight
- 3-5 pieces of different colors of cellophane (each piece large enough to fit over the front of the flashlight)

Procedure

1. Hold the flashlight at arms-length facing you.
2. Turn on the flashlight, but do not stare at the light.
3. Observe and record in Table 1 below the color of the light.

Table 1. Light Colors

Filter Color	Emitted Color
None	

4. Place one cellophane filter over the front of the flashlight.
5. Observe and record in Table 1 the color of the light from the flashlight.
6. Remove the filter and place a different colored piece of cellophane over the front of the flashlight.
7. Repeat steps 5 – 6 until you have tested each of the four filters (pieces of cellophane).
8. Place two or more different colored filters together at once on the flashlight to make different colors. Record these filter combinations and their light colors in Table 2 below.

Table 2. Light Colors

Filter Color Combinations	Emitted Color

Questions

1. White light is said to be a combination of all colors of light. Describe the evidence you found in your investigation that supports this notion about the nature of white light.

Vision

Help Seeing

Eyeglasses have been used to improve vision for around 750 years. Though newer tools and methods have been developed, many still use traditional glasses to improve their vision. Glasses come in two major types, with one lens to correct either near or far vision issues or a multi-lens version that improves both issues with a single lens.

Farsightedness is a condition in which distant objects are seen clearly, but objects closer to the eye are blurry. The formal name for this condition is hyperopia, with the prefix “hyper” meaning “above” or “beyond” and with the suffix “opia” meaning relating to vision. Lenses to correct hyperopia are called reading glasses. Nearsightedness, or myopia, describes the condition in which close objects are seen clearly and distant objects appear blurry.

Another common vision condition is astigmatism. In this case, either the cornea or lens of the eye is distorted, and both near and far objects appear blurry. Multi-lens eyeglasses are suggested for patients with astigmatism, since they need help with vision correction of near and far objects.

Color-blindness is another type of vision problem, in which individuals are unable to distinguish between certain colors. This condition most commonly involves difficulty distinguishing between red and green colors. Inability to distinguish between blue and yellow colors is less common, and only a small percentage of people are unable to differentiate between any colors at all. There are lenses that help reduce the problem of colorblindness; however, they do not cure the issue, but only reduce the effects of the condition.



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Answers: Page 2 Answers: (1) a, (2) c, (3) c, (4) d, (5) c. Page 3 Making New Colors Answer: (1) Each filter removed specific other colors from the white light. When no filters were in place, the light from the flashlight appeared white.

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