Fool Your Vision to Find Out How It Works

Name: _____

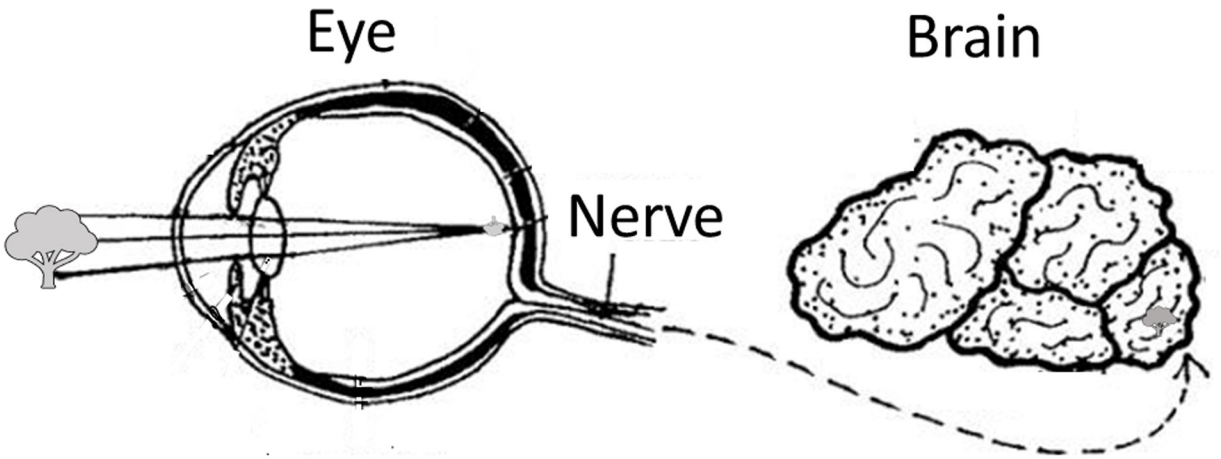
Date: _____

Student worksheet

Directions: Answer the question below before beginning your experiment.

1. Before the Experiment

How are we able to see our surroundings? Use the image to identify the three main steps in the visual process. State which body parts are involved, and what happens in each of these. (Note: the objects in the image are not drawn to scale.)



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Directions: Follow the directions below to do your experiments.

2. Experiment

Follow these steps to do your experiments. The teacher will provide the colored circle and a piece of white paper.

Experiment 1: Afterimage

Work in pairs for this experiment.

a. Choose who will start being the observer and who will start tracking time.

b. **Observer**: Focus on the white spot in the center of the provided colored circle for 30 seconds. Student tracking time: use the stopwatch or clock to time the observer.

c. After 30 seconds, **Observer**: Immediately look at the center of the white space to the right of the color wheel. Draw what you see either in the space provided with colored pencils or record your observation with a computer graphics program.

d. Switch roles and repeat steps a–c.

e. Record your observations (description and sketch) below.

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Directions: Follow the directions below to do your experiments.

Experiment 2: Looking Through a Tube

Do this experiment individually.

a. Roll the sheet of white paper along the longer side into a tube with a diameter of about a quarter. Use a piece of tape to hold the paper in place.

b. Choose a non-white background like a wall or door to look at.

c. Hold the paper roll and hand as shown in the figure below. Note how one hand holds the tube to your eye (being careful with any sharp paper edges) so that you can look through it, and the other hand is held against the tube so that the outside of your pinky finger is touching the tube. Notice how this hand is about halfway down the length of the tube. Look straight ahead with both eyes open.



d. Observe.

e. Close your right eye. Notice what your left eye sees. Then, close only your left eye and notice what your right eye sees. If you have difficulty closing just one eye, ask your partner to cover your eye.

f. Repeat steps c–e, now looking through the tube with your other eye.

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Directions: Follow the steps below to record your data.

g. Record your observations in the table below.

Position Tube	Eyes	Observations (description and sketch)
Left eye	Both open	
	Left closed	
	Right closed	
Right eye	Both open	
	Left closed	
	Right closed	

 Name: _____

Directions: Follow the steps below to analyze the data and reflect on your experiment.

3. Analyze Your Data

An optical illusion is something that you perceive but is not really there. It occurs because something goes wrong in the visual process.

Work in pairs to find plausible explanations for each of the two observed optical illusions.

Experiment 1: Afterimage.

a. In your own words, explain why the optical illusion occurs.

b. Explain how your reasoning explains all the observed results.

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Directions: Follow the steps below to analyze the data and reflect on your experiment.

c. Explain how your explanation is/is not in agreement with the background information you have about the visual system.

d. What other experiments could be done to confirm or refute your explanation?

Experiment 2: Looking Through a Tube

a. In your own words, state an explanation for why the optical illusion occurs.

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Directions: Follow the steps below to analyze the data and reflect on your experiment.

b. Explain how your reasoning explains all the observed results.

c. Explain how your explanation is/is not in agreement with the background information you have about the visual system.

d. What other experiments could be done to refute or confirm your explanation?