

DO IT!

Optical Illusions!

Our brain is constantly processing information from all of our senses. Sometimes the brain takes short cuts when it either does not have all the information necessary, or needs to quickly make sense of the information coming in. Optical illusions are pictures that provide information that either is not clear or is not complete. In this activity, youth will look at several well-known optical illusions. What can they tell us about how our brains process information?



You'll Need

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| 1) Optical Illusions Printout | 4) Pencils/Markers/Pens |
| 2) White Note Card with picture on it | 5) Paper |
| 3) Magnifying Glass | |

Smart Start

This activity can be done independently. Set up a table with several stations containing all materials. Next to each optical illusion, set a note card with the type of illusion it is (i.e. filling in, grouping, figure vs ground).

- 1. Introduce optical illusions.** Are youth familiar with any optical illusions? What are they? How can they trick your brain? Tell youth that today we are going to focus on five different ways that eyes send information to the brain. In each of these cases, the brain gets an incomplete picture from the eyes and has to fill in information.
- 2. 5 Types of Illusions.** Tell youth they are going to be learning about five different types of optical illusions. They will examine each illusion, and learn about the reasons why your brain fills in the information it does. Have youth go around the table and examine each of these illusions:
 - **Inverted image:** Using your magnifying glass, look at a note card displaying an image a few inches from your face. The image should be focused. What do you see? The image looks upside down! The magnifying glass is acting in a similar way to our retinas. When light enters our retina, the image it processes is upside down. Our brains correct the image so that we then see images correctly.
 - **Filling in:** Follow instructions for the Vanishing Spot. What happens to the black circle? The space in the black line? Our retinas have a 'blind spot' where our optic nerve connects our eyeballs to our brains. There are no receptors in this part of the eye. Yet we still see full

pictures! Our brain guesses what we should see, and fills in the rest of the picture based on this guess.

- **Grouping:** Look at figure 1 on your Brain illusions sheet. How are the dots arranged? Across? Up and Down? Why do you think that? Our brain organizes images based on many factors, including distance. Therefore, the lines look like they are organized in vertical or horizontal rows, because of the spacing between each dot.
- **Figure vs ground:** Look at figure 2 on your Brain Illusions sheet. What do you see? A vase? Two faces? Or does the image switch between the two? Our eyes can only concentrate on one figure at a time. When two exist at once, like in this picture, our brain decides which to concentrate on, and ignores the other.
- **Context Clues:** Look at figure 3 on your Brain Illusions sheet. Which row looks concave (the circle curves inward) and which looks convex (looks like a full circle). Imagine the light is coming from above. Now from below. Does that change how each row looks? Our eyes see things in two dimensions, and our brain changes these objects to three dimensions. It does this by looking at depth, distance, and light/shading. Without being able to know all this information, our brains can make mistakes
- **Context Clues:** Look at figure 4 on your Brain Illusions sheet. Which square is in the front of the cube? How do you know?

3. **Begin Challenge.** Divide youth into pairs and introduce the challenge: Now that youth have tried several different types of optical illusions, can they create an illusion themselves? If students are stuck, have them reexamine the previous illusions. They could, for example, group shapes in different ways, or create an image that holds two different pictures. Give youth time to plan and create an optical illusion. If a group finishes quickly, have them create more!
4. **Gallery Walk.** Do a gallery walk and try out all optical illusions. Have youth see if they can identify the type of illusion. How do they know?
5. **Wrap Up.** What illusions did you find most interesting? Why? What do these illusions tell us about how our brains process information?

DO IT!

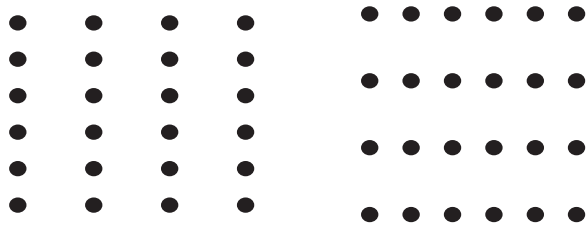
1. Hold this sheet about 18 inches from your face. Close your right eye. Stare at the x using your left eye. Move the sheet back and forth slightly. What happens to the black circle?



2. Close your right eye and try again, this time focusing on the triangle. What happens?



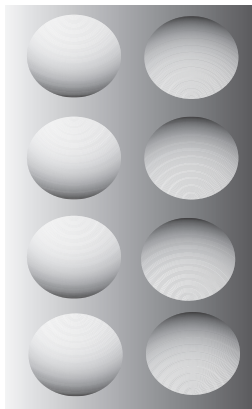
1.



2.



3.



4.

