

## A Hole in Your Hand

Keep Calm and Open Both Eyes



### Materials Needed

- o Sheet of paper, thin cardboard or paper towel roll.

### Grade Range

- K-2
- 3-5
- 6-8

### Topics/Skills

Science: Vision;  
Perception, Optical  
illusions

### Learning Standards

NGSS: [Structure, Function, and Information Processing](#)

### Duration

10-12 minutes

### Prep Time

5 minutes

Have you ever heard that your eyes can play tricks on you? Well, Abracadabra, here's how to see a "hole" in your hand. This activity will take only a few minutes, a rolled piece of paper or tube and your trickable brain.

### Activity Challenge

Using a tube of your own design, trick your eyes to see a hole in your hand.

### Preparation

1. Gather material to make a tube at least 8 inches long.
2. If using a sheet of paper, roll it into a tube shape fasten the edges.

### To Do

1. Look through the tube with one eye using one hand to hold it (see picture above). Keep both eyes open.
2. Bring your opposite hand up next to the tube with the palm facing you.
3. Touch the tube with the side of your hand.
4. Move your open palm along the tube until it appears that the palm has a hole in it.
5. Reverse hands and try again and tube shape.

### Observations

Draw what you see with both eyes open and what you see with one eye open. Be sure to include labels in your drawing.

### Extensions

- Try the experiment with an object other than your hand.
- See if it can be positioned so that it appears there is a hole in the object.
- Change the lighting by moving to a shaded area or by switching lights on/off. Note any differences in your observations.

### Science Behind the Activity

Each eye sends information to the brain based on what is seen. Since each eye is in a slightly different position the information will be slightly different. The brain merges or blends the two different images to form a single image that we perceive as reality. During years of processing visual information, the brain has come to assume that each eye is looking at the same reality, although from slightly different positions.

By using a tube to restrict what one eye can see we force the brain to deal with two very different images, a hand and the view through an opening or hole. The brain assumes both images are a true representation of reality and so blends them together. That causes a merging that gives us the illusion that we are seeing not two separate images but one image of a hand with a hole in it (Alais & Blake, 2005).