

# CURIOSITY AT HOME

## BLIND SPOT AND HOLE IN THE HAND



### FINDING YOUR BLIND SPOT

#### MATERIALS

- 4"x6" index card or paper cut into a 4"x6" rectangle.
- Marker or pen

#### PROCEDURE

- Hold the index card horizontally so the long edge is facing you.
- Roughly  $\frac{1}{2}$ " from the right edge, draw a dot • with the pen.
- Draw a plus symbol + on the other side, also about  $\frac{1}{2}$ " from edge.
- Hold the card at arm's length and eye height. Cover or close your left eye. Stare at the + with your right eye and slowly bring the card closer to your face. At some point, the dot will disappear completely!
- Repeat with your right eye closed and focusing on the dot with your left eye.

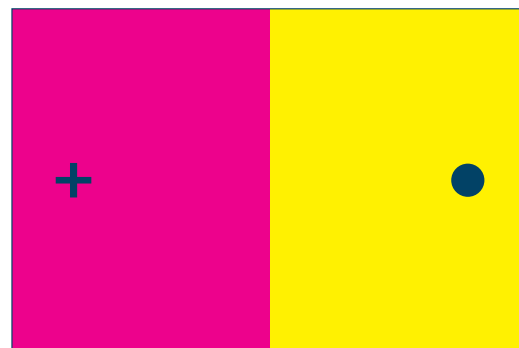
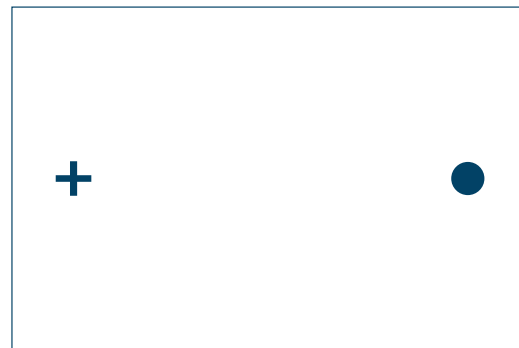
#### TRY THIS

- Make another card but using lined paper or colored construction paper instead of plain white. How does this change your perception? What happens to the background when the shape disappears?
- Try with cards that are half one color and half another. Which color does your brain "fill in" for the missing shape?

#### DID YOU KNOW

The back of the eye is lined with special cells called rods and cones. These cells receive light and send that information to the brain. Each of our eyes has a small spot with none of these special cells, leaving us with a small blind spot. Thankfully the blind spot is in a slightly different place in each eye, so most of the time your eyes cover each other's blind spots. However, if you close one eye, or if the blind spots overlap while looking at a certain object, things in the blind spot disappear! Your brain tries to fill in the gaps in your vision. In this case, your brain sees a solid-colored index card and makes the reasonable assumption that the entire card is probably the same color. It assumes from experience that there is not likely to be a differently colored spot right under the + and so it fills the blind spot in with the background color or pattern of the card.

*Are your eyes completely foolproof? Can you really trust everything they tell you? Our eyes work together with our brains to create a conscious image of the world around us. During this process, raw sensory information from our eyes is changed, deleted, and stitched together by our brains so we can make sense of it. You can experience this sensory processing in action with the following activities.*



*Experiment continued on next page...*



Show us how you're being curious! Share your results with us.



# CURIOSITY AT HOME

## BLIND SPOT AND HOLE IN THE HAND



### HOLE IN YOUR HAND

#### MATERIALS

- 8.5" x 11" sheet of paper, rolled into a hollow tube about 1" inch in diameter, and secured with glue or tape

OR

- Empty paper towel or toilet tissue roll (no tape/glue needed)

#### PROCEDURE

- Hold the paper tube up to your left eye and look through it like a telescope.
- Keeping both eyes open, look at an object in the distance.
- Hold your right hand in front of your face, with your palm facing you. Put the edge of your right hand (pinkie-finger side) next to or touching the tube. You should see a hole in your hand!
- Switch the tube from your left to your right eye. Is the effect the same? For some people, this works better with one eye than the other.
- What happens if you hold move your hand further from or closer to your face?
- Experiment with different sizes of tubes. Is there a difference with a wider or narrower tubes?

#### DID YOU KNOW

Your eyes see two separate pictures of the world that your brain combines into one cohesive image. In this case, your left eye is seeing a hole, and your right eye is seeing your hand, so your brain combines those two images into one, creating the optical illusion that you are looking through a hole in your hand. You may find that the illusion works better with one eye than the other. This might be because that eye is your dominant eye—your brain favors the image from that eye. For example, if you found that the hole looked clearest when you looked through the tube with your right eye, your right eye is likely dominant!

*Experiment continued on next page...*



Show us how you're being curious! Share your results with us.



# CURIOSITY AT HOME

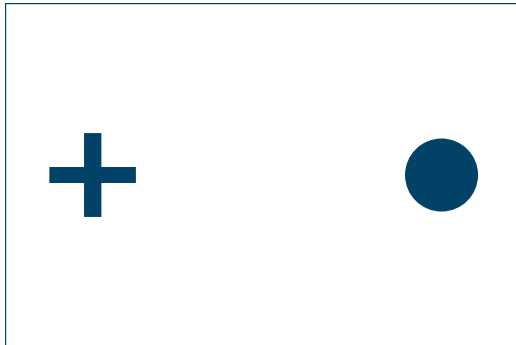
## BLIND SPOT AND HOLE IN THE HAND



### K-2 GRADE EXPLORATION

Here are some questions you can explore together.

- Make the dot • and plus symbol + on the blind spot card bigger. Do they still disappear? How big can you make them before they stop disappearing?
- Draw a crazy pattern all over the blind spot card. Use lots of colors and lines and shapes. What happens to those patterns when the dot • or plus symbol + enters your blind spot?



Show us how you're being curious! Share your results with us.

PACIFIC  
SCIENCE  
CENTER



# CURIOSITY AT HOME

## BLIND SPOT AND HOLE IN THE HAND



### 3–5 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Using the blind spot cards, close your right eye and have a someone else measure how far away the card is when the dot • disappears. Record the distance in your science notebook.
- Now close your left eye and measure how far away the card is when the plus symbol + disappears. Record that distance in your science notebook
- Compare the two numbers. Are they the same or different?
- Do you think this distance is the same for everyone? Ask someone else to try the experiment and compare their results to your own.
- What might your results mean about the way peoples' eyes work? Do you think everyone's eyes work the same?



@pacsci

Show us how you're being curious! Share your results with us.

PACIFIC  
SCIENCE  
CENTER



# CURIOSITY AT HOME

## BLIND SPOT AND HOLE IN THE HAND



### 6–8 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook

- Try the *Hole in Your Hand* activity with both eyes. Does the illusion work better with one eye than the other?
- Which eye do you think might be your dominant eye? Write your guess in your science notebook. Now try this simple experiment to find out.
  - With both eyes open, point to something in the room. It can be a poster, an object, or even just the corner.
  - Without moving your hand, close one eye. Did it look like your finger moved? If not, the eye you currently have open is your dominant eye.
  - Try with the opposite eye closed.
- Answer the following questions in your science notebook:
  - Do you think a person's dominant eye and dominant hand are always the same? Make a prediction in your science notebook.
  - Ask your several people to try and figure out which eye is dominant, then compare that to their dominant hand. Record the results in a chart in your science notebook. Was your prediction correct?

Person's Name	Dominant Eye	Dominant Hand	Are the dominate hand and eye the same or different?



@pacsci

Show us how you're being curious! Share your results with us.

PACIFIC  
SCIENCE  
CENTER

