

# Exploring the Depths – of Vision

## Overview:

Participants will explore depth perception and learn how a pirate's eye patch may affect their vision.

## Goals:

- Learn how binocular vision contributes to depth perception
- Explore eye dominance

**Time Required:** 60 minutes

## Materials:

- Ping pong ball
- Pirate eye patches
- Pencil or pen to write with
- Worksheet
- A yardstick or measuring tape
- Removable tape
- An open space of at least 10ft x 5ft – larger depending on how many pairs you have

**Vocab:** vision, eye dominance, depth perception

## Procedure:

1. Set Up:
  1. Use a yardstick or measuring tape to measure a distance of 10ft. Mark the starting point with a piece of removable tape. Mark every 2 feet with a piece of removable tape.
  2. At the 10ft marker, place a sheet of paper on the ground that says '10 FEET' in large letters that can be read from the starting point.
2. Introduce the activity. "Why do you think pirates wear an eye patch?" "How do you think that affects their vision?"
3. Explain the rest of the procedures:
  - a) To start, one person will stand at the starting point and the other person on the 2ft marker.
  - b) Gently toss the ping pong ball back and forth ten times. Things to observe:
    - When throwing the ball...Watch your partner as they catch the ball.
    - When catching the ball...Notice how you track the ball with your eyes.  
*Do you watch the ball from the moment it leaves your partner's hands, to the moment it lands in yours?*
  - c) In the column 'Both Eyes Successful Catches', record the number of times you caught the ball at a distance of 2 feet.
  - d) Repeat steps 1-3 with both eyes open, at each distance you marked on the floor. Record your successful catches in the corresponding row.



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4. Once all groups are done with this portion, discuss “*Does your success rate change as the distance changes? Why or why not?*”
5. Now, pass out the Pirate Eye Patches and instruct students to completely cover their Left Eye. Ask “What do you notice?”
6. For the rest of this activity, you will cover one eye when you catch the ball – remove the eyepatch when you toss the ball to your partner.
7. Instruct students to repeat the steps (3a-d), with their Left Eye covered. This time record their results in the ‘Right Eye Successful Catches’ column. Remind students to remove the eyepatch when they throw the ball and cover their eye when they catch.
8. When all groups are finished, have students remove their eye patch and discuss:
  - *Is it easier or more difficult to catch the ping pong ball with one eye covered?*
  - *Do you notice any changes in how you catch the ball, for example, do you keep your hands up higher or lower?*
  - *Do you turn your head at all while you’re tracking the movement of the ball? Does your partner notice that you do anything different to catch the ball?*
  - *Does your success rate change as the distance changes?*
  - *Is the distance more challenging with only one eye open? If so, why do you think that might be the case?*
9. Instruct students to cover their Right Eye. Ask, “What do you notice?” How is this similar/different from having your left eye covered?”
10. Have students to repeat the steps (a-d above), with their Right Eye covered. Remind students to remove the eyepatch when they throw the ball and cover their eye when they catch. This time record their results in the ‘Left Eye Successful Catches’ column.

### Reflection:

1. Once all groups are finished, have students remove their eye patch and discuss:
  - *Is trying to catch the ball different with only your left eye open, compared to when only your right eye was open?*
  - *Do you notice that you do anything different to catch the ball?*
  - *Does your success rate change as the distance changes?*
  - *Is the distance more challenging with only one eye open? If so, why do you think that might be the case?*
2. Instruct students to add up the total number of successful catches in each row, Total (distance). Ask “*Which distance did you have the most successful catches? Which one did you have the least number of successful catches?*”
3. Instruct students to add up the total number of successful catches in each column, Total (eye). Ask “*Did you have more catches for Both Eyes open, compared to Right Eye or Left Eye? Was there a difference between how many successful catches you had with your Right Eye open, compared to when your Left Eye was open?*”



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### **Extension:**

1. Find your dominant eye - “Just like you can be ‘right-handed’ or ‘left-handed’, you have a dominant eye. To find your dominant eye, make a triangle with your hands. With your arms outstretched, focus you triangle on a distant point - like a doorknob or light switch across the room (or the star on the slide deck). Keeping your point centered in the triangle, move your hands back to your face. Your triangle will end up over your dominant eye!”.

### **Adapted from the following lesson:**

Arnett, M. & Science Buddies. Exploring the Depths – of Vision! Retrieved Nov 17, 2023 from <https://www.sciencebuddies.org/stem-activities/exploring-the-depths--of-vision>

### **Additional Resources:**

Gary Heiting, OD (english). “How to Find Your Dominant Eye + Why You’d Want To.” *All About Vision*, All About Vision, 27 Feb. 2019, [www.allaboutvision.com/resources/dominant-eye-test.htm#Dominant%20Eye%20Test](http://www.allaboutvision.com/resources/dominant-eye-test.htm#Dominant%20Eye%20Test).

