



# Visual Plasticity

## Lesson Plan

### Learning Objectives:

- Understand that sensory and motor stimuli are mapped onto the brain in an organized manner.
- Understand the term “plasticity” and that neurons adapt to changes in the environment

### Background Information:

The brain controls your body. It processes the information you receive using all five of your senses and enables you to respond accordingly. Your brain has a virtual map of all your senses and motor movements, which it uses to locate and respond to specific stimuli. Your brain has the ability to adapt to the surrounding environment and the information it receives. Some changes in the environment result in relatively quick changes in the brain – like what we will see with the visual system in this activity. The brain’s ability to adapt to the environment is called plasticity. The ability of the visual system to adapt is referred to as visual plasticity. In other words, visual plasticity means that our brains can change our behavior when our visual information, the way that we see what is around us, changes suddenly.

The prism goggles bend light so that what you see while wearing them is shifted to the left.

### Facilitating the Activity:

- Explain the concept of plasticity before doing the activity. Describe how sensory and motor cortices are adjacent to one another in the brain. Reiterate the concept of plasticity after the activity.
- Tape the target to a door or blackboard so that there is about **15 feet of clearance** in front the target.
- Mark a line with a piece of tape approximately 5 paces from the target – move this line closer or farther from the target depending on the age and size of your students.
- Ask for two volunteers. Ask one volunteer to serve as bean bag collector at the target and the other to serve as thrower.
- First ask the thrower to fit the prism goggles to their face so that he or she can take them on and off quickly and easily during the activity. Once the goggles are fitted appropriately the thrower can wear them on the top of his or her head/forehead until it is time to place them over the eyes.

#### **\*\*The goggles will work over glasses.**

- Next, ask the thrower to **overhand toss** bean bags at the target (without goggles). Continue until the thrower is able to hit the target regularly – adjust the distance from the target to increase success if necessary.
- Ask the thrower to quickly put on the prism goggles and immediately begin throwing bean bags at the target again. The thrower should

### PARTICIPATION

- This station is designed for 10-20 students

### MATERIALS

- Prism goggles (with both lenses similarly oriented)
- Bean bags (5-10)
- Tape
- Material for a target
- Homunculus poster

### TIME

- Prep: < 2 min
- Activity: 10-20 min



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initially have trouble hitting the target. Let the thrower continue until he or she has returned to baseline and is successfully hitting the target again.

- Ask the thrower to quickly remove the prism goggles and immediately begin throwing bean bags at the target again. Just like before, the thrower should initially have trouble hitting the target but will regain success at the task after a short while.

### FUN FACTS

- Not all animals can do this!
- Experiments with newts that had their eyes surgically turned upside-down for a few months could not adjust.
- Humans and monkeys that wear glasses which reverse their visual field adjust after a month!

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