

STEAM: Making Sense of Your Senses (Grades K-12)

Program Description:

In this program, students will test the limits of their senses! Discover how your brain connects you to the world around you. We know that your brain talks to your body telling you when to move, how to breathe, and when to sleep, but do you know when your body might talk to your brain? The brain is a difficult subject to study, often because many of its systems are not easy to observe. Helpful exceptions to this are the senses. In this class, students will explore the workings of their minds through activities built around the senses.

What content standards align with this program?

NGSS Performance Expectations: LS1 From Molecules to Organisms: Structures and Processes (Especially relevant for fourth grade, middle school, and high school standards)

NGSS Science & Engineering Practices

Practice 1: Asking Questions and Defining Problems; Practice 2: Developing and Using Models; Practice 3: Planning and Carrying out Investigations; Practice 4: Analyzing and Interpreting Data;

Museum Program Strand:

Empower individuals to use observations and inquiry to understand arguments and design creative solutions.

This program is aligned with the following Museum Learner Outcomes:

Holders of Foundational Knowledge	Masters of Fundamental Literacies	Creative Thinkers and Doers	Generous Collaborators for Tough Problems	Learners For Life	
X	X	X	X	X	

What will students know and be able to do after completing this program?

- Students will conduct investigations and gather data to explore how our senses receive signals from the world around us.
- Students will be able to explain the structures and processes the brain uses to interpret the information it gathers from the senses

What questions will students answer?

- How does our brain communicate with our body?
- How do our senses communicate with the Brain?
- How do our sense of smell and sense of taste interact?
- How do we record observations in a scientific investigation?

Key Vocabulary

Five Senses
 Receptor
 Nerve
 Occipital lobe (5 grade+)
 Somatosensory cortex (5 grade+)

Orbital cortex (5 grade+)

Materials List and Setup

Lab booklets (1 per student)

Pencils

Mirrors

Blindfold

Q-tips

rulers

jelly beans

Human-Human Interface

Program Activities: 60 minutes

1. Introduction. Welcome to the program.
 - a. Introduce the theme of the workshop.
 - b. Demonstration using Human-Human Interface technology.
 - c. Draw out students' prior knowledge of the five senses.
 - d. Explain that we will work through a series of experiments around investigation questions. We will look at models and scientific reasoning after students have had a change to explore and try to explain what they observe.
2. Vision Experiments
 - a. How do our eyes adjust to different environments?- Pupil dilation experiment
 - b. How can we find the limits of our vision- Blind Spot Test
 - c. Explanation of how our brain processes what we see: light enters pupil → light hits photoreceptors on retina → Optic Nerve → Occipital Lobe
3. Touch experiment
 - a. How accurate is our sense of touch? - 2-touch homunculus test
 - b. Students do experiments and record results
 - c. Explanation of how brain processes touch: mechanoreceptors → nerves → somatosensory cortex of brain. Use a model of a brain to show where the sensory cortex is and how the homunculus corresponds to areas with more receptors.
4. Flavor Experiment
 - a. How much does our sense of smell impact the flavor we recognize in food?
 - b. Jelly bean flavor testing experiment--nose plugged and unplugged.
 - c. Discuss what five tastes our taste buds can differentiate between and how a common connection between our mouth and nose means that smell influences most of what we taste.
 - i. Chemoreceptors in nose and tongue → nerves → orbital cortex