Science & Literacy Activity

ACTIVITY OVERVIEW

This activity, which is aligned to the Common Core State Standards (CCSS) for English Language Arts and the Next Generation Science Standards, introduces students to how humans and other animals use their senses to help them survive.

This activity has three components:

1. **BEFORE YOUR VISIT**, students will explore different senses to prepare them for the Our Senses exhibition.
2. **AT THE MUSEUM**, students will read and engage with exhibition texts (including printed text, digital and physical/hands-on interactives, videos, and models). This information will help them participate in a post-visit discussion.
3. **BACK IN THE CLASSROOM**, students will participate in a discuassion about what they learned in the exhibition about how humans and other animals use their senses to help them survive.

Materials in this packet include:

For Teachers

- Activity Overview (pp. 1-2)
- Answers to Student Worksheets (pp. 3-8)

For Students

- Student Worksheets (pp. 9-14)
- Create a Comic Strip (p. 15)
- Perform a Skit (p. 16)

Next Generation Science Standards

LS1.D: Information Processing
Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive.

Common Core State Standards

Anchor Standards for Speaking and Listening
SL.1: Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others' ideas and expressing their own clearly and persuasively.

Supports for Diverse Learners

This resource has been designed to engage all learners with the principles of Universal Design for Learning in mind. It represents information in multiple ways and offers multiple ways for your students to engage with content as they read about, discuss, view, and write about scientific concepts. Different parts of the experience (e.g. reading texts, or locating information in the Museum) may challenge individual students. However, the arc of learning is designed to offer varied opportunities to learn. We suggest that all learners experience each activity, even if challenging. If any students have an Individualized Education Program (IEP), consult it for additional accommodations or modifications.

1. BEFORE YOUR VISIT

Prepare your students for the Museum visit with this class discussion that explores our different senses.

Instructions

Explain to students that the class will be visiting an exhibition at the Museum called *Our Senses: An Immersive Experience*. Generate brief whole group discussion using this prompt:

- Before we go on our trip, let's take some time to talk about what we know about our senses and why they matter. What do you know about your senses? How do they help you?

Organize students into pairs; each pair will investigate one of four senses.
(Note: This assignment will carry through the pre-, during-, and post-visit experience.)

Have student pairs explore an object related to the sense they are investigating. Possible examples include:

- Hearing: Bell, radio, noisemaker/instrument, etc.
- Touch: Feather, fuzzy material, sandpaper, etc.
- Smell: Spices, perfume, fruit, etc.
- Vision: Something colorful, something patterned, something that lights up, etc.

Students should talk about their experience. Possible prompts include:

- What do you notice about the object?
- How are you using your senses?

2. AT THE MUSEUM

At the Museum, students will observe specimens and engage with texts (including printed text, digital interactives, videos, and models). The information they'll gather from these sources will help them engage in a post-visit discussion.

Preparation for Museum Visit

- Review the educator's guide to see how themes in the exhibition connect to your curriculum and to get an advance look at what your students will encounter (guide is downloadable at **amnh.org/our-senses-educators**).
- Familiarize yourself with the Teaching in the Exhibition section of the educator's guide, the map of the exhibition, and student worksheets (pp. 3-14).
- Distribute the student worksheets. All students should receive Part 1: Pair Discussions in the Exhibition (pp. 9-10), and additionally the Part 2: How Does it Work? worksheet that corresponds to the sense they explored in the pre-visit discussion.

Suggestions for Facilitating the Museum Visit

- Explain the goal of the Museum visit: to observe specimens and engage with texts (including printed text, digital interactives, videos, and models), and to gather information to help them engage in a post-visit discussion.
- Have students explore the exhibition in pairs, with each student completing his or her own student worksheet.
- Encourage student pairs to ask you or their peers for help locating information. Tell students they may not share information with other pairs, but may point each other to places where information needed to complete the worksheet can be found.

3. BACK IN THE CLASSROOM

Engage your students in an activity about what they saw in the *Our Senses* exhibition. The goal is to help students process what they learned and refine their thinking about the particular sense they investigated, and to understand the similariities among how different senses work. Below are two activity options to help students demonstrate some of what they learned about senses in the exhibition:

Option A: Comic Strip

- Have students use the information they gathered in the exhibition to create comic strips that depict scenarios in which a character senses something and then reacts. See student handout on p. 15.
- Students can create these in pairs if desired. When finished, each student or pair can present their comic strip to the entire class.
- After each student has presented, facilitate a brief discussion using the following prompt:
  - What patterns did you notice in how all of these senses work?
- Student discussion should surface the following ideas:
  - For all of the senses, the information is collected by very specialized cells.
  - These cells are located in body parts that are the best places to collect the information.
  - Even within the same sense, there are cells that respond to the particular information, *e.g.* different types of cells in the fingertips respond to different types of textures.
  - After being picked up by the sensory cells, the information always travels to the brain, which interprets and reacts to it.

Option B: Perform a Skit

- Have student pairs use the information they gathered in the exhibition to plan and perform a skit in which a character senses something and then reacts. See student handout on p. 16.
- After each skit is performed, facilitate a brief discussion using the following prompt:
  - What patterns did you notice in how all of these senses work?
- Student discussion should surface the following ideas:
  - For all of the senses, the information is collected by very specialized cells.
  - These cells are located in body parts that are the best places to collect the information.
  - Even within the same sense, there are cells that respond to the particular information, *e.g.* different types of cells in the fingertips respond to different types of textures.
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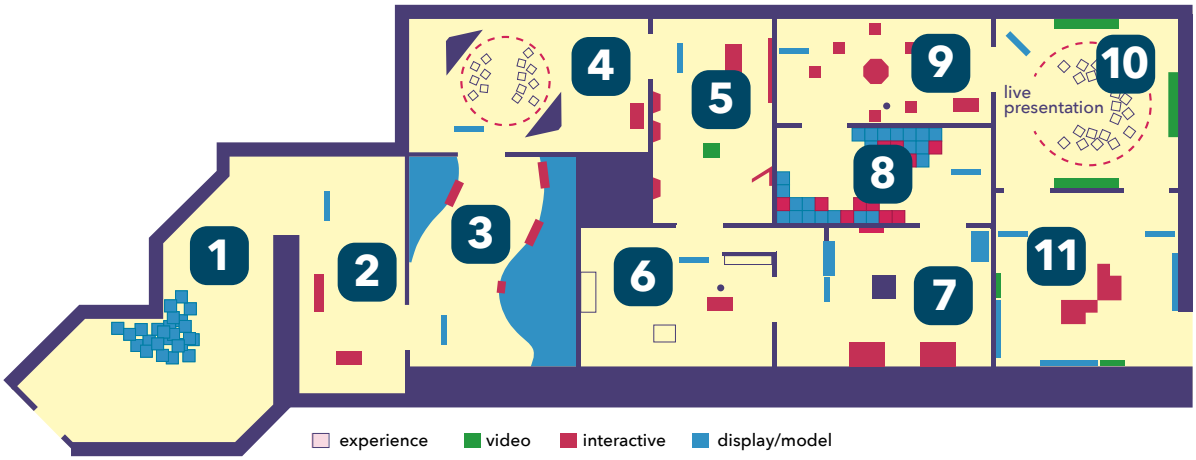
Student Worksheet: Page 1

Name: _____ **ANSWER KEY**

PART 1: Pair Discussions in the Exhibition



Room 1: INTRODUCTION

Look at the wall graphic about "inner" and "outer" senses. Discuss with your partner:

- What is the difference between the two types of senses?
  (Answer: Inner senses help you monitor things that are going on inside your body; outer senses help you understand the world around you.)
- Why are both sets of senses important?
  (Answers will vary.)

Room 2: SEEING

Look at the shifting colors and images on the walls. Discuss with your partner:

- What information are your eyes collecting in this room?
  (Answer: Different images on the walls.)
- What happens that makes the images on the wall change?
  (Answer: The color of the light shining on the walls changes.)

Room 3: DETECTING

Find an an animal that can detect something that humans can't. Discuss with your partner:

- What information is this animal collecting? How does this information help this animal?
  (Answers may include: Butterflies can detect UV light/more colors; this helps them tell the difference between flowers. Platypus can detect electric fields given off by other creatures; this helps them find food. Snakes can detect infrared light/heat; this helps them find prey.)

Room 4: HEARING

Sit on the cube-shaped seats and listen to the sounds while following the instructions on the screen. Discuss with your partner:

- What sounds were you able to hear?
- How does the ability to hear specific sounds even when it's noisy help you? (Answers will vary.)

Student Worksheet: Page 2

Name: _____ **ANSWER KEY**

Room 5: SELECTING

Select the senses for each animal head. Read about how it processes information from its senses in its brain. For each animal, discuss with your partner:

- Which senses are most important to this animal? Why?
  (Sample answers: Coyotes have excellent vision and hearing for hunting; Dolphins use hearing for echolocation.)
- Try out the other activities in this room. Talk to your partner about what you experienced.
  (Answers will vary.)

Room 6: BALANCE

Talk to your partner about what it feels like to walk around in this room. Is it more difficult than usual? Why? *(Answers will vary.)*

Room 7: CORRECTING

Try out the activities in this room. Talk to your partner about what you experienced.
(Answers will vary.)

Room 8: TOUCH

Touch the different surfaces to feel how your sense of touch allows you to feel many different textures. Talk to your partner about why it might be important to tell the difference between these different textures. *(Answers will vary.)*

Room 9: SMELLING

In this room, you will explore some of the many molecules that make up a wonderful complex scent: chocolate! Talk to your partner about what you experienced. Did any of the scents surprise you?
(Answers will vary.)

Room 10: LIVE PRESENTATION

Watch the live presentation. Talk to your partner about what you learned. *(Answers will vary.)*

Room 11: EXTENDING OUR SENSES

Look at the images on the walls for examples of how technology can help us "sense" things that our own senses can't detect. See if you and your partner can find:

- Something very small that an image makes large enough for us to see
  (Sample answers: Spider silk glands, diatoms, mosquito leg)
- Something happening very slowly that has been sped up so we can watch it
  (Sample answers: assorted time-lapse videos)
- Something that's not visible because it's inside something else that an image can show
  (Sample answers: blood vessels inside a pigeon, the skeleton of a flying frog)

Student Worksheet: Page 3

Name: _____ **ANSWER KEY**

PART 2: How Does it Work?

COLOR VISION (Room 2: SEEING)		
Step 1	**Describe what happens first:** *(Answer: Light enters your eye.)*	**Sketch and label all three steps:**
Step 2	**Describe what happens next:** *(Answer: Cone cells for that color detect it.)*	
Step 3	**Describe what happens last:** *(Answer: Information travels from the cone cells to the brain, which forms an image.)*	

Why are there three different types of cones?

(Answer: Different types of cones detect different colors.)

Student Worksheet: Page 4

Name: _____ **ANSWER KEY**

PART 2: How Does it Work?

HEARING (Room 4)		
Step 1	**Describe what happens first:** *(Answer: Sound waves/ vibrations enter your ear, causing structures in your ear to vibrate.)*	**Sketch and label all three steps:**
Step 2	**Describe what happens next:** *(Answer: Vibrations reach hairs in different parts of your cochlea.)*	
Step 3	**Describe what happens last:** *(Answer: Hairs send signals to the brain, which interprets them as sounds.)*	

What happens differently for higher and lower sounds?

(Answer: They reach different parts of the cochlea, so that signals from hairs in different parts are interpreted by the brain as different tones.)

Student Worksheet: Page 5

Name: _____ **ANSWER KEY**

PART 2: How Does it Work?

TOUCH (Room 8)		
Step 1	**Describe what happens first:** *(Answer: You touch something.)*	**Sketch and label all three steps:**
Step 2	**Describe what happens next:** *(Answer: The sensation is picked up by the type of nerve ending that best fits the sensation.)*	
Step 3	**Describe what happens last:** *(Answer: Information from the nerve endings travel along specialized pathways to the brain, which interprets the sensation.)*	

Why do we feel some sensations more quickly than others?

(Answer: Information travels along some of the pathways from skin to brain more quickly than others.)

Student Worksheet: Page 6

Name: _____ **ANSWER KEY**

PART 2: How Does it Work?

SMELLING (Room 9)		
Step 1	**Describe what happens first:** *(Answer: Odor molecules float into your nose.)*	**Sketch and label all three steps:**
Step 2	**Describe what happens next:** *(Answer: Odor molecules connect with the odor-sensing cells in the nose that they "fit" with.)*	
Step 3	**Describe what happens last:** *(Answer: Cells send information to the brain, which then can interpret and perceive the scent.)*	

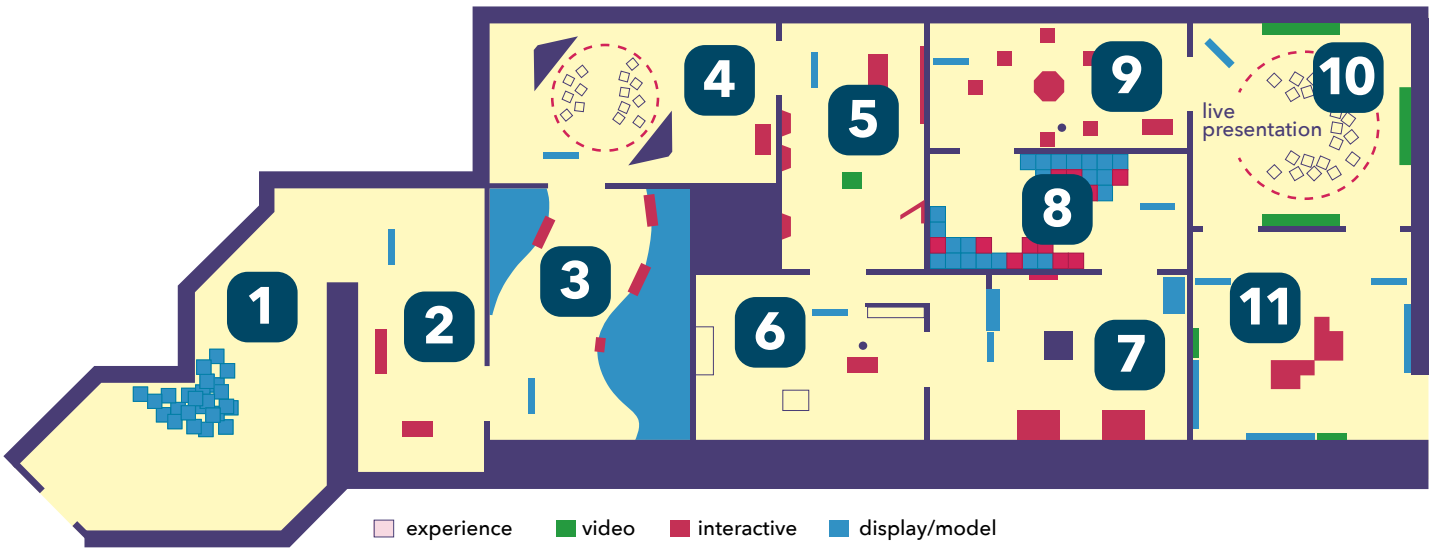
If we have around 400 types of receptors, why is it possible to perceive millions of different smells?

(Answer: The combinations of scent molecules connect with combinations of odor-sensing cells to create millions of combinations.)

Student Worksheet: Page 1

Name: _____

PART 1: Pair Discussions in the Exhibition



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Name: _____

Room 5: SELECTING

Select the senses for each animal head. Read about how it processes information from its senses in its brain. For each animal, discuss with your partner:

- Which senses are most important to this animal? Why?
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PART 2: How Does it Work?

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PART 2: How Does it Work?

HEARING (Room 4)		
Step 1	**Describe what happens first:**	**Sketch and label all three steps:**
Step 2	**Describe what happens next:**	
Step 3	**Describe what happens last:**	

What happens differently for higher and lower sounds?

Student Worksheet: Page 5

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Step 1	**Describe what happens first:**	**Sketch and label all three steps:**
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Student Worksheet: Page 6

Name: _____

PART 2: How Does it Work?

<table>
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</table>

If we have around 400 types of receptors, why is it possible to perceive millions of different smells?

STUDENT HANDOUT
CREATE A COMIC STRIP

Using the information gathered about the sense you explored in the exhibition, create a comic strip that shows a character sensing something and then reacting.

Your comic strip should include:

- A total of five panels
- A labeled illustration in each panel
- Panel 1, showing the information being sensed
- Panel 2, showing what happens first (based on what you recorded on your worksheet)
- Panel 3, showing what happens next (based on what you recorded on your worksheet)
- Panel 4, showing what happens last (based on what you recorded on your worksheet)
- Panel 5, showing the person's reaction

STUDENT HANDOUT
PERFORM A SKIT

Using the information gathered about the sense you explored in the exhibition, plan a skit in which a character senses something and then reacts. You need to write and then perform the skit with your partner.

Your skit should include:

- Information that requires a sense to understand (e.g. a sound, a scent, a texture, or a visible item)
- A person who senses the information and then reacts
- A narrator who explains what happens first, next, then last, as the person reacts (this should include the information you recorded on your worksheet about the three steps of "How It Works").