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 use the information they learned in the exhibition to participate in a discussion about how humans and other animals use their senses to help them survive.

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.

Materials in this packet include:

For Teachers

- Activity Overview (pp. 1-3)
- Teacher Exhibition Notes (pp. 4-5)
- Answers to the student worksheets (pp. 6-7)

For Students

- Student worksheets (p. 8-9)

1. BEFORE YOUR VISIT

Explain to students that the class will be visiting an exhibition 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. Have student pairs explore an object related to particular senses. 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.

Note that students will use more than just one sense to observe each object. Students should talk about their experience. Possible prompts include:

- What do you notice about the object?
- Which of your senses are you using?
  - What does this sense help us do?
  - Why do you think this sense is important?
  - What do you wonder about this sense?

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 participate in a post-visit activity.

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 Teacher Exhibition Notes (pp. 4-5), student worksheets (pp. 6-9), and the map of the exhibition.

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 participate in a post-visit discussion.
- Review the worksheet (pp. 8-9). Clarify what information students should collect.
- 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.
- You and your chaperones should use the Teacher Exhibition Notes (pp. 4-5) to guide small student groups through the eleven rooms of the exhibition. It includes prompts for facilitating discussions, as well as notes on how students should use their worksheets to record information.

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.

3. BACK IN THE CLASSROOM

Engage your students in discussion about what they saw in the *Our Senses* exhibition. The goal is to help students process what they learned and refine their thinking about our senses. Students can use the information they learned while visiting the exhibition (both from memory and through utilizing notes on their worksheet) to have a whole class discussion.

Discussion questions:

- How do senses help people learn about their world?
- Describe some ways the five senses help protect people from harm.
- Choose a sense (teacher or student choice).
  - How does having this sense help you to survive?
  - How does having this sense help (insert animal) survive?
  - Compare (insert animal's) sense of (insert sense) to human's sense of (insert sense). What is similar? What is different?
- Name an animal that can sense something that humans can't (Room 3). What can you infer about how this helps the animal survive?
- Choose an animal that you learned about in the exhibition (Room 5). Which sense is most important to this animal? How do you know?

Conversational prompts for teachers:

- "Can you say more about that?"
- "What do you mean by that?"
- "Can you give an example?"
- "Let me see if I understand what you're saying . . . Are you saying . . . ?"
- "Who can repeat what (student's name) just said or put it into their own words?"

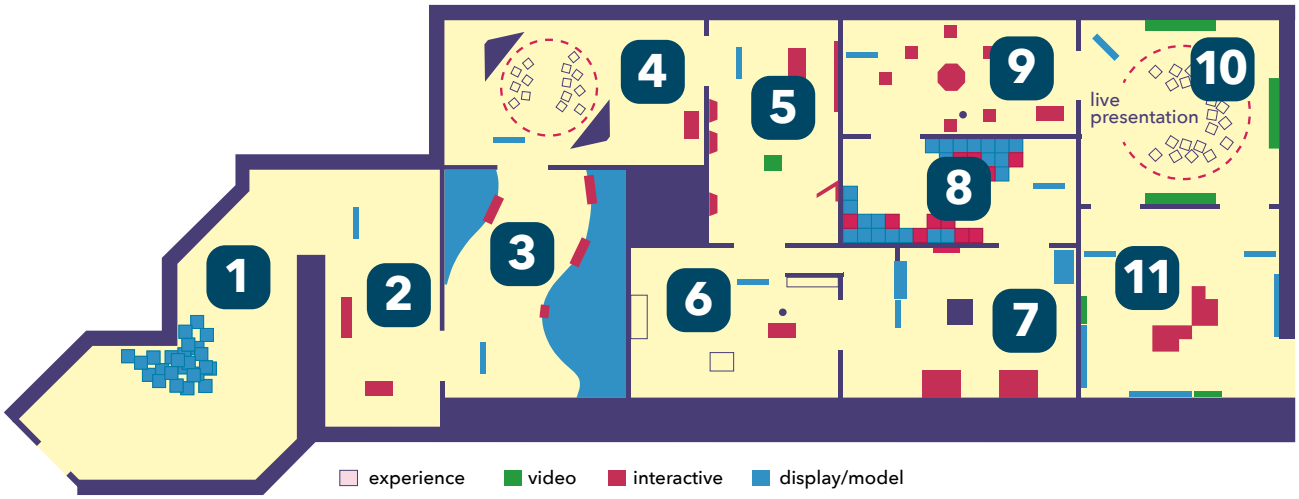
Sentence frames for students to use to participate in discussion:

You can lean into individual students and quietly coach them to use these sentence frames, in addition to the conversational prompts above, where appropriate.

- "I wonder . . . "
- "I think . . . "
- "Do you mean . . . ?"
- "But what about . . . ?"
- "I have a question about . . . ?"

Teacher Exhibition Notes

This exhibition contains many displays and interactives about sensing and perception through 11 rooms. Many of the items are best used as experiences and discussion prompts. There are three places (Rooms 3, 5, 11) where students may be prompted to fill in information in the accompanying worksheet.



Room 1: INTRODUCTION

Have students look at the wall graphic about "inner" and "outer" senses. Ask them which ones they recognize, reading/paraphrasing to them as necessary.

Room 2: SEEING

Ask students: 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

Help students find an example in this exhibition of an animal that can detect something that humans can't.

On their **worksheets**, have students record the animal, what it detects, and how detecting this information helps them. Have them sketch the animal and what it is detecting.

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

Have students sit on the cube-shaped seats and listen to the sounds while following the instructions on the screen; you may need to read/paraphrase the instructions to students.

After the experience, ask students: What sounds were you able to hear? *(Answers may vary.)*
How could it help you to be able to hear specific sounds even when it's noisy? *(Answers may vary.)*

Room 5: SELECTING

Have students investigate the three animal heads to see how their senses are processed in their brains. Read and paraphrase the text that comes up to help them complete the corresponding sections in their **worksheets**. If necessary, conduct a jigsaw so that each student/student group is only responsible for one animal, comparing their answers later in the classroom.

Students can use the activities in the rest of this room to see how what they pay attention to affects their understanding of what they are looking at. In particular, have them watch the video of the people tossing the balls, reading the on-screen instructions to them if necessary. Afterwards, ask them why they think they were not able to notice all of the details of the video the first time they watched it. They may be surprised at how much they missed!

Room 6: BALANCE

Ask students if what they see in the room affects their balance. Using the inner ear interactive, show them that balance depends on our sense of vision, but also on a structure in our inner ear.

Room 7: CORRECTING

This room demonstrates how our brains make decisions about how to interpret information from our senses to create our perceptions. Have students try out the different activities.

Room 8: TOUCH

Have students touch the different surfaces to demonstrate how their sense of touch allows them to feel and understand many different textures.

Room 9: SMELLING

Have students explore some of the many molecules that make up a wonderful complex scent: chocolate!

Room 10: LIVE PRESENTATION

Have students watch the live presentation to learn more about human and animal senses.

Room 11: EXTENDING OUR SENSES

Have students look at the images on the walls for examples of how technology can help us "sense" things that our own senses can't detect. Challenge them to find :

- an image of something happening very slowly, sped up so we can watch it: assorted time-lapse videos
- an image that makes something inside visible from the outside: blood vessels inside a pigeon, the skeleton of a flying frog
- an image of something very small that the image makes large enough for us to see: spider silk glands, diatoms, a mosquito leg

Have students arrange the colored shapes on the table to create either a face, car, flower, or butterfly pattern, and see if the computer recognizes it. Make sure they give the computer the correct answer so it can do better next time!

On their **worksheets**, have them sketch the shape on their worksheet and label the parts they think make it recognizable as that particular pattern.

Ask students: Did the computer recognize their pattern? What do they think made it easy/hard for the computer to figure out?

Student Worksheet: Page 1

Name: ***ANSWER KEY***

ROOM 3: DETECTING

Find an example in this exhibition of an animal that can detect something that humans can't.

Animal: *Answers will vary. Examples include: butterfly, platypus, snake*

What the animal can detect that humans can't: *Sample answers: UV light, electric fields, infrared light/heat*

How does detecting this information help this animal?

Answers will vary. Examples include: to tell the difference between types of flowers; help find food;

help hunt prey

Sketch the animal and its sensing ability:

Sketches will vary, but should depict an animal and its special sensing ability.

Student Worksheet: Page 2

Name: ANSWER KEY

ROOM 5: SELECTING

Choose two of the three animal heads.

Animal 1: *Answers will vary but should be either coyote, human, or dolphin.*

Name a sense that is important to this animal. *Answers will vary but should be either hearing, smell, or sight.*

How is it important? *Answers will vary. Example: Dolphins can hear high tones that they use in echolocation to locate prey.*

Animal 2: *Answers will vary but should be either Coyote, Human, or Dolphin*

Name a sense that is important to this animal. *Answers will vary but should be either hearing, smell, or sight.*

How is it important? *Answers will vary; Example: Coyotes have excellent hearing that allows them to recognize the howls of other coyotes from miles away.*

ROOM 11: EXTENDING OUR SENSES

Arrange the colored shapes on the table to create either a face, car, flower, or butterfly pattern.

Sketch the pattern you made here. Label the parts of this shape that should help the computer recognize what it is.

Sketches will vary, but should be composed of geometric shapes.

Student Worksheet: Page 1

Name: _____

ROOM 3: DETECTING

Find an example in this exhibition of an animal that can detect something that humans can't.

Animal: _____

What the animal can detect that humans can't: _____

How does detecting this information help this animal?

_____

_____

Sketch the animal and its sensing ability:

Student Worksheet: Page 2

Name: _____

ROOM 5: SELECTING

Choose two of the three animal heads.

Animal 1: _____

Name a sense that is important to this animal. _____

How is it important? _____

Animal 2: _____

Name a sense that is important to this animal. _____

How is it important? _____

ROOM 11: EXTENDING OUR SENSES

Arrange the colored shapes on the table to create either a face, car, flower, or butterfly pattern.

Sketch the pattern you made here. Label the parts of this shape that should help the computer recognize what it is.