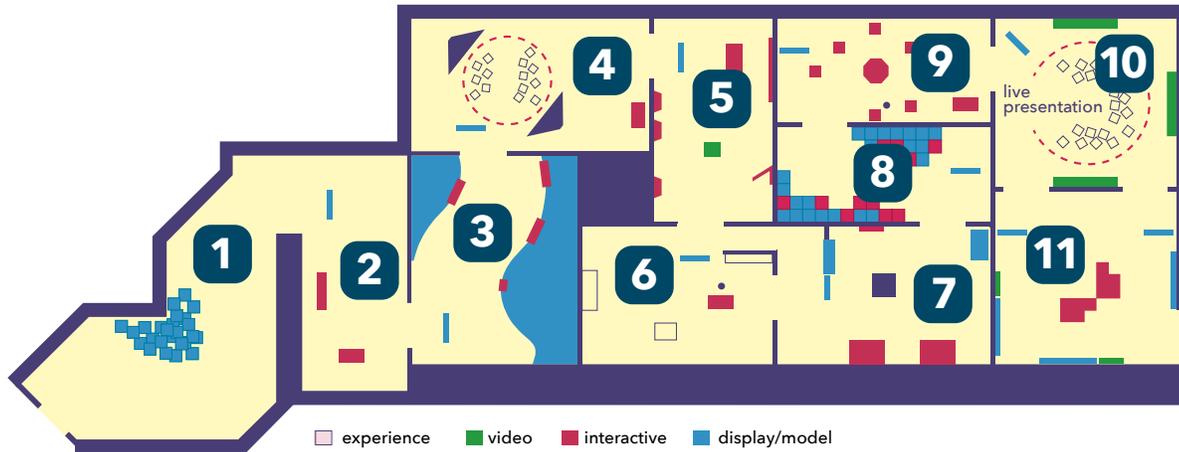


Student Worksheet: Page 1

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 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	<p>Describe what happens first: <i>(Answer: Light enters your eye.)</i></p>	<p>Sketch and label all three steps:</p>
Step 2	<p>Describe what happens next: <i>(Answer: Cone cells for that color detect it.)</i></p>	
Step 3	<p>Describe what happens last: <i>(Answer: Information travels from the cone cells to the brain, which forms an image.)</i></p>	

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

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

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

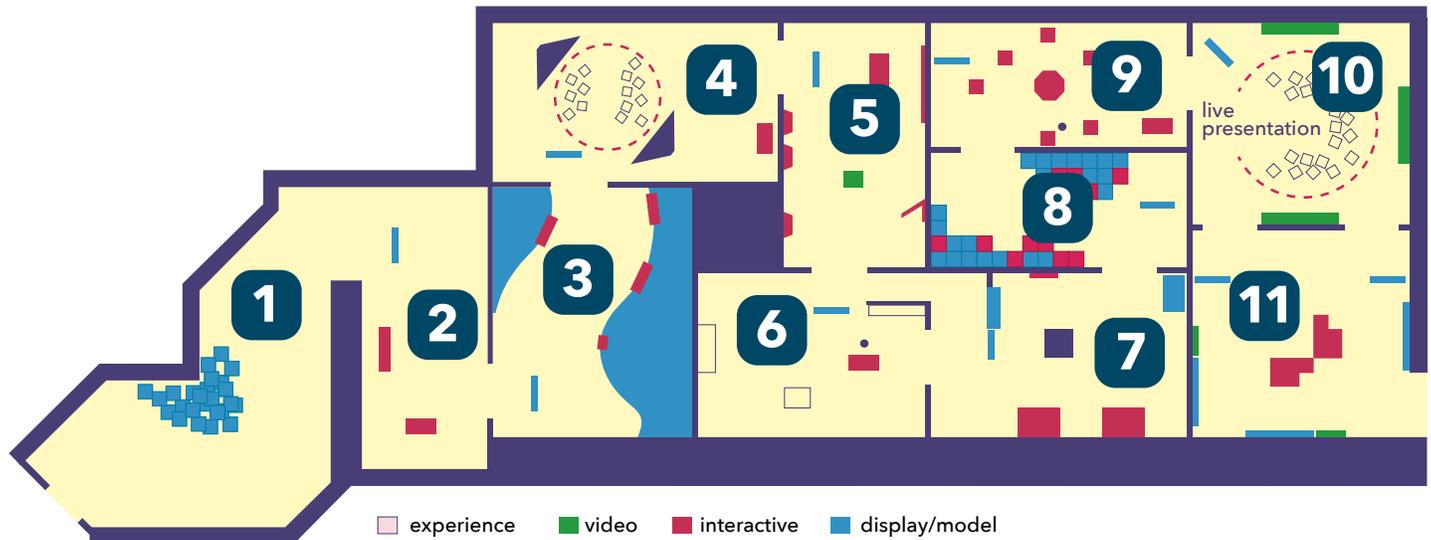
If we have around 400 types of receptors, why is it possible to perceive millions of different smells?

(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



Room 1: INTRODUCTION

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

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- Why are both sets of senses important?

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?
- What happens that makes the images on the wall change?

Room 3: DETECTING

Find 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?

Room 4: HEARING

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Student Worksheet: Page 2

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?
- Try out the other activities in this room. Talk to your partner about what you experienced.

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?

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Try out the activities in this room. Talk to your partner about what you experienced.

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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.

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- Something that’s not visible because it’s inside something else that an image can show

Student Worksheet: Page 3

Name: _____

PART 2: How Does it Work?

COLOR VISION (Room 2: SEEING)		
Step 1	Describe what happens first:	Sketch and label all three steps:
Step 2	Describe what happens next:	
Step 3	Describe what happens last:	

Why are there three different types of cones?

Student Worksheet: Page 4 Name: _____

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

Name: _____

PART 2: How Does it Work?

TOUCH (Room 8)		
Step 1	Describe what happens first:	Sketch and label all three steps:
Step 2	Describe what happens next:	
Step 3	Describe what happens last:	

Why do we feel some sensations more quickly than others?

Student Worksheet: Page 6

Name: _____

PART 2: How Does it Work?

SMELLING (Room 9)		
Step 1	Describe what happens first:	Sketch and label all three steps:
Step 2	Describe what happens next:	
Step 3	Describe what happens last:	

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”).