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BASIS Lesson Plan

Lesson Name: Our Brains Sensing Our World

Grade Level Connections:

Next Generation Science Standards: Grade 1, Life Science (1-LS1)
FOSS Next Generation Edition: Grade 1, Life Science (Plants and Animals)

**Note to teachers: Detailed standards connections can be found at the end of this lesson plan.*

Teaser/Overview

We have senses which take in information about the world. Our brain uses our senses to figure out what's going on! Students will explore how we use our senses and our brain with three hands-on interactive activities.

Lesson Objectives

- Students will understand how our brains understand sensory input.
- Students will personally explore the importance of sight, smell, and touch, and how our brain understands these things through inquiry-based activities.
- Students will explore how we use our senses is related to how the body is laid out (i.e. two eyes instead of one; greater senses at our fingertips as opposed to our elbows)
- Students will participate in the scientific process by making observations, asking questions, and testing hypotheses.

Vocabulary Words

- **Senses:** The ways we gather information; e.g. taste, smell, touch, vision, hearing
- **Vision:** Sensing light and color using our eyes
- **Smell:** Sensing odors and flavors using our nose
- **Touch:** Sensing things with our skin; e.g. objects, textures, temperature
- **Brain:** A part of our body that we use to think, move, and understand information from our senses

Materials

Volunteers will bring:
Laminated images of eyes (2), ears (2), nose (1), hands (2), mouth (1), brain (1)
Laminated image of popcorn (2)
Sight Station
- 3D printouts (12; 2 of each image)
- Red/Blue glasses (10)

Smell Station
- Cotton balls
- Extracts (vanilla, mint, cinnamon, orange, garlic)
- Small containers to place cotton ball with extract (

Touch Station
- Paper bags labeled "A" filled with small piece of double-sided sandpaper
- Paper bags labeled "B" filled with cotton balls
- Paper bags labeled "C" filled with piece of Play-Doh
- Paper bags labeled "D" filled with smooth marbles

Teachers should provide:
Students should have clean hands because they will be sharing and touching many items.

Classroom Set-Up

Student Grouping: Tables / desks should be set up to provide enough space for three stations. Students should have clean hands at the beginning of the lesson because they will be sharing and touching many items. Students will start at desks or in a central area. They will be split into three groups and rotate through the stations. Students will return to the central area at the end of the lesson.

Classroom Visit

1. Introduction (12 minutes)

Role Model Introduction:
Being a role model for students is an important part of being a BASIS volunteer. Begin your lesson by introducing yourselves! Every team member should take a moment to explain who they are and what they study/do as a scientist. A bonus will be to tell your "story," as if giving an elevator pitch

to 7-year-olds: Why did you become a scientist? What made you interested in your topic? Why should students relate to you, or be interested in you? Feel free to draft a script of what you will say, here. And remember, you can also weave your story throughout your lesson through examples from your own life, and/or return to it with Q&A at the end.

Topic Introduction:
After you introduce yourselves as role models, take some time to introduce the topic of this lesson: *Our bodies have a set of tools to sense the world that talk to our brain*.
It may be helpful to keep the suggested take-away in the back of your mind throughout the lesson.

Your topic introduction should follow the outline below. As much as possible, try to frame this information as questions posed to the class, rather than as a lecture. This helps activate students' prior knowledge and facilitates student-guided discussion.

- We're going to talk about senses today! We're going to start with an activity.
- ACTIVITY: Sound localization (group activity): we use our two ears to hear sounds; how can we tell where a sound is in space?
    - The presenters will stand around the room and clap while the students have their eyes closed. The students will point to the presenter who just clapped. The students will open their eyes and the presenter will reveal who clapped. Repeat 2-3 times.
    - *Alternative: (students first practice pointing) Two presenters will stand on opposite sides of the room with their backs to the students. One presenter will clap (while the other mimes) and the students will point to where they think the sound is coming from. Repeat 2-3 times.*
- Ask the students how they were able to figure out who was clapping each time. Guide students to the idea that we have two ears with a pathway to our brain. When a clap is on the left the clap will reach the left ear first and the clap will get to the second ear second. Yet we hear the clap only once. The brain tells us to hear one clap and that it came from the left since the clap reached the left ear first.
- What other kind of senses do we have?
- DISCUSSION: We experience the world through **senses**: **vision**, **smell**, **touch**, **taste, and hearing**. Our bodies have a set of tools to sense the world (i.e. eyes to see, nose to smell and taste, hands to touch) that talk to our **brain**, which uses that information to help us understand the item we've seen or felt, etc. (Write vocab words and pictures on the board.)
- Ask the students: What are our senses? What do they tell us about the world/ourselves?

Teaching Tip: Say, Write, Show

- Bring in photos and props to illustrate the topic intro
- Write new vocabulary words, key terms, and brainstorm lists on the board
- Refer back to the board to engage visual learners and English Language Learners

2. Learning Experience (33 minutes)

Students will be split into three groups. Each group will start at one of three stations set up around the room, and rotate every 10 minutes. At each station, a BASIS volunteer will lead an activity to explore one of the senses. An additional BASIS volunteer will keep time and offer support to the other stations as needed. Remember that all three of these stations are designed to address the take-away in a particular way: *Our bodies have a set of tools to sense the world that talk to our brain*.

Classroom Management Tips: Station Rotation

- Keep students from getting too restless by moving them through stations
- It helps to keep things orderly. When it's time to rotate, have the leader announce that all students should stand up in place and NOT MOVE until you say so; point out where each group will move to; confirm that everyone understands; THEN instruct students to move to the next station.
- Have a volunteer keep time and tell station leaders to wrap up at 9 minutes.
- Ask the teacher if you need help!
- Remember that students might visit your station first, second, or third: don't assume prior knowledge from another station!

Station 1: Sight (how vision works)

1. Engage students in a conversation about how we use the sense of sight
    a. Students may think about colors, brightness, darkness, patterns, etc. Prompt students with some guiding questions "How do we see?" "Why do we need two eyes to do this?" "How does light influence color?"
    b. Introduce the idea that sight is a sense that we use to help us understand the world around us.
2. Do the Sight activity (blue/red glasses) -- discuss with students how the two eyes have slightly different images of the world
    a. Students will put on blue/red glasses
    b. Blue/Red activity: Student will cover one eye and see a blue 3D image. Then they will cover the other eye and see a red 3D image. (Look, eyes see different things, you see different colors!)
    c. Then they will look at the images with both eyes and see the 3D image. (Purpose of vision-- to do depth)
    d. Discuss that each eye is giving a different image and when we put them together we get a 3D understanding of the world! Explain how this is a result of the brain making two images into one.

e. Discuss why the students may think that we need two eyes then? To get a larger image?

3. Connect the activity to the big picture
    a. Invite students to reflect on the importance of our sense of sight. Why is sight important? How do our brains figure out what's happening in the world? (Two eyes, brain combines their inputs.)
    b. Emphasize the overall takeaway of the statin:
    c. Emphasize the overall takeaway of the lesson: **Our bodies have a set of tools to sense the world that talk to our brain.**

Station 2: Smell & Taste (interactions)

2. Engage students in a conversation about how we use the senses of smell and taste
    a. Students may think about sweet smells (flowers), foul smells (skunks, garlic), etc.
    b. Students may think about different tastes (sweet, salty, sour, bitter)
    c. Prompt students with some guiding questions: "How can we tell we're eating an orange versus an apple if we have our eyes closed?" "How do our senses interact?"
    d. Introduce the idea that smell and taste are two senses that we use to understand the world. Sometimes, though, smell and taste don't do what we expect!
3. Try to guess extracts by smell
    a. Give each student a cotton ball with one scent, placed within a container. Discuss what it reminds them of and ask them to identify it. Collect cotton ball containers. Repeat with each smell (vanilla, mint, cinnamon, orange, garlic).
    b. If time: give each student a cotton ball with two smells and ask the students to figure them out.
4. Connect the activity to the big picture
    a. Invite students to reflect on the importance of our sense of smell. (Lots of different odorant receptors)
    b. Emphasize the overall takeaway of the station: **Our brain helps us understand what smells are telling us.**
    c. Emphasize the overall takeaway of the lesson: **Our bodies have a set of tools to sense the world that talk to our brain.**

Station 3: Touch (how touch works)

1. Engage students in a conversation about how we use the sense of touch
    a. Students may think about touch as how we learn about the world around us.
    b. Prompt students with some guiding questions: "How do we touch things?" "How does our ability to sense textures vary from our fingers to our hands/our hands to our arms?" "How do we know where we are in the world?"
2. Do the Touch activity
    a. Set up paper bags (one for each student) filled with a variety of items that have different textures (sandpaper, cotton balls, Play-Doh, smooth marbles).

   b. Give each student a bag filled with an object and ask them to try and guess what the objects in the bag are.
   c. Discuss how they were able to identify and describe the texture of the objects. Were some of the objects easy to identify? Which ones were difficult to figure out?
3. Connect the activity to the big picture
   a. Invite students to reflect what we can learn through touching. Extra: how does the information gets from your hand to your brain?
   b. Emphasize the overall takeaway of the station: **Our brain helps us understand what we are touching to learn about the world**
   c. Emphasize the overall takeaway of the lesson: **Our bodies have a set of tools to sense the world that talk to our brain.**

Optional Group Activity on Proprioception (3 minutes)

Move hands around.

   a. Ask students to find a partner. Have one student close their eyes while the other moves their hand around in space and leaves their hand in a location.
   b. Biological motion demo: Discuss with the student with their eyes closed if they know where their hands are. Discuss with the students how even if they cannot see their hands or didn't move their hands themselves, they know where their hands are. Discuss how your body can sense hands, arms, feet and legs relative placement with their bodies. Ask them why and how they think this happens?

3. Wrap Up: Review and Discuss the Learning Experience (5 minutes)

Have students rejoin you on the carpet for a wrap-up discussion.

- What is the brain and what are the senses? Review of vocabulary words.
- What did we learn at station 1, 2, & 3?
- Invite students to share other ways their senses interact and sometimes do things we don't expect.

Prompt students to think about what other questions they would investigate in the future to figure out what our brains and senses are doing.

4. Connections & Close (5 minutes)

Connections to the real world around students:

- What are our favorite foods? How do we use our senses to experience food? (Bring a picture of popcorn.)
- How do we use our senses in this classroom to understand what's happening?

- What happens when one of our senses doesn't work or doesn't work very well? [When you're sick and have a stuffy nose, how does this affect how your food tastes?] How do our senses interact?

If possible, tie lesson back into your research or role model story.

Close:

- Reiterate for students that science helps us learn about our senses and also helps us understand how our brain helps us process this information
- Ask students if they have any questions about science or being a scientist
- Close with a good bye and a thank you, and encourage the kids to keep thinking about ways they use their senses every day to help them stay safe!
- Don't forget to help clean up!

Follow Up: After the Presentation

Teachers who wish to extend the impact of this lesson may find the following CRS web pages useful:

- http://www.crscience.org/educators/helpfulreports
- http://www.crscience.org/educators/treasuretrove

Standards Connections

NGSS:

- Connections by topic
  Life Science: 1. Structure and Function
- Connections by disciplinary core ideas
  Life Science: 1-LS1. From Molecules to Organisms: Structure and Processes
- Connections by scientific & engineering practices
  8. Obtaining, evaluating, and communicating information
- Connections by crosscutting concepts
  2. Cause and Effect: Mechanism and explanation
  6. Structure and Function: Determine properties of things
- Connections by performance expectation
  1-LS1-1. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

FOSS Next Generation Edition: Grade 1 Life Science: Plants and Animals Module