Sensation Stations

Exploring the Nervous System and AI Systems

Reaction Time Lab

Instructions

1. Choose a partner to be the **Tester** and one that is the **Data Collector**

Tester	Data Collector
1. Hold a meterstick on the zero cm line, between your thumb and forefinger with the 100 cm line pointing towards the ceiling. 2. When the Data Collector says to drop, drop the meterstick and immediately try to catch with the same thumb and forefinger. 3. Look at your fingers, and measure where you caught the meterstick. 4. Repeat steps 1-3 three more times. QR	1. With your partner, make sure they are holding the meterstick correctly. 2. When they are ready, tell your partner to drop the meterstick and at the same time start a timer. 3. Stop the timer when your partner catches the meterstick 4. Record the time it took your partner to catch the meter stick on the data sheet. 5. Record the distance that the meterstick traveled after it was dropped on the data sheet. 6. Repeat steps 1-5 three more times.

2. After testing and collecting the data, you will calculate the average distance and time for the tester's trials.
3. Switch roles and repeat with partner 2.
4. Answer the analysis questions on the handout.

Color, Light and Sight

Eye Anatomy

1. Watch the video linked here on Eye anatomy. Answer the questions on the student handout about how we see.

2. Label the diagram of the eye in your handouts using the information from the video above.

3. Go to this website(AMNH) and follow instructions on your handout to learn more about how the eye works.

4. Practice and label the eye using this online simulation. Label the Eye

Make sure you answer all questions in the student handout.

1. You should have several colorful objects and some colorful sheets of cellophane.
2. Select one of the objects.
3. Place the object on the table in front of you. Make observations of what you see of the object before testing the cellophane sheets.
4. Now choose a colored cellophane sheet.
5. Place the cellophane sheet between your object and your line of sight.
6. Record any observations of what you now see and perceive of the object.
7. Repeat this with the other cellophane sheets.
8. Repeat steps 1-7 for a second different object

Sound

Part 1: See and Feel the Vibrations

While performing these tasks, make observations and record them in the table below.

1. Strike a tuning fork with the rubber mallet, or against the table and:
   a. Hold it near your ear (without touching your ear) and make observations
   b. Touch the base of the vibrating fork to your elbow and rest your elbow on the table. Make observations
   c. Touch it to the table top and make observations.
   d. Gently dip the fork into a cup of water and make observations.

Questions to consider for observations:

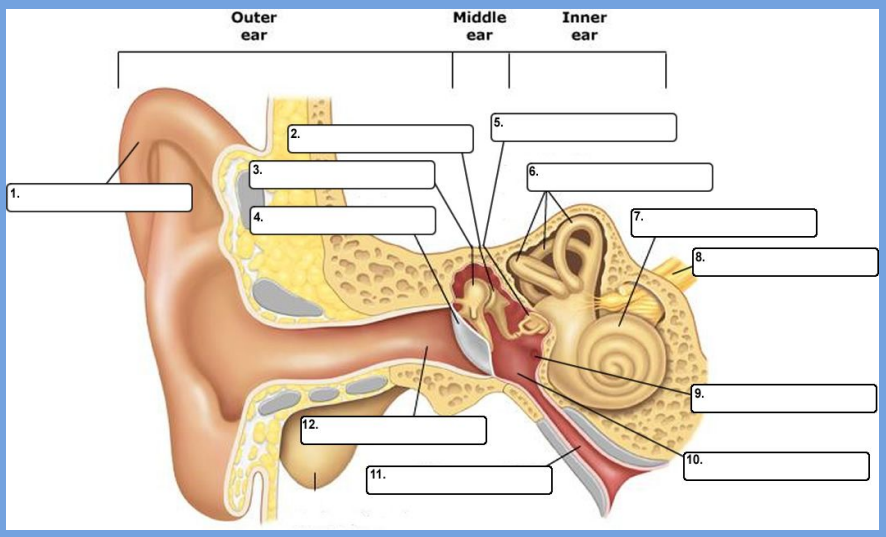
1. Do you feel any vibrations?
2. Do you see any moving?
3. Does the sound change when transferred through solids or water?

Part 2: How your Ears Detect Sound:

1. Watch the video and label the diagram using the word bank below on your student handout.
2. Trace or put in sequence how sound is received by your ear and travels to your brain.

Word Bank

- Tympanic membrane
- Auricle
- Auditory Canal
- Eustachian Tube
- Tympanic Cavity
- Cochlea
- Vestibulocochlear nerve
- Malleus
- Incus
- Stapes



3. **Answer all analysis questions on your handout**

Touch

Part 1: Texture Test

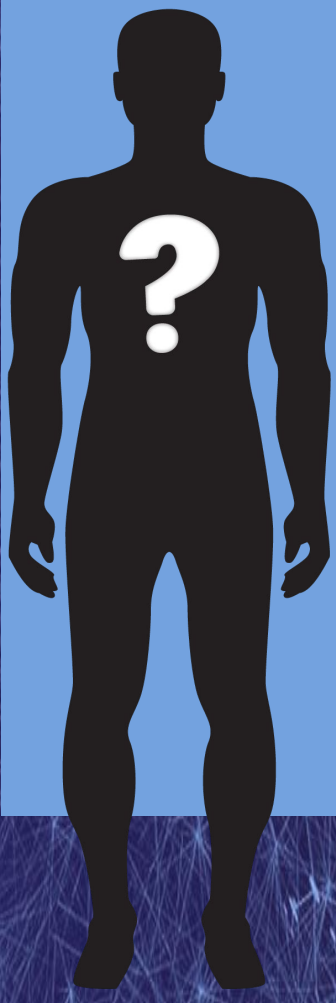
1. With your partner, decide who will be the tester, and who will be the experimenter.
2. Testers will close their eyes or put on a blindfold.
3. Experimenters will GENTLY touch the tester's arm with various materials.
4. Experimenters will ask Testers to state what they think they feel and record the answers.
5. Repeat for all objects
6. Partners will switch roles and repeat the process in steps 1-5.

Part 2: 2-point Discrimination Test

1. Decide which partner will be the tester and who will be the experimenter.
2. Testers will close their eyes and tell the experimenter how many points they feel.
3. Experimenters will GENTLY touch their partner with the testing device and ask for their observations on each of the areas listed in the data table below.
4. Using a testing device (an open paper clip with the ends spaced 1-2 cm apart), LIGHTLY touch two points on the experimenter and record their observations.

Different Species, Different Senses

1. Take a look at each organism's profile task card.
2. FIll out the data chart in your handout.
3. Once the data chart is filled out you will work with a partner to create a Venn Diagram that compares and contrasts how each organism receives and processes information.







Machines and how they Learn

Part 1: Simulating Machine Learning

1. With your partner, take a look at the image cards in your set.
2. Decide on a classifying system. (Example: if it has wings it's a bird). Make sure you write down everything you do with the cards and how you are classifying everything.
3. Once you have your rules, you will get a new set of cards. Apply your classifying system to these new cards.

Round 2 Now take the classifying strategy from your first set of cards and apply it to the second set. What worked? What didn't? Make sure you take notes and identify where mistakes occurred.

Part 2: Quick Draw

1. You will practice with Google Quick Draw to look at how a system was trained to recognize images as different simple objects.
2. Go to Quick draw and play the game for a few minutes. Do at least 5 rounds of drawings.
3. After playing the game, take a look at the data set for quick draw. There are over 50 million drawings.
    a. Choose a drawing from the list below and answer the following questions.
    b. Take a look at the data set for that image. Make some notes about what you see.
        i. What detail (or lack of detail) do you see?
        ii. Do all of these images fit the prompt (DO the cakes look like cake?)