May the Force Be with You!

Activity Rundown:

It's time for a scientific adventure! Today, we'll be taking our experimentations outside and exploring how our five senses help us understand and identify the world we live in.

You will need:

- Notepad or notebook
- Writing utensil
- Walking buddy!

Let's do it!

1. If it's safe to do so, head outside with a walking buddy! Make sure you're always practicing good safety practices such as: social distancing, sticking to marked paths, and always travelling with another person.
2. There are going to be five main goals for this scavenger hunt. Create a table like the one below on the piece of paper:

Smell	Touch	See	Hear	Taste

3. During your walk, write down as many things in each sense column as you can! Some might be much easier to fill up than others. There is lots to see and hear out in the world, but not many things to taste! You might just have to convince your walking buddy to take you out for ice cream so you have something to add to that column…
    a. We recommend the following minimum amounts for your senses column: at least 5 for smell, 5 for touch, 10 for see, 5 for hear, and 1 for taste.
    ***Remember to interact safely with the world around you! Use common sense when interacting with anything you might find out there, and always double check with an adult before investigating.**

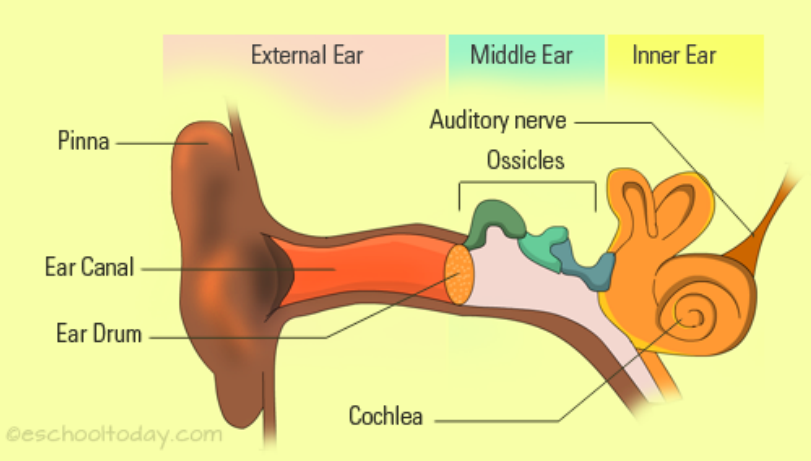
4. Make sure you write down key observations about the things that tickle your sense. For example, if you hear music playing, is it loud or quiet? Do you know the song? What instrument is making that noise? Is it live music or a recording? Is it far away or near? Anything you think is notable!
5. If you don't feel like writing, draw pictures instead!
6. If it's not safe to go outside yet, you can complete this scavenger hunt in your own home! Try making a different list for each room (living room, bedroom, bathroom, etc.).

Background:

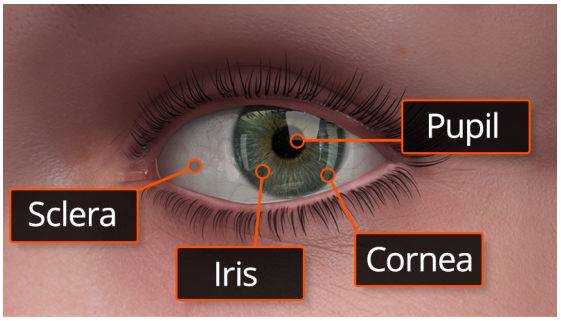
There are a total of five sense that most humans use to investigate and understand the world we live in:

1. **Taste**
    - Taste is typically linked with the muscular organ that is located in our mouths: the tongue!
    - The surface of the tongue is very rough and bumpy! That's because the top of your tongue is covered with a layer of bumps called **papillae** (puh-PILL-ee).
    - Papillae help grip food and move it around while you chew. And they contain your taste buds, so you can taste everything from chocolate to broccoli!
    - People are born with about 10,000 taste buds. But as a person ages, some of their taste buds die.
    - Taste buds can detect sweet, sour, bitter, and salty flavors.
    - What is generally categorized as "taste" is actually a bundle of different sensations: it is not only the taste perceived by the tongue, but also the smell, texture, and temperature of a meal that are important.
2. **Hearing**
    - The organ for hearing sound is the ear. It is one of the most complex and useful organs in our body!
    - The ear is made up of three different sections that work together to collect sounds and send them to the brain: the outer (external) ear, the middle ear, and the inner ear.
        - The outer ear is made up of the **pinna** and the **ear canal**.
        - The middle ear is an air-filled cavity that turns sound waves into vibrations and delivers them to the inner ear. The middle ear is separated from the outer ear by the **eardrum**. Sound hits the eardrum, making it move! This movement leads to vibrations of three very small bones in the middle ear known as the **ossicles** (AH-sih-kuls).
        - The vibrations from the middle ear change into nerve signals in the inner ear. The inner ear includes the **cochlea** (KOH-klee-uh) and the **auditory nerve.** The snail-shaped cochlea changes the vibrations from

the middle ear into nerve signals. These signals travel to the brain along the auditory nerve.



3. **Sight**
   - We see through our eyes, which are organs that take in light and images and turn them into electrical impulses that our brain can understand.
   - The eye is about as big as a ping-pong ball and sits in a little hollow area (the **eye socket**) in the skull. The **eyelid** protects the front part of the eye and keeps it clean and moist by opening and shutting several times a minute!
   - The white part of the eyeball is called the **sclera** (SKLAIR-uh). The sclera is made of a tough material and has the important job of covering most of the eyeball. Look very closely at the white of the eye, and you'll see lines that look like tiny pink threads. These are **blood vessels**, the tiny tubes that deliver blood, to the sclera.
   - The **cornea** (KOR-nee-uh) is a transparent dome that sits in front of the coloured part of the eye (the **iris**). The cornea helps the eye focus as light makes its way through.
   - The **pupil** (PYOO-pul) is the black circle in the center of the iris, which is really an opening in the iris, and it lets light enter the eye.



   - After light enters the pupil, it hits the **lens**. The lens sits behind the iris and is clear and colorless. The lens' job is to focus light rays on the back of the

eyeball, called the **retina** (RET-i-nuh). The retina uses special cells called **rods** (for black and white) and **cones** (for colours) to process light. You have about 120 million rods and 7 million cones in each eye!

- The retina takes the light the eye receives and changes it into **nerve signals** so the brain can understand what the eye is seeing.
- The nerve signals then travel along the **optic nerve**, which sends the image all the way to your brain!

4. **Touch**
    - Our skin, the largest organ in a human body, allows us to interact with all the complex textures that the world has to offer! It helps us to determine if something is cold or hot, slimy or rough, and many more.
    - In order to process so many different bits of information, the skin comes equipped with millions of **sensory nerve receptors**. There are several types of sensory nerve receptors. Some receptors tell the difference between hot and cold while others sense an itch or a pain.
    - Once the sensory nerve receptors have picked up on a specific type of touch, this message is passed to a **neuron**, or **nerve cell.** The neuron passes the message to more neurons along a specific pathway until the message reaches the brain.
5. **Smell**
    - Whenever we smell something, our nose and brain work together to make sense of hundreds of very tiny invisible particles, known as molecules or chemicals, that are floating in the air.
    - Up on the roof of the space behind your nose (the nasal cavity) is the **olfactory epithelium** (ol-FAK-tuh-ree eh-puh-THEE-lee-um). The olfactory epithelium contains special receptors that are sensitive to odor molecules that travel through the air. These receptors are very small — there are about 10 million of them in your nose!
    - When the smell receptors are stimulated, signals travel along the olfactory nerve to the **olfactory bulb**. The olfactory bulb is underneath the front of your brain just above the nasal cavity. Signals are sent from the olfactory bulb to other parts of the brain to be interpreted as different scents.
    - The brain interprets the combination of receptors to recognize any one of about 10,000 different smells.

Did you know that not everyone has the same ability to use their sense to identify the world around them as you do? Humans come in all different varieties. Some may not be able to see the world around them, but their sense of smell might be heighted accordingly! Some people lack the required amount of cones in their eyes, so they can't see the full range of the rainbow. Some lack the sense of taste and don't mind eating all their vegetables!

Resources:

- https://kidshealth.org/en/kids/

Reach out!

We would love to hear from you about all the amazing STEM projects you are doing at home! Show us your finished products on any of the following social media platforms by tagging us or by using the following hashtags. We hope these projects have brought some excitement to your day during these difficult times.

Let us know how we did! Please click here to fill out a short survey on how well we did and what you would like to see more of in the future. Thank you!

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