



Story General Information

The World As We Know It (🧠 A Cognitive Health Story) (4th Grade – 9-10 yrs.)

All animals get information about the world around them and they use this information to modify their behaviors in a way that allows them to survive.

- The world as we know it is dependent on our sensory receptors.
- Humans are the only animals that are able to enhance their sensory systems to detect stimuli that they would not normally be able to detect. That gives humans a definite advantage as to what they can learn about the world.
- How our brains perceive the information that is obtained from our sensory systems depends on a number of factors. We need to understand that not only is the world around us constantly changing, but that our perception of the world also changes. What we know about the world allows us to choose behaviors that will allow us to not only survive – but, to thrive.

The facilitator begins by introducing themselves, neuroscience, and the program: Brain Health: It's SPEctacular. They explain the **C** in SPEctacular represents Cognitive Health. In this story, children discover the importance of gathering information about the world around them in order to survive and thrive and exactly how the sensory system works.

In order to get information about the environment around them, animals rely on their sensory system. People have five senses. The facilitator and children review the senses (sight, hearing, smell, taste, and touch) and throughout the story will look more in-depth at how each of the senses function. The children are introduced to the terms *stimuli* and *receptors*. The facilitator defines each term and briefly identifies and describes how each sense has receptors that respond to outside stimuli allowing people to learn about the world around them. Animals also have receptors that respond to stimuli, but they can be different than the receptors of people.

To understand the sense of sight, the facilitator explains how people/animals see the world. The sensory receptors in the eye are called *rods* and *cones*. *Rods* tell the brain about dark and light. *Cones* tell the brain about colors. The eye catches different wavelengths of visible light on the *Electromagnetic Spectrum* or energy scale. Different wavelengths of visible light on the *EM Spectrum* are different colors. Animals, like chickens and dogs, have a different number of receptors than humans and therefore, see the world differently.

Hearing is also different between humans and animals. The hair cells in the human ear catch different wavelengths of sound. The faster the molecules in the air the higher pitched the sound. Dogs have a very high quality level of hearing. Chickens and humans are actually very similar.

Tongues are full of receptors or taste buds. Different places on the human tongue taste different flavors. The number of receptors on the human tongue is much greater than those of a dog. Therefore, dogs tend to be less picky about what they eat (like poop).

The facilitator and children discuss how people's sensory systems may not function properly. With the development of technology, different tools can be used to help people's senses function more normally. It can be something as simple as a pair of eye glasses or more in-depth like a hearing aide. Technology also helps humans complete tasks that the senses do not necessarily allow. For example, the invention of X-Ray machines allows humans to see inside the body and devices like radios and phones allow for communication to travel through waves. The human brain allows people to learn, design, create, and build tools and technology that allow us to experience the world beyond the five senses.

The sensory system sends any information it gathers to the brain. The brain determines what information is important at the time and initiates a behavior. However, *perception* also plays a role in decision-making. The facilitator defines and describes perception for the children. People perceive the world around them differently due to past experiences, attention/focus, emotions, and expectations. Someone's perception can change based on new experiences too. The facilitator and children discuss different scenarios of perception and change in perception to help visualize how each of these factors can affect decision-making.

People, their perception, their brain, and their environment are always changing. To cope with those changes, the sensory system constantly responds to the stimuli and sends the brain the new information it gathers. When the brain is healthy, it is able to assess and make decision. In a constantly changing world, the ability to adapt, survive, and thrive is made possible with a brain that is happy, healthy, and SPECTacular!

Story Objectives:

- Students will identify the parts of their sensory system.
- Students will explain why we have a sensory system.
- Students will name and describe different sensory receptors (ex: rods/cones, hair cells, bipolar cells, taste cells, nerve endings)
- Students will define *stimuli* and provide examples.
- Students will describe how and why sensory systems are different and give examples (dog/chicken).
- Students will explain how and why people use technology to enhance their sensory system and give examples (ex: glasses, hearing aids, machines, etc.)
- Students will describe how the brain uses information from the sensory system to make decisions.
- Students will define *perceive/perception*.
- Students will describe how perception plays a role in decision making.
- Students will explain how perception changes based on experience, attention, emotions, and expectations.
- Students will describe how the ability to assess the world around them improves their Cognitive Health.