



Science Behind the Story (SBS)
I Have An Idea (🧠 A Cognitive Health Story)
(PreK- 4-5 years old)

This story explains how the brain gets information from the senses and puts that information together – like a puzzle – to come up with thoughts and ideas.

- 🧠 Your 5 senses get information from the world and send that information to your brain.

Humans are able to get information from the world (both inside and outside of the body) around them because of their sensory systems.

We tend to talk about our 5 senses, although in actuality we have more (Gadhvi, 2022). Gustation and olfaction make up our chemical senses. We then have vision, which obviously allows us to see. Then there are our inner hear senses, audition and information from our vestibular system (regarding balance and the position of our head on our body). There is then somatosensation which includes pain, stretch, vibration, temperature, and proprioception – which is a muscle sense.

The world impinges on our nervous system via sensory receptors (Marzvanyan, 2021). The information about the world then gets converted into electrical impulses which the nervous system uses to get and process information. The information that gets sent to your brain is in the form of electromagnetic energy (for the visual and auditory systems), chemicals (for our olfactory and gustatory systems), and mechanical, thermal, noxious stimuli (for our somatosensory system). Our vestibular system allows gets information via mechanical stimuli.

- 🧠 Your brain takes all that information, which is like pieces of a puzzle, and puts it together. This is how ideas and thoughts are born.

Once the information about the world gets into the brain, via the sensory systems, then other parts of your brain play a critical role in the conscious perception of stimuli. Or, what you know about the world.

In the sensory areas of your cerebral cortex, which is the part of the brain that covers the entire brain, information from the sensory systems are put together with other information from other parts of the brain, such as what you already “know” (your memory areas) (Rolls, 2000) and how you “feel” about the information (your limbic system) (Rajmohan, 2007). This then allows you to have thoughts and ideas about the new information.

- 🧠 Thoughts and ideas can (and should) change based on the information that the brain gets from the senses.

The world is constantly changing and so are the things that people know. Humans are able to create tools that can augment their senses, which allows us the opportunity to learn even more things. For example, we can actually “see” inside the human body with the use of X-rays, PET (positron emission tomography) scans, MRIs (magnetic resonance imaging) (hopkinsmedicine.org). These machines allow our eyes to see things that we could not see with our eyes alone. We can “hear” someone who is far away by using phones.

We need to be able to change what we know about the world based on the information that receive from our senses (and our augmented senses). This is how new ideas are formed and new technologies get developed.

National Standards:

Next Generation Science Standards

- Crosscutting Concepts:
 - **Cause & Effect:** Events have causes, sometimes simple, sometimes multifaceted. Deciphering causal relationships, and the mechanisms by which they are mediated, is a major activity of science and engineering.
 - Events have causes that generate observable patterns.
 - **Patterns:** Observed patterns in nature guide organization and classification and prompt questions about relationships and causes underlying them.
 - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.
 - **Structures & Functions:** The way an object is shaped or structured determines many of its properties and functions.
 - The shape and stability of structures of natural and designed objects are related to their function(s).

ASCA (American School Counselors Association)

Personal/Social Development

- **Standard A:** Students will acquire the knowledge, attitudes and interpersonal skills to help them understand and respect self and others.
 - PS:A1 Acquire Self-knowledge
 - PS:A1.6 Distinguish between appropriate and inappropriate behavior
- **Standard B:** Students will make decisions, set goals and take necessary action to achieve goals.
 - PS:B1 Self-knowledge Application
 - PS:B1.2 Understand consequences of decisions and choices
 - PS:B1.3 Identify alternative solutions to a problem
- **Standard C:** Students will understand safety and survival skills.
 - PS:C1 Acquire Personal Safety Skills
 - PS:C1.7 Apply effective problem-solving and decision-making skills to make safe and healthy choices

National Health Education Standards (Shape America) & CDC (Centers for Disease Control and Prevention)

- **Standard 1:** Students will comprehend concepts related to health promotion and disease prevention to enhance health.
 - 1.2.2: Recognize that there are multiple dimensions of health. **(CDC)**

References:

Gadhvi M, Waseem M. Physiology, Sensory System. 2022 May 8. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. PMID: 31613436.

Marzvanyan A, Alhawaj AF. Physiology, Sensory Receptors. 2021 Aug 27. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. PMID: 30969683.

Rajmohan V, Mohandas E. The limbic system. Indian J Psychiatry. 2007 Apr;49(2):132-9. doi: 10.4103/0019-5545.33264. PMID: 20711399; PMCID: PMC2917081.

Rolls ET. Memory systems in the brain. Annu Rev Psychol. 2000;51:599-630. doi: 10.1146/annurev.psych.51.1.599. PMID: 10751982.

<https://www.hopkinsmedicine.org/health/treatment-tests-and-therapies/ct-vs-mri-vs-xray>