Making Neuroscience Fun

A Brain Awareness Program for All Ages

Brain Health: It's SPECtacular

Story General Information

The Brain Changes All the Time (A Brain Facts Story)
(5th Grade – 10-11 yrs.)

This story describes how because the world you live in is always changing, your behaviors have to change and so does your brain.

- Being able to adapt to changes in your world helps you to survive.
- Everything that you do changes your brain. Your brain has the ability to adapt – known as neuroplasticity.
- Everything about your brain is changing. This includes the number of neurons and glial cells that make up your brain, the connections between those cells, and the blood vessels that carry things in and out of your brain – everything is always changing.

The facilitator begins by introducing themselves, neuroscience, and the program, Brain Health: It's SPECtacular. Brain Health is about maintaining a happy, healthy brain to feel good. This story focuses on the physical features and characteristics of the brain that make change possible and emphasizes the importance of the ability for the brain to adapt.

The world is continually changing. The facilitator identifies two major ways in which the world changes. The physical environment can change, and innovation propels the world to change. If humans were physically unable to adapt to the ever-evolving world around them, they would not be able to survive. Fortunately, the brain is designed to learn new information, remember it, and adapt behaviors to survive and thrive in the "new" world.

The facilitator elaborates on the physical world changing. This is not speaking about the actual Earth changing (even though it does). For the children, this means their world. The one they live in. The facilitator describes how babies live in a very narrow small world, but as they grow older and mature, their world expands. It includes more people, more places, and more activities. Therefore, as that baby grows, their brain must learn to cope, adapt, and live in that new world. For example, babies cry to have their needs met because they cannot talk. But once they are older words become necessary for communication. A child cannot just cry and scream at school when they need a pencil or book. As humans grow, their skills develop and mature to meet their needs and help them survive in the new environment.

Innovation also changes the world by making survival easier. The human brain is so cool that people have been able to find new and creative ways of doing more difficult tasks. As new innovations, such as tools of technology, are developed, people learn to use those instead. The brain changes their behaviors. The facilitator describes how communication has evolved over centuries. From only being able to communicate with those close by to now video chatting with someone across the world in a matter of moments. The human brain not only learned how to use these devices, but a human brain invented those tools! The brain adapts and changes to innovation to make life easier.

The children are introduced to the term *neuroplasticity,* which means the brain changes. The sensory system (sight, hearing, smell, taste, and touch), emotions, and movements all play a role in gathering information to

change the brain. Everyone's brain is different because everyone experiences life differently. The brain's ability to learn and change can have both positive and negative effects. Using gathered information to create new ideas or help others creates positive feelings. However, experiencing something scary, like crashing a bike, can cause the body to respond negatively (nervousness or fear). The brain remembers because that is what it learned. The facilitator shares that talking about that situation is the best way for brain and body to overcome those emotions/responses.

But how exactly does the brain constantly change? What inside the brain allows it to gather information, learn, and remember? Cells in the brain do this, specifically, the *neurons* and *glial cells*. When learning a new behavior, the brain uses many cells and lots of energy. The more a behavior is practiced, the less energy or cells it takes for the brain/body to perform that behavior. The same is true of blood supply to the brain. The harder the brain is working to learn or remember, the more blood it needs. The more efficient the brain becomes with that behavior, the less blood needed, the less energy needed, the more efficient the brain is working.

Neuroplasticity is a wonderful and exciting feature of the brain. It is how humans survive and thrive in the world. It propels innovation and creativity. Having a brain that is able to adapt to an environment that is constantly changing sure is SPECtacular!

Story Objectives:

- Students will identify two ways the world changes: physically & innovations.
- Students will describe how *their* world physically changes as they grow.
- Students will explain how their needs are met as they get older.
- Students will explain why their brain changes to adapt to the physical environment changing.
- Students will describe why innovation happens.
- Students will explain why they can use technology.
- Students will define *neuroplasticity.*
- Students will describe and give examples of good and bad changes to the brain.
- Students will explain what physically (cells/blood) happens in the brain when it changes.