"MY AMAZING BRAIN"

My Amazing Brain has been created, by the Centre for Studies on Human Stress, for teachers and students to discover and learn about the wonders of the brain, which is an important player in the response to stress. The program has been adapted for children from 7 to 10 years of age in order to educate them about the brain. Education programs on stress have been developed by the Centre for Studies on Human Stress for children and teenagers aged 12 to 16 years. 'My Amazing Brain' program can thus serve as an introduction to the education programs of the Centre for Studies on Human Stress that will give the basis for a clearer understanding of the stress education programs that are available at older ages.

My Amazing Brain is an interactive and hands-on program that follows the work of Dr. Eric Chudler's *Neuroscience for Kids* at the University of Washington. It takes students on an exciting journey into the brain. Along the way, students will explore the functions of the brain through experiments and various fun activities. To help you present the learning material to your students, we have created a "Map of the Brain" with the various lobes (Frontal, Temporal, Occipital and Parietal). As you enter each lobe of the brain, you will fall upon activities and experiments that will enable you to explain to your students, the functions related to that particular section of the brain. Overhead slides are also provided for you to serve as a guide to maintain the flow of the course. In this lesson, students will learn about the skull, neurons, memory, the body's five senses, as well as other integral parts of the brain.

The lesson has been divided into 6 main sections, and within those sections, various topics are included. A few extra fun activities, "Can Your Brain Trick You?" and "Can You Trick Your Brain?" can be carried out at the end of the course.

1. Skull
   - Cerebrospinal Fluid
2. Frontal Lobe
   - Left Brain/Right Brain
   - Body's Sense: Smell
3. Temporal Lobe
   - Body's Sense: Hearing
   - Memory: the Hippocampus
4. Parietal Lobe
   - Body's Sense: Touch
   - Neurons
   - Homunculus
   - Body's Sense: Taste
5. Occipital Lobe
   - Body's Sense: Sight
6. Cerebellum: Balance

* Can Your Brain Trick You?
   - Optical Illusion

* Can You Trick Your Brain?
   - Stroop Effect

In this booklet, we have included the outline of the lesson plan, as well as the Teacher's Lesson Plan that includes all the details and instructions to carry out the activities and experiments.

Have fun exploring your amazing brain!

Sonia Lupien, Ph.D.
Director
Centre for Studies on Human Stress

OUTLINE of Lesson:

The "Map of the Brain" is divided into 4 lobes, and the cerebellum. Your journey begins with the discovery of the skull and ends at the cerebellum. In each lobe of the brain, you will learn about different functions of the brain, as outlined below.

1. Skull:

- To demonstrate the functions of the *Cerebrospinal Fluid*, you will carry out the "Mr. Egghead" experiment, using raw eggs! The experiment will show that the cerebrospinal fluid (egg white) and the skull (the eggshell) protect the brain (egg yolk) from sudden impact. Kids love this experiment!

2. Frontal Lobe:

- ***"Left Brain and Right Brain" Activity:*** Students will learn that sensory information from the left side of the body crosses over to the right side of the brain, and information from the right side of the body crosses over to the left side of the brain. Through a series of short activities, students will discover which side of the brain they use the most.
- ***Body's Sense: SMELL***. Here, 2 experiments are outlined for kids to investigate the olfactory system. The experiments are designed for students to explore whether people vary in their ability to match unlabelled containers of odor material and whether they are able to taste a Skittles® when their nose is pinched closed.

3. Temporal Lobe:

- ***Body's Sense: HEARING***. The experiment will allow students to discover how sound travels from the air to the eardrum.
- ***Memory: The hippocampus*** is one part of the limbic system that is important for memory and learning. The activity in this section allows students to see just how good their memory is!

4. Parietal Lobe:

- ***Body's Sense: TOUCH***. The experiment will allow students to observe a person's ability to discriminate one versus two points touching various places on the skin. The implications of having different sensitivities in different skin areas will be discussed. What do we need in order to feel? Neurons!
- ***Neurons:*** An activity to demonstrate the function of a neuron will help students to better understand the sense of touch.
- ***The sensory homunculus*** helps us understand sensory information processing in the brain.
- ***Body's Sense: TASTE.*** Taste buds are one of the most sensitive parts of the body. Students will experiment how taste buds work by trying to name a taste while having their eyes closed (i.e. salty, bitter, sour and sweet).

5. Occipital Lobe:

- ***Body's Sense: SIGHT***. Depth perception is the ability to judge objects that are nearer or farther than others. The experiment in this section will show that two eyes are better than one, especially when it comes to depth perception.

6. The Cerebellum

The Cerebellum is responsible for balance. In a fun activity, students will try to keep their balance! *Note that for the sake of clarity, the cerebellum is presented within the section on the temporal lobe and the ear.*

* Can Your Brain Trick You?

- ***Optical Illusions:*** What you see is not always what is there. Or is it? There is one optical illusion to share with your class.

* Can You Trick Your Brain?

- ***Stroop Effect:*** Give your students the Stroop Test! The task takes advantage of our ability to read words more quickly and automatically than we can name colors.

Teacher's Lesson Plan

The Teacher's Lesson Plan is a detailed guide for the lesson. The text, written in black, is for you to read to your students exactly as it is. But with experience, you may use this text simply as a guide.

This document is organized in terms of the journey you will be taking to the main areas of the brain: The Skull, The Frontal Lobe, The Temporal Lobe, The Parietal Lobe, and The Occipital Lobe. As you enter each area of the brain, you will start off with a short explanation of what the area is responsible for. Experiments pertaining to the specific area of the brain soon follow. Most of the experiments are hands-on, and require props and material. (See pg.16 for a list of materials needed for the entire lesson). The document provides instructions for each of the experiments, as well as questions that you can ask and discuss with your students. Slides have also been provided to help you maintain the flow of the lesson. This document indicates when and what slides should be shown during the course of the lesson.

We hope this serves as a helpful guide to you. Now you may begin your journey in your amazing brain!

Introduction:

Pinch your nose. Wiggle your toes. Lift up your right leg. Think about your favorite movie, and try to remember the last time you saw it. Now place both hands around your head. What do you feel? Something hard?

That's your skull. And what do you think is inside?

Inside your skull is your brain. Your brain is the control centre for everything you do; pinching your nose, wiggling your toes, running, breathing, remembering.

Today, we are going to take a journey into the brain. Along the way, we're going to explore different parts of the brain. We'll discover the cool things that go on inside your head and learn what the brain does. Is everyone going to join us?

On this exciting journey you will all be scientists, carrying out fun experiments.
But first, we need a map to help us find our way! Here's a map of the brain and this is the trail that we need to follow.

Let's go!

- *Show students the map of the brain.*

Here's your brain, and this is the skull (tapping your head)...
There are eight bones that surround your brain. These eight bones make up the cranium. The skull is there to protect your brain.

- *Introduce BRAIN MODEL, if available at your school.*

SKULL

What's inside your skull?

{SLIDE: "Protect your Brain"}

Inside your skull is your brain. But is your brain really alone inside your skull or do other things surround it? To discover whether your brain is directly under your skull or if other things surround it, we're going to do the Mr. Egghead experiment.

Mr. Egghead Experiment - Cerebrospinal Fluid

You will need:

- Eggs (at least 2)
- Marker to draw on a face (waterproof)
- Plastic container with top
- Water (to fill the container)

(From Dr. Chudler's Neuroscience for Kids)

This egg represents the brain. And the plastic container represents the skull. (Place the egg in the plastic container and close the lid). If I shake the container, you'll see that the egg will break. (Shake the container). Now the brain has been damaged. Let's take another egg. (Place another egg in a plastic container) But this time, let's try to think of a way to protect the brain so it doesn't break. Can you think of a way?

How about we put some water into the skull together with the brain? Do you think that will help to protect the brain from breaking? Let's try. (Pour some water into the plastic container and close the lid). Now I'm going to shake the container to see what happens when the brain is surrounded by water. (Shake the container).

The egg did not break! How come? This is because the water was protecting it, acting like a cushion. In the brain, there is a type of water called the Cerebrospinal Fluid that helps to protect the brain from sudden impacts. So, from this experiment, we know that both the Cerebrospinal Fluid and the skull surround the brain, and also protect the brain.

- *Follow the path on the map. You have now made your way through the skull and have entered the brain.*

Enter the FRONTAL LOBE:

The frontal lobe is concerned with your capacity to move and your capacity to talk. Well, think about it…in order to talk, you have to move your lips! If you were not able to move your lips, you could not talk! This is the job of your frontal lobe. Now, the entire brain, including the frontal lobe, is organized in a weird way. Let me explain.

Your brain is divided in two equal portions. You have the left-brain, and you have the right-brain. The left and right brain are connected with each other by something called the corpus callosum. If you look at your body, you see that you also have a left side, and a right side. You have a left eye, and a right eye. You have a left hand, and a right hand. Now, each side of the brain controls a side of the body.

Question: How many of you use their right hand to write? How many of you use their left hand?

Question: When you use your left hand to write, which side of the brain do you think controls your left hand? The left-brain or the right-brain?

Answer: The right-brain!

- **Left-Brain, Right-Brain**

The right side of the brain controls the left side of the body and the left side of the brain controls muscles on the right side of the body.

So, if you are a left-hander, it means that you are using your right brain to write. If you are a right-hander, than it is your left-brain that helps you write.

But, is this true for everything you do? Let's try an experiment! But before we do our first experiment all together, I want to ask you to choose a friend with whom you will do all the experiments for the day. We will call this person your 'partner'. Let's take 5 minutes so that you can find a partner.

Left-Brain, Right-Brain Activity:

Pair up with your partner and try this experiment. Ask your partner to do the Task, and then write down which side of their body they used to do it.

TASK	RIGHT or LEFT?
Write your name.	Right or left hand?
Kick an imaginary ball	Right or left foot?
Look through a tube.	Right or left eye?
Listen through a wall.	Right or left ear?

Now compare your results with your classmates. Did you find that people used one side of their body for all the Tasks, or did they use the right side sometimes and the left side other times? Did the boys use one side more than the girls? What side of the brain did you use the most?***

***This is a trick question! Remember that the right side of the body is controlled by the left side of the brain. So what side of your brain do you think you use most?
(From Dr. Chudler's Neuroscience for Kids)

- ❖ *Follow the path on the map. A red flag! This flag means that we have come across one of the body's senses. Do you know how many senses there are?*

Body Senses: SMELL
{Slide: How do we smell?}

What do you need in order to smell something? You need a nose, a brain, and hair!

The smells of a rose, perfume, freshly baked bread and cookies...these smells are all made possible because of your nose and brain. Look into your friend's nose, and you'll see some small hairs! Everyone has hair in his or her nose.

At the end of these hairs, into the skin of your nose, there is a cell, which is a like a little 'button' that is pushed down when the hair is moved. When a smell gets into your nose, it moves the hair, which then pushes the button and sends a message to your brain that there is a smell out there. Then your brain tells you what smell it is.

So, when you smell something, you voluntarily push the air within your nose and this makes your little hair move, which pushes the button of smell. Do you want to push your 'smell-buttons' and see how good you are at detecting different smells? Let's try the 'Scent-in-a-Jar activity'!

Scent-in-a-jar Activity:

We can recognize a wide variety of smells. Some smells can stir up memories. To demonstrate the sense of smell, collect several items that have distinctive smells such as:

lemon	orange peel	cedar wood	perfume soaked cotton
banana	pine needles	chocolate	coffee
dirt	vanilla	garlic	onion
mint	vinegar	moth balls	rose flowers

Keep the items separated and enclosed in plastic containers so that the odors do not mix. Put a blindfold on a student (or punch holes in the top of the containers to eliminate the need of a blindfold) and ask the student to:

Questions and Comparisons

1. Identify the item by smell.
2. Rate the odor (strong, pleasant, neutral, [bad or good for young kids])
3. Tell about any memories associated with the smells.

(From Dr. Chudler's Neuroscience for Kids)

Continuation of the lesson on smell

As you probably know, when you have a cold and your nose is stuffed up, you cannot smell very well. This is because it is difficult for you little buttons in the nose to be pushed down in order to send the message that there is a smell.

Why do you think we have the capacity to smell things? Yes, that's right! In order to enjoy the good smell of flowers or cake! But can you think of another reason why we would need smell in our lives?

Smell can help us survive and this is why it is so important. For example, if there is a fire in the house, you will be able to smell the fire, which will then tell you that you have to get out of the house.

Another role of smell is to help us taste food! You don't believe me? Let's try the skittle experiment!

Skittles® experiment:

Give a Skittles® to your students and have them keep it in their hand until the entire class has one. As they enjoy the taste of the candy, get them to pinch their nose. They will soon discover that while pinching their nose, they are not able to taste the candy anymore! This activity demonstrates exactly what happens when you have a cold and you cannot smell very well - the molecules that carry smell cannot reach the olfactory receptors. Also, this activity shows you that smell helps you taste, because the two activities are closely related in the brain. This is why when mom's food smells good, it will surely taste good!

Enter the TEMPORAL LOBE:

The temporal lobe is concerned with hearing sounds. It is also important for making memories.

- *Follow the path on the map. We have come to another flag. What sense is this?*

Body Senses: HEARING

What do you think we need in order to hear?
Answer: We need a nose, a brain...and hairs!

Just like the nose, the ear contains some small hairs. If you don't believe me, look into the ears of your partner and you will see some hair. Just like the hairs in your nose, the hair in the ear will move each time that a sound enters the ear. And when the hairs move, they press a button that sends a message to the brain saying, "I hear something!"

Question: Do we really need to have a sound around you in order to hear something?

Let's do an activity to find out!

Pair up with your partner and each one, in turn, say the word 'banana' close to your partner's ear. Does your partner hear the word banana? Yes!

Stay with your partner and each one, in turn, say 'bliblabloblu' close to your partner's ear. Does your partner hear something? Yes! It is not a word, but it is a sound. So again, we can hear a sound.

Again with your partner, now slowly blow some air in his-her ear. Does he-she hear something? Yes??? Weird isn't it! You are not putting a word or a sound in his-her ear, but yet, he-she 'hears' something! Let's try a last experiment!

Gently place your finger in your ear. Now wiggle it around. What happens? You 'hear' something? Funny sounds? Now, does your partner hear this sound? No? Now stop moving your finger and keep it still. What do you hear now? Not much, right? Do you know why?

The answer is that when you say a word or make a sound, when you blow some air in your friend's ear, or when you wiggle your finger inside your ear, you are moving those little hairs that are in your ear. When the hairs move, they push that button that sends the message to your brain that there is a sound. But when you kept your finger still, none of the hairs in your ears were moving. No button was pressed so your brain didn't receive any message.

{Slide: How do we hear?}

The CEREBELLUM

The hairs in your ear help you hear things but they also help you keep your balance. But the hairs that help you keep your balance are all the way inside your ear, in the back of your ear. You can't see them. When these hairs are moved, they send a message to the cerebellum that you have moved. The cerebellum is at the back of your head, and it means "little brain".

{Slide: Keep your balance}

The cerebellum is responsible for balance. It controls & coordinates movements of muscles such as walking, dancing, and running.

The hairs way back in the cerebellum are in water.

Try to imagine an aquarium with algae in it. The algae are straight up when the aquarium is not moving. When you are standing and not moving, the hairs in the water of your ear do the same, they don't move.

But if you move the aquarium, the algae in the water will also move slightly to the left or right. This is exactly what the hair in the water of you ear will do when you move. If you bend your head to the side and down a bit, then the water in your ear will move, pushing the hair to move as well. When the hair in your ear moves, it sends a message to your cerebellum that you have moved!

And sometimes, your cerebellum can be quite mixed up by all this movement! Want to try it?

Balancing Activity:

Turn around in place for 10 full circles and then abruptly stop. You will lose your balance!

This is because by turning so often, the water in your ear moves a lot, creating waves. The hair in the water gets all shaky, sending all sorts of mixed messages to your brain. The brain is mixed up a bit. You see things in double and everything is all unbalanced! After a few minutes, you are fine. This is because the water in your ear has stopped moving, and the hair as well. Therefore, there are no weird messages being sent to your brain anymore!

- *Follow the path on the map. We come across a seahorse.*

What's that? A seahorse in your brain?

{Slide "A Seahorse in Your Brain?"}

The HIPPOCAMPUS is one part of the brain that is important for memory and learning. It got its name because its shape resembles that of a seahorse.

What is memory? (You can ask the question to the students in order to see what they think of memory)

Memory is the capacity we have to remember things that happened in the past, or that will happen in the future.

Question #1: What did you have for breakfast this morning? This should be an easy question to answer.

Question #2: What did you have for breakfast 4 days ago? Mmmh… This should be a more difficult question to answer.

Why? Because there are two types of memory, one that is called short-term memory that helps you remember what happened within the last day or so, and one called long-term memory that helps you remember things that happened a long time ago, such as your last birthday party when you had this great gift.

But we also have to remember things in the future. For example, you have to remember what homework you have do to when you arrive home this afternoon, you have to remember to bring your gym shoes on the days that you have gym, you have to remember that you have to go to your friend's birthday party next week. If you cannot remember the future, then you will be in trouble!

The hippocampus in the brain is the place where all of this happens. If you have a disease in this small region, you are amnesic. This means that you don't remember anything and you cannot learn anything new! So each time you leave your house in the morning, you have to learn you address again if you want to go back home!

For children like you, remembering things that happened in the long-term is more difficult – remember when I asked you what you ate for breakfast 4 days ago? That was more difficult than remembering what you ate this morning.

But for older people, it's the exact opposite. For them, they are not so good at remembering things that happened a short time ago. But they are very good at remembering things that happened to them a long time ago. Their long-term memory is very good. So, when you meet your grandparent the next time, try to have them talk about things that happened when they were very young. You will see that they will remember everything that happened a long time ago, and you will have a great time learning how was life when grandpa and grandma were young!

{Slide "Do you think you have good memory?"}

Memory Activity:

Show the slide of 15 pictures to the class for 25 seconds. Within that time, they must try to remember as many objects as they can. Once the 25 seconds have passed, remove the slide so that students no longer see the objects. Ask students in the class to name the objects they were able to remember.

(From Dr. Chudler's Neuroscience for Kids

Enter the PARIETAL LOBE:

The Parietal lobe is concerned with feeling touch.

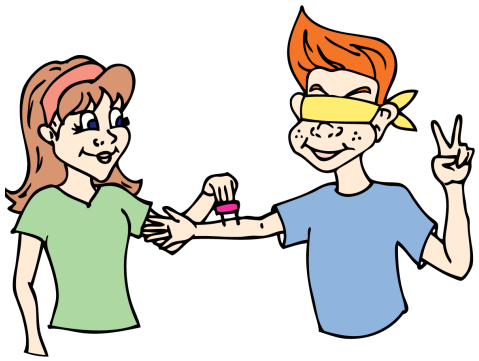
Touch your head. Do you feel it? Surely, you do. Do you always feel it when you are touched by something? If you say 'Yes', do the following experiment with us!

- *Follow the path on the map. We have come to another red flag, another one of the body's senses.*

Body Senses: TOUCH

{Slide "The Toothpick Experiment"}

Toothpick Activity:



You will need:

- Toothpicks
- Play-Doh®

Break a toothpick in two and place the ends into a piece of play-Doh® 1 inch apart. Both ends of the toothpick must be of same height. Leave the play-Doh®, with the toothpicks inside for a couple of hours. The Play-Doh® will eventually harden. (This needs to be prepared in advance).

Get a friend and place a bandana over their eyes. Gently place the toothpicks on their upper part of their arm. Make sure both tips of the toothpick touch the skin at the same time. Ask your subject if he or she felt one or two pressure points. Now try it again, but this time on their hand. Ask your subject if he or she felt one or two pressure points. You will notice that your subject most probably said that he or she felt one pressure point on the upper arm and two pressure points on their hand.

Tell them that you actually placed 2 toothpicks each time. You will see that they don't believe you, but you know this is true! How can this be?

How can your friend feel only one pressure when you put two toothpicks on their arm?

The answer to this question lies in the NEURON, which is like a button in the skin that when pushed, sends a message to the brain that the skin has been touched. Now, in order for a button (a neuron) to send a message to the brain that it has been touched, it has to be touched!

There are more neurons in your hands than in your upper arm, so when you touch your hand, you have more chance of pushing a button then if you touch your arm, which doesn't have a lot of neurons (buttons). In order to understand this difficult concept, let's do an experiment.

{Slide: "You need a Neuron!"}

NEURONS!

Neuron Activity:

This activity demonstrates that there are more neurons in certain areas of the body than others – the more neurons, the more sensitive that area is to touch.

You will need:

- 2 sponges

You will need an open space for this activity. Have 3 students stand in the middle of the class (or other open space), two arm's length apart from each other. The teacher explains to the students that each one of them represents a neuron, and that each of the sponges represents a tootpick of the tootpick experiment. The teacher will then throw 2 sponges up in the air. The probability of the 2 sponges touching any of the students is small as they are far apart from each other. Neurons in certain areas of the body are not dense, and therefore, not very sensitive to touch. This is the case of your upper arm.

Now, have all the students in the rest of the class, huddle in between the 3 students. They are going to be quite squeezed together, representing a region where there is a lot of neurons! The teacher will now throw the sponges up in the air. With all the students in the middle of the class, the sponges are most certain to hit at least one of them! This shows that in certain areas of the body, there are more neurons, and these parts are more sensitive to touch. This is the case of your hand, and it is why you felt the two toothpicks (like the 2 sponges) on the hand, but you only felt one on the upper arm.

{Slide: "Mr. Homunculus"}

Meet **THE HOMUNCULUS!** The homunculus is a map in your brain that shows the number of buttons that are devoted to each part of your body. The homunculus diagram shows that there are more touch buttons in certain areas of our body compared to other areas. Notice that the Homunculus has big hands, face, and lips, as these are some of the most area of the body with the most touch buttons.

- *Follow the path on the map. We have come to a red flag, another one of the body's senses.*

Body Senses: TASTE

Now, look at the mouth of the homonculus. A lot of button-neurons there don't you think! This is because in your mouth, you have a tongue. And the role of your tongue is not to make a funny face, but rather it is to taste! So, the homonculus tells us that on our tongue, we have a lot of taste-buttons. Do you want to see these taste-buttons?

Pair up with your partner. Ask your partner to take out his-her tongue and closely look at it. You can see the taste-buttons! These are everywhere on your tongue and they help you taste food.

What is the food you like the most in the world? Chocolate? Pizza? Macaroni and cheese? How do you taste food? Do you need to see food in order to know what you taste?

Sugar & Lemon Activity:
Let's try it out! I would need one volunteer. (Ask the volunteer to close his/her eyes. Place a drop of lemon on the volunteer's tongue. Ask him/her to identify what it is. Then, place some sugar on the volunteer's tongue. Ask him/her to identify what it is. In both cases, he will probably be able to identify what the tastes were without seeing the food that he-she puts in his-her mouth.

Class, how did he/she know that I had placed lemon juice and sugar on his tongue? It cannot be because he-she had his-her eyes opened, since they were not!

That's because, on your tongue, you have little taste buttons (called 'taste buds') that are everywhere on your tongue. In order to taste food, you first have to put it in your mouth. Once the food is in your mouth, it will for sure touch your tongue and when it does, it pushes the taste-button which then sends a message to the brain that something tasty was eaten.

{Slide: "Taste Buds"}

Enter the OCCIPITAL LOBE:

The occipital lobe helps you understand what you see.

- *Follow the path on the map. We have come to a red flag, another one of the body's senses.*

How do we see?

You are walking in the park and your eye sees a flower. The picture of the flower is sent to your eye. And a message is sent to the part of the brain called the Occipital lobe. This is the part of the brain that helps you understand what you see. So once the message is sent

to your brain, your brain tells you, "it's a flower that you see!" But sometimes, different parts of your brain fight and this can cause some problems.

For example there was once a man who had this problem. Different parts of his brain were just not agreeing with each other. When taking a walk on the street, he would tap every fire hydrant he saw while saying, "Good child". This man's brain thought that the fire hydrants were small children! His eyes saw the fire hydrant, but his brain told him that this was a child! (Note: the scientific name for this disorder is an 'agnosia').

Or, when someone showed him a pair of glasses, he would say that it was a bicycle! The information of two circles with a line in the middle would get to his brain through his eyes, but the brain would make big mistakes at deciding what it was! Try to imagine your life with such a problem!

Besides telling you what you see, your occipital lobe helps you understand what object is closer than another object. This is called depth perception.

And in order for your brain to help you decide what is closer than what, you need...your two eyes! Let's do an experiment.

Body Senses: SIGHT

{Slide: "How do we see?"}

Depth Perception Activity:

Two eyes are better than one, especially when it comes to depth perception. Depth perception is the ability to judge objects that are nearer or farther than others. To demonstrate the difference of using one vs. two eyes to judge depth, hold the ends of a pencil, one in each hand. Hold them either vertically or horizontally facing each other at arms-length from your body. With one eye closed, try to touch the end of the pencils together. Now try with two eyes: it should be much easier. This is because each eye looks at the image from a different angle. This experiment can also be done with your fingers, but pencils make the effect a bit more dramatic.

(From Dr. Chudler's Neuroscience for Kids)

Depth perception is very important. Indeed, when you have to cross the street, and you see a car coming, you have to decide whether it is far enough so you have time to cross, or whether it is too close and you should wait. It is because your brain has depth perception that you can judge the distance of things around you.

Extra Fun Activities

• Can Your Brain Trick You?

As we have seen with the sense of balance, when the brain receives weird messages, it can get all mixed up and send you weird messages! Also, because your brain likes to be in order and not to be mixed up with all sorts of things, it can also trick you! This is called an illusion.

Do you want to have an illusion? Look at the picture.

Optical Illusions
{Slides}

"Is the Wheel Turning?"
When you keep looking at the image, it seems to be moving before your eyes. But there is no movement in the picture. How could this be?

It's because of the slight movements in your eyes that are done constantly in order to keep a sharp image sent to your brain. Look at your friend's eyes. Do you see that it is always doing some small movements - from left to right? Every human eye does that! The eyes move in order to send the best possible picture to the brain, using various angles and directions. However, because the eyes makes these movements, when it looks at arrows pointing in one direction, the slight movements of the eyes send the message to the brain that the arrows are moving, when they are not!

The same illusion can happen when you are in your parents' car. Your parents' car is at a stop, but if the car beside your parents' car starts moving, you will have the feeling that it is you who is moving! This is an illusion caused by a mixed message of your eyes sent to your brain!

* Can You Trick Your Brain?
{Slide}

OK. Your brain can trick you but you can also trick your brain without being able to control yourself!

Experiment: Stroop Effect
Are you a good reader? The better you are at reading, the better you will be at tricking your brain in the next experiment. I will show you words on the screen, and your task is to tell me as fast as possible (you have to go fast!) what is the color of the ink I used in order to write the words. For example, you can see the word 'table' written in red, and you would have to say 'red' as fast as you can. Are you ready?

Present the 'neutral' Stroop words (e.g., table, etc) and ask the children to name (altogether) the color of the ink used to write these words.

Wow! You are very good! Now, let's do it again!

Present the 'color' Stroop words (e.g., blue, etc) and ask the children to name (altogether) the color of the ink used to write these words.

Boy, this is difficult isn't it? Why? It is because you are a good reader and you are faster at reading the words than your brain is at identifying the color of the ink. So you win over your brain! Because the words you read are all words that represent colors, you can trick your brain and read the word before you get to name the ink.

Try this task with your parents! You will see that it works very well and that they will not be able to tell you why this happens! But *you* will!

My dear friend, I hope that this short journey into the brain was a great experience for you. If you would like to redo some of the experiments we have done today, or if you want to explain some of the things you have learnt, to your family and friends, then you can go to a computer and get to our website. You will find all the information that we have covered today, and you will be able to do the 'My Amazing Brain Program' with all of your friends and family, showing them what good a scientist you are!

It was a pleasure to meet you, and your amazing brain!

Sonia Lupien

Materials Needed & Budget Required

Map printed on 24lb Bond Paper	$32.50
Overhead slides (25 slides)	$44.00
Mr.Egghead Experiment	
2 eggs (at least)	$ 0.50
Marker to draw on face of egg	$1.15
2 Plastic Tupperwares	$3.00
Skittles® Experiment	
Bag of Skittles®	$3.00
Scent-in-a-Jar	
4 salt/pepper shakers	$2.30
Items you want to put into the containers (ex. Orange peel, vinegar, garlic, coffee)	
Box of Pencils	$3.00
Toothpick Experiment	
Toothpicks	$1.15
Play-Doh®	$1.15
Neurons Activity	
2 sponges	$2.30
Sugar & Lemon Activity	
Lemon	$1
Sugar sachet	$1
Total Budget Needed	**$96.50**