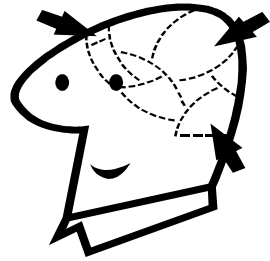


# "I'm Lost!"



## Incorporating Brain Based Methods of How We Think & Learn in Science Class

"I'm lost in that class, I just don't get it!" Often students come home expressing their grief of being lost in class and no further explanation can be provided by them. Fortunately, your open relationship with your child has provided this "red flag" early enough to make adjustments. The subject matter just doesn't make sense and as time goes by, they fall further into the chasm of alienation regarding the subject at hand.

Similar to being physically lost, our brain tells us when we are in unfamiliar territory. Within our homes we can find our way around in the dark night because of an experiential mental map of where things are. When placed in a new environment, however, we have no mental map of our surroundings. Not having a mental map, or trying to create one in an environment where the sensory input makes no sense, encourages emotions such as anxiety, frustration, and fear of failure. If these emotions get out of control, our brains cannot establish reason and find its way through the unfamiliar territory. We are lost.

This past decade, neuroscience has begun to understand the detailed physiology of the brain and their emotional states. The brain's **neo-cortex** is responsible for your IQ, conscious decisions, and analytical abilities. It will help you find your way out of a particular situation. The **amygdala** is the part of the brain that exhibits emotion. It is the watchdog that triggers reflexes, physical and emotional. This is important when we encounter experiences that threaten our survival, it tells us when something is wrong or out of the ordinary. The **hippocampus** is the part of the brain that lags behind the emotional response, but provides rational thought. The hippocampus memorizes and the cortex learns. The hippocampus creates new dendrites and synapses during adolescence which increases short term memory in teenagers. (Dendrites and synapses are parts of brain cell that make connections to memories of knowledge) The hippocampus is slow in its development; in fact there isn't much evidence of it until about age three, which may explain why we rarely remember anything prior to that age. Being **Lost** can be described as the inability to make a mental map that can match the environment.

Frustration, aggravation, panic, mind blocks, anxiety, fear of failure are some of the emotions expressed when an individual feels the stress of being lost, all emotions coming from the amygdala. Consider the experience of being late to our destination and not finding the car keys. The amygdala assumes control and the result is we often cannot find something that is right in front of our eyes. The amygdala has powerful connections to many parts of the brain, which means that the entire memory system is affected. As a result, we cannot remember the most basic of things or perform the simplest of tasks. If and when we calm down, or are not stressed, our hippocampus will direct us with our mental map to see that the car keys are right there in front of us. Stress releases cortisol and other hormones into the blood invading the hippocampus and interfering with its work. This stress causes us to focus narrowly on the thing we consider most important, and it may be the wrong thing; being late; fear of failure, making the teacher or parents angry.

When we are learning something complex it is called explicit learning. Initially it can be overwhelming, triggering the amygdala to create emotions such as mind blocking, anxiety, and fear. Examples are numerous, our first bike ride without training wheels, learning math concepts, science concepts, how to read expository text, our first semester exam, learning how to ski. One of the key ideas with incorporating brain based methods in which we think and learn is to overcome the stress of being lost. We need to gain control of the amygdala and involve the neo-cortex to provide some directions and the hippocampus for rational thought which will dissolve the stress involved.

If new information involved with explicit learning is presented in a non-confrontational environment that is safe and comfortable, and delivered in a way that can be understood, knowledge is gained. Dendrites and synapses connect. The hippocampus takes over and as more experience is gained, you begin to do the task less consciously. You develop this skill as second nature, a thing of beauty. This is known as implicit learning. Implicit learning is like a natural smile, it comes by way of a different neural pathway from the one that carries explicit memory. When teachers or parents see this occur, such as the natural smile when the connection with the concept or task at hand is made, nothing can make the effort more worthwhile than seeing a student's smile.

**Transferal** refers to how the skills and knowledge can be synthesized into the real world of the student. There are two types of transfer. **Low Road Transfer** is the automatic transfer of highly practiced skills and knowledge, with little need for reflective thinking. Low road involves using knowledge already learned, i.e. constructivist knowledge, and incorporating implicit learning and transferring it into explicit learning. "You know what whales are, but did you know they can compose songs that last 30 – 90 minutes and repeat them without a mistake? Explore why!" **High Road Transfer** is the explicit conscious formulation of abstraction in one situation that allows making one connection to another. "The female genotype is XX and the male genotype is XY. Since baldness is carried on the X chromosome, is it possible for women to become bald?"

Elements promoting transfer include:

- ✓ *Providing constructivist opportunities (using what students already know).*
- ✓ *"Hooks", "Cues" and physical objects to support learning and inquiry.*
- ✓ *Frequently using a scaffolding approach to learning. (building knowledge laterally to vertically). This includes repetition both High and Low Road.*
- ✓ *Providing real world connections, concept mapping, and problem solving.*
- ✓ *Encouraging communication and collaboration (part of constructivism).*
- ✓ *Encouraging and providing opportunities for reflection and going further.*
- ✓ *Explicitly reviewing the purposes behind activities with goal setting in mind.*

We have learned more about the brain since 1990 than in our entire human history. Until recently, we have had few clues to unlock the secrets of the brain. Brain based research findings on how the brain processes and accesses information has improved our understanding of the learning process. This provides a solid foundation on which I base my educational decisions in teaching.

**"...self trust is the first secret to success..." -R.W. Emerson**