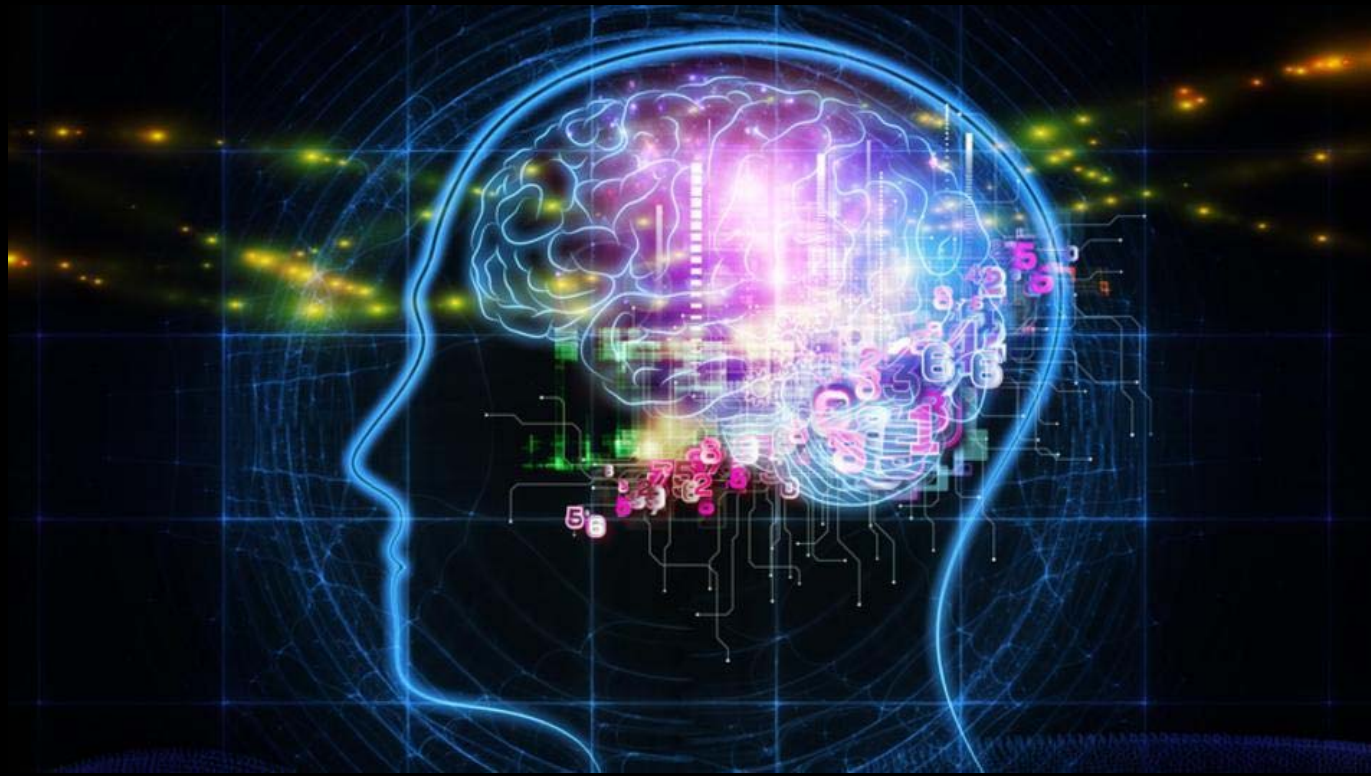


**Translating brain science
into effective classroom instruction
to improve your teaching and students' learning**



**Dina Rosen, Ph.D.
Kean University**

This session will explore

- How can teachers nurture a resilient brain?
- Why do some children excel and others do not?
- What can teachers do to help all children excel?
 - Multi-sensory Education
 - EQ
 - Sleep, Exercise



Poll

1) How familiar are you with research in the brain sciences?

- Very**
- Somewhat**
- Not at all**

2) The frontal cortex is essential for multisensory education.

- True**
- False**
- I am not sure**



Everything we do uses our brain.

100 Billion nerve cells (neurons)



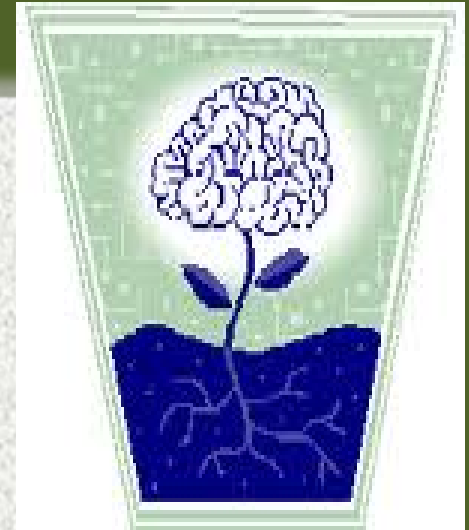
100 Billion



**20 % of number neurons
we had before birth**

The human brain prunes

Prune = Gardeners
carefully and purposefully
cut off unwanted branches
from plants and bushes.

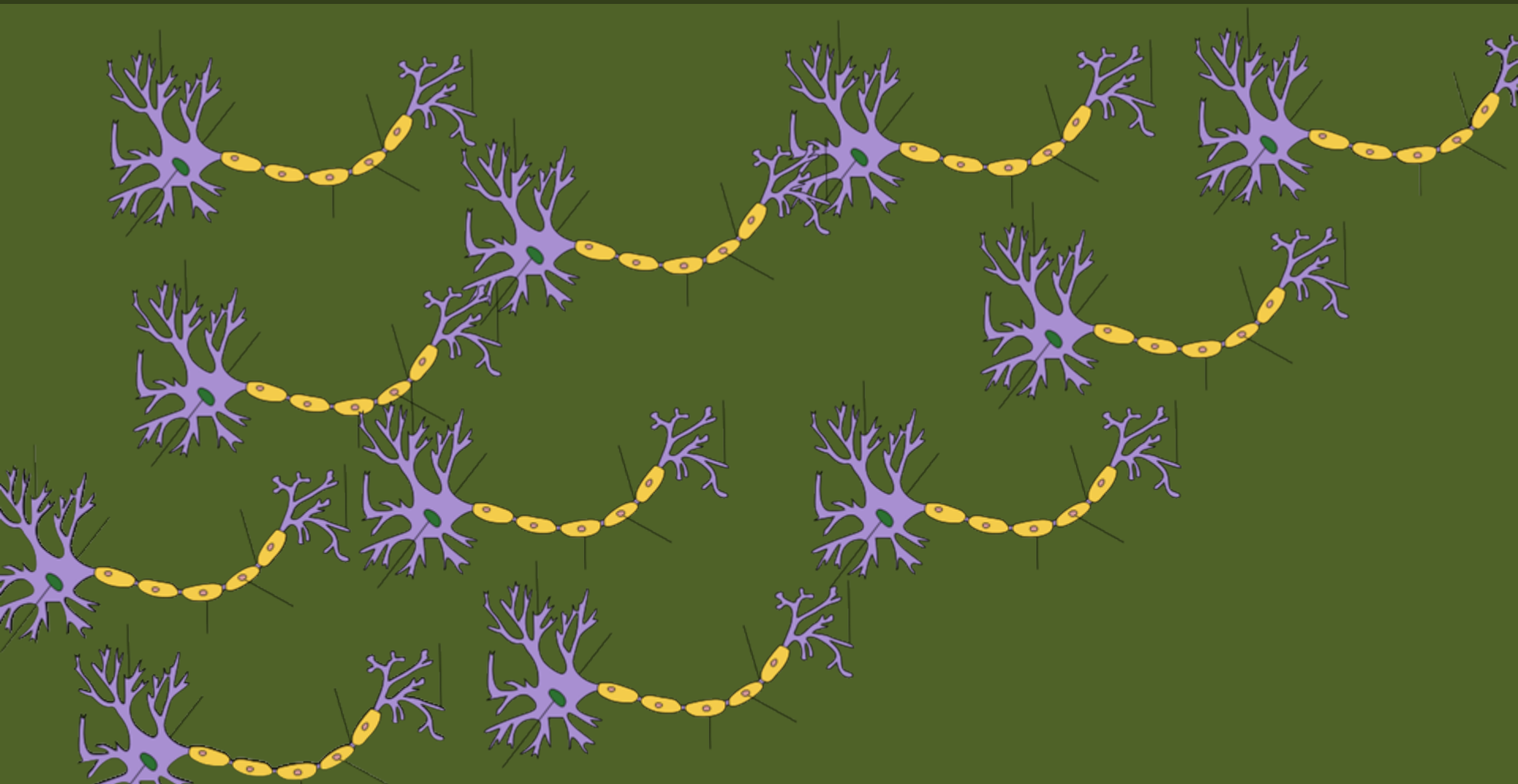


The brain cuts out, or prunes, unused neurons.

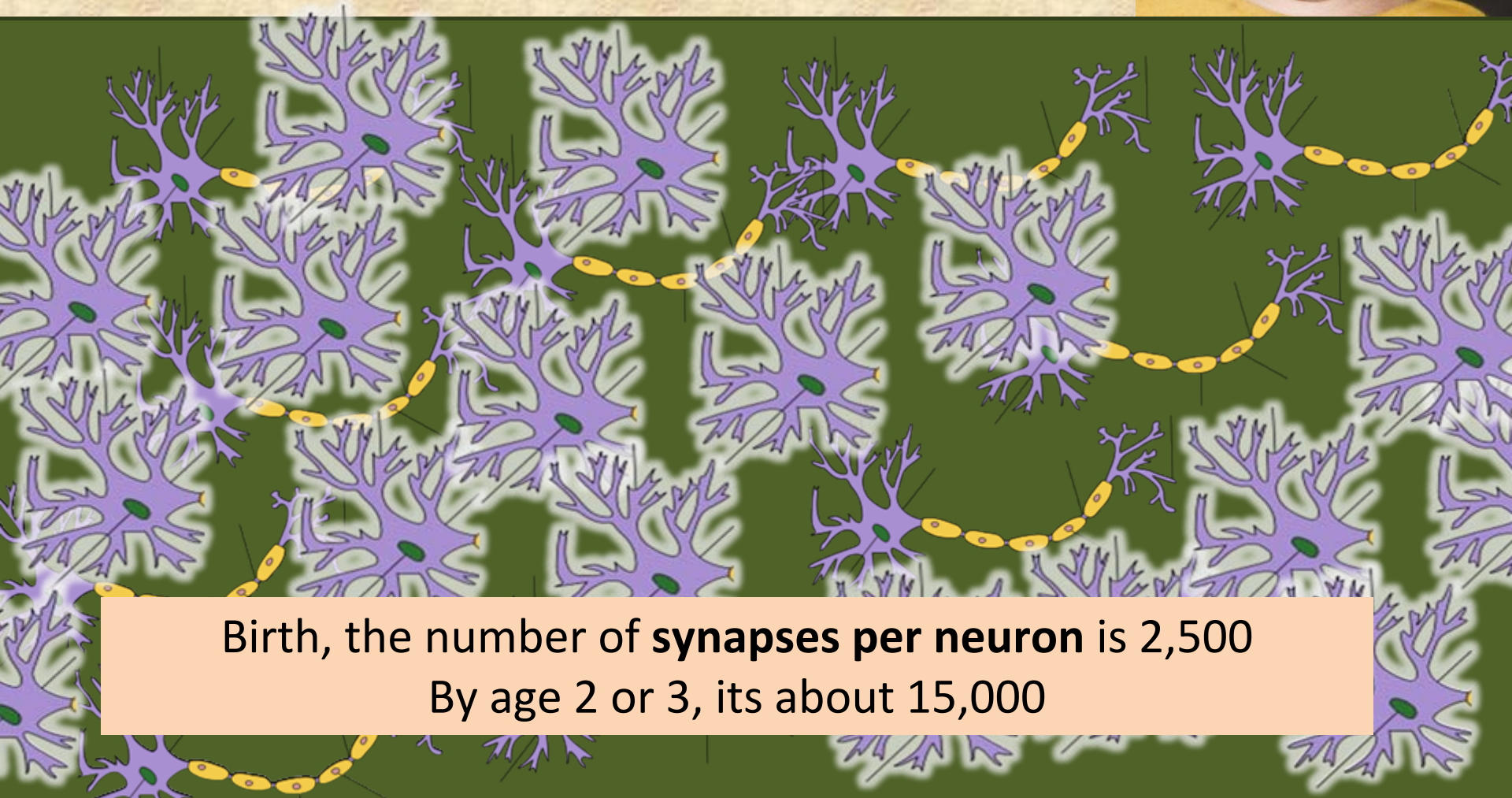
Prenatal Peak



Pruning Neurons

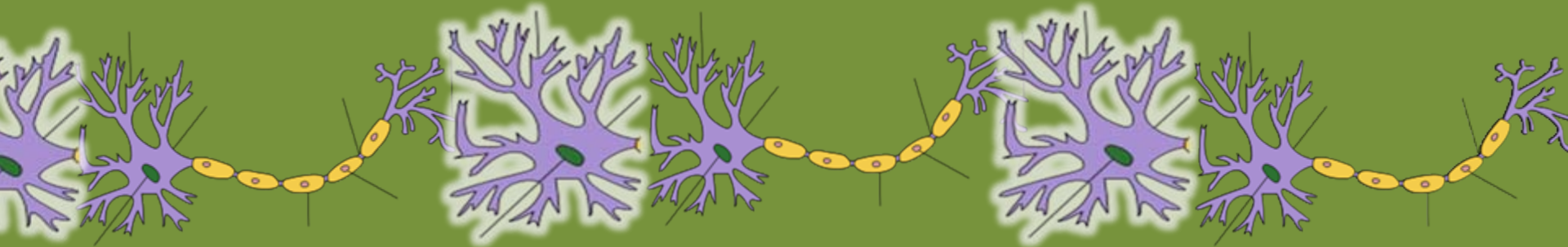


New Branches and **Synapses**

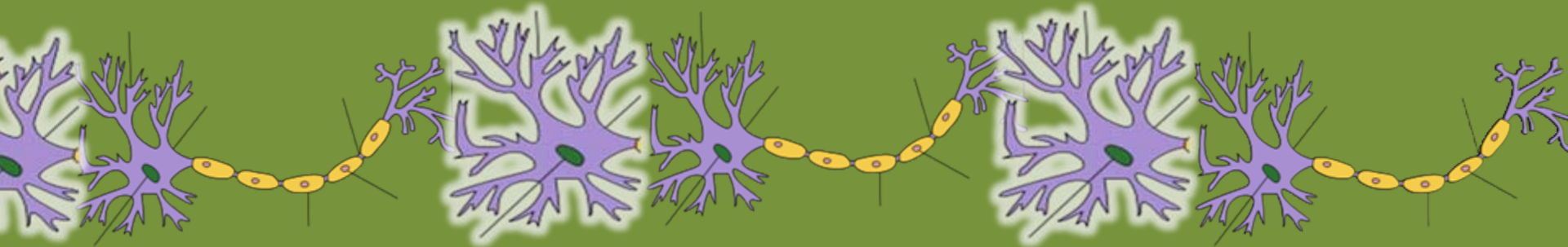


Birth, the number of **synapses per neuron** is 2,500
By age 2 or 3, its about 15,000

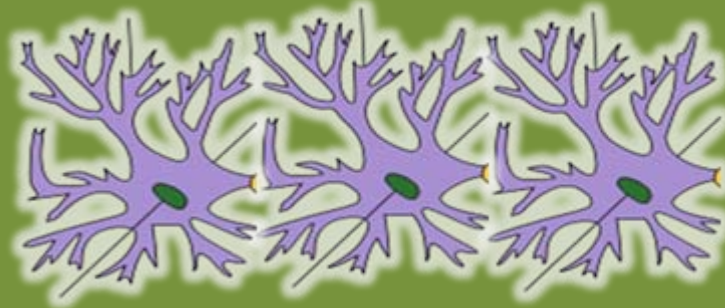
**Are you feeling
a little disappointed that
you have lost
so many neurons?**



Don't be!



The added branches speed up processing



The brain can grow
And make new neurons!

neurogenesis



Stress influences Pruning

**Dangerous/Difficult Place
Constant trauma**

Burns out neurons

**The Brain is resilient.
You can help children develop new
synapses and neurons.**



Poll: True or False

The fact that we lose neurons is always a very bad thing.

- True
- False

Children who are in stressful environments are more likely to experience neuron burn out than children who are in stable, supportive environments.

- True
- False

Physical changes happen in the brain over time and teachers can facilitate these changes.

- True
- False

Why do some children excel and others don't?



Why do some children excel and others don't?

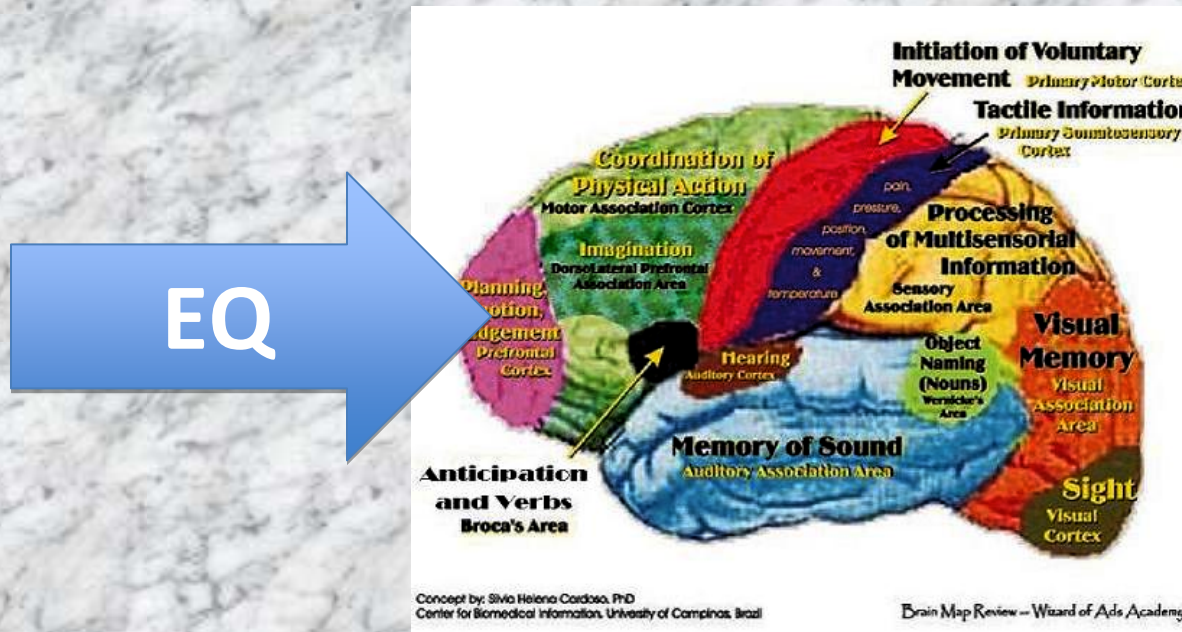
One reason is

E.Q.

Emotional Intelligence



Dr. Daniel Goleman



IQ

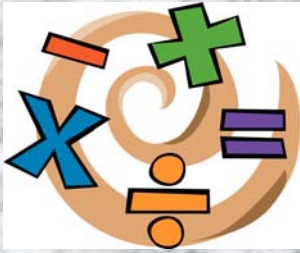
-vs-

EQ

Intelligence Quotient

Emotional Quotient

EQ Can Matter More Than IQ



Dr. Joshua Aronson



Math majors at Stanford University

GROUP 1

**Told study focus:
“Why YOU are so good at math”**

GROUP 2

**Told study focus:
Why Asians are better at math than
other groups**

Stereotype Threat

**produces psychological and physiological responses that
interfere with intellectual performance**

**When white men can't do math
Journal of Experimental Social Psychology, 35, 29-46.**



Structural Cognitive Modifiability



Dr. Reuven Feuerstein

studied immigrant children who had
compromised critical learning periods due to war

found that IQ tests improved after receiving
extra psychological and educational attention

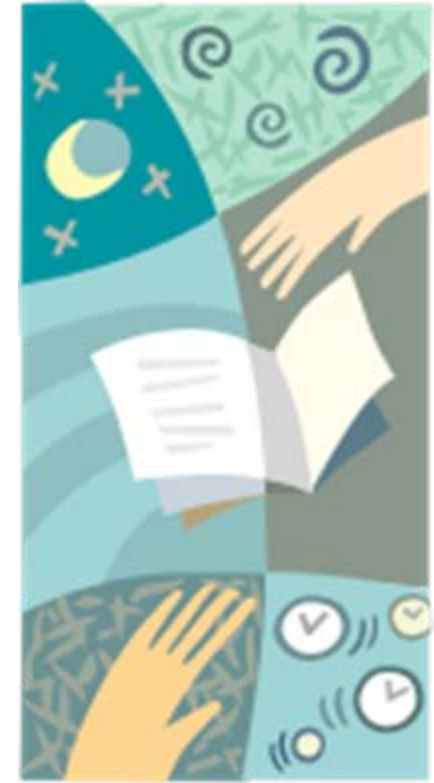
**Since the brain changes (has modifiability)
people can overcome missed learning opportunities**

Why do some children excel and others don't?

Factors that reduce EQ

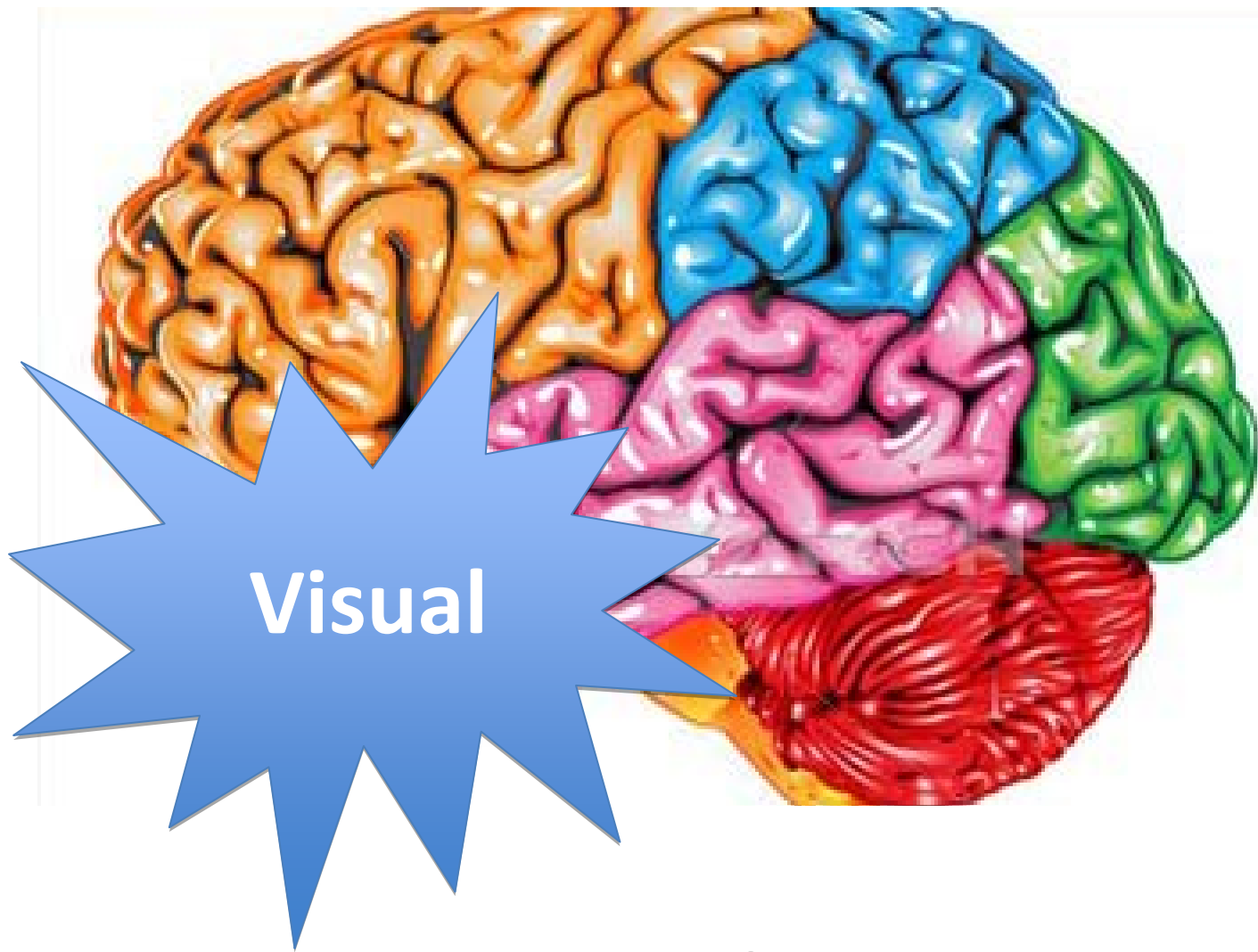
- Stereotypes
- War and stressful environments





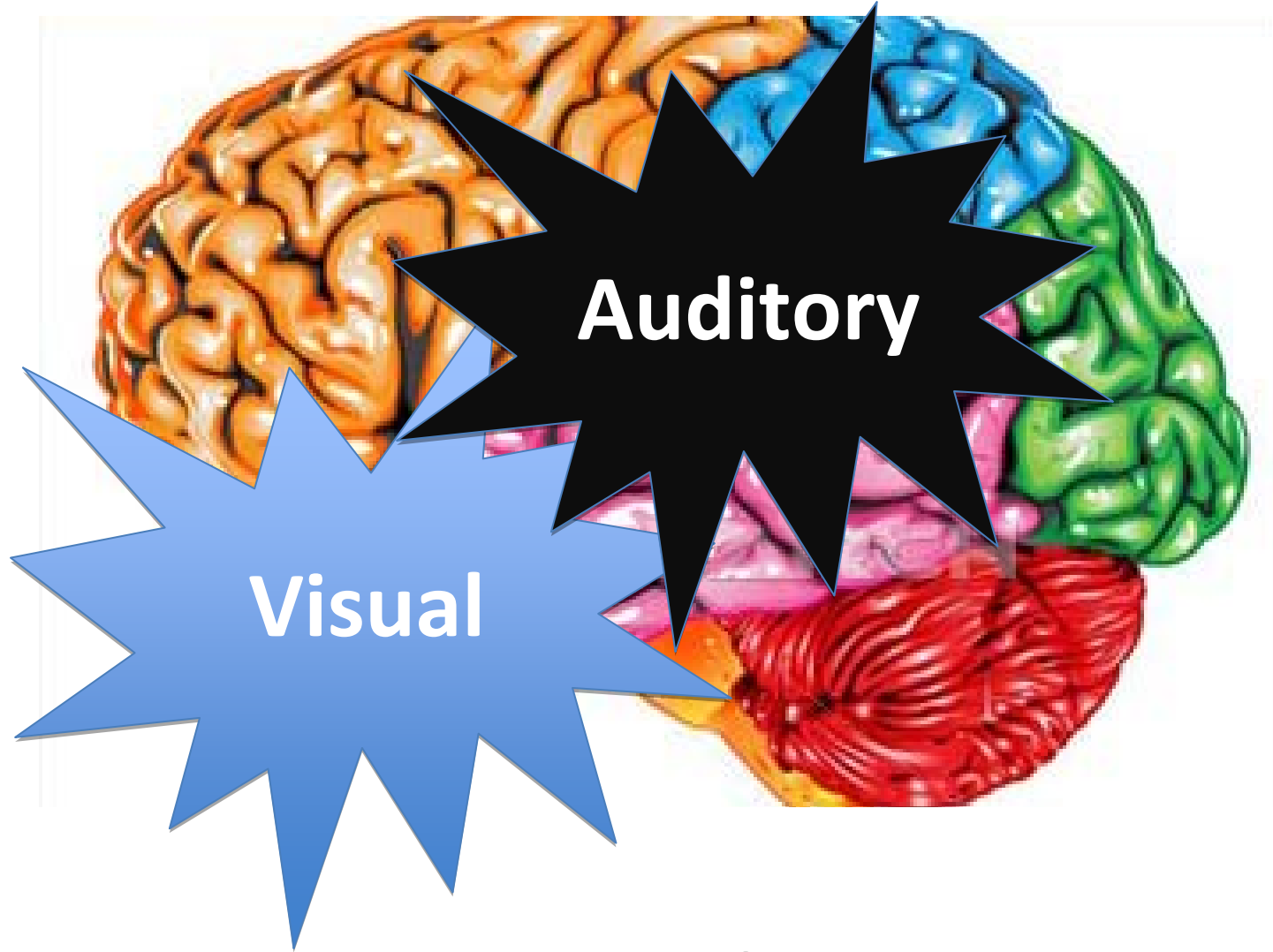
Multi-sensory Instruction

refers to the way information is delivered to students.



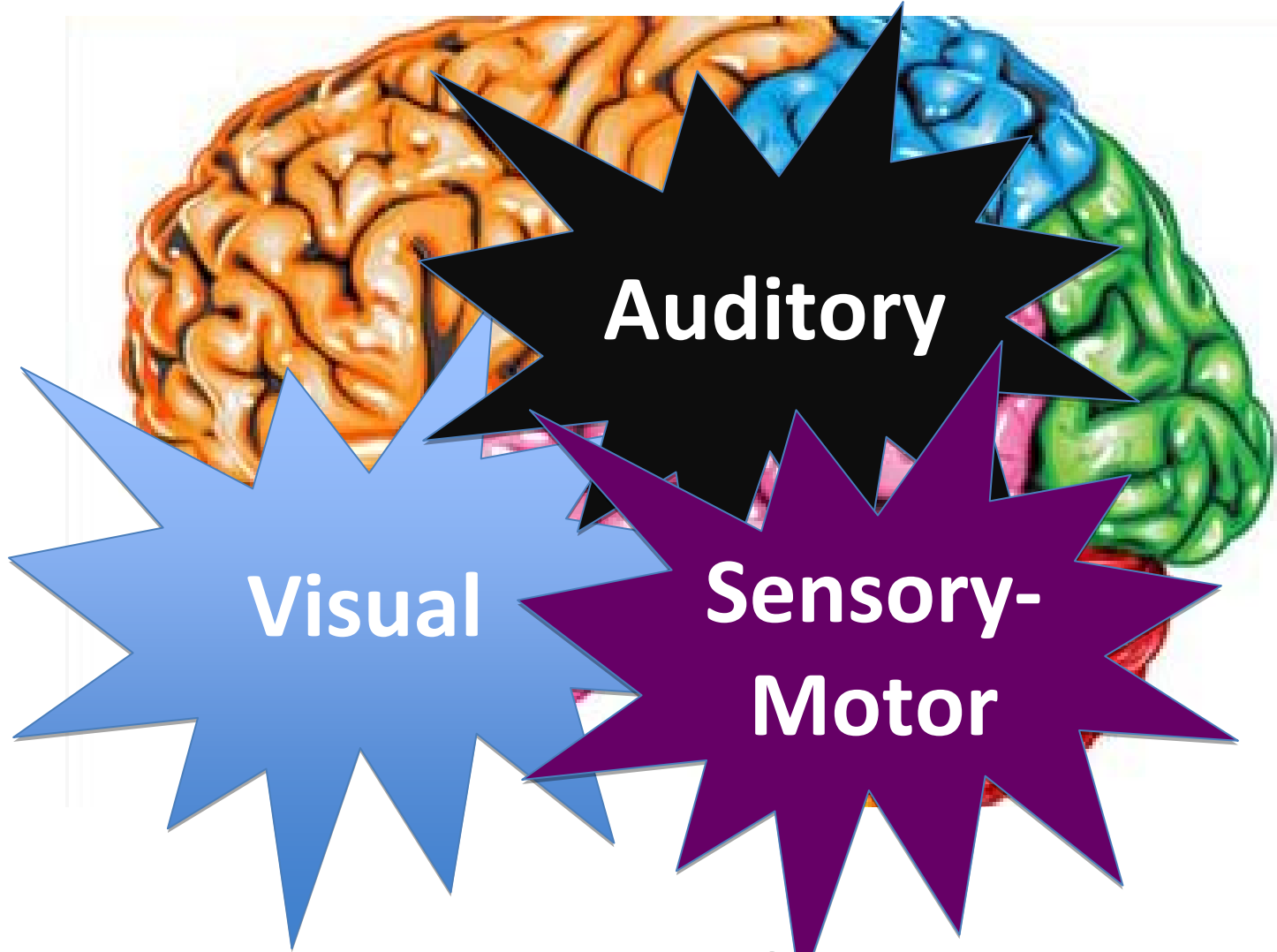
Three Modes of Instruction:

Multi-sensory Instruction



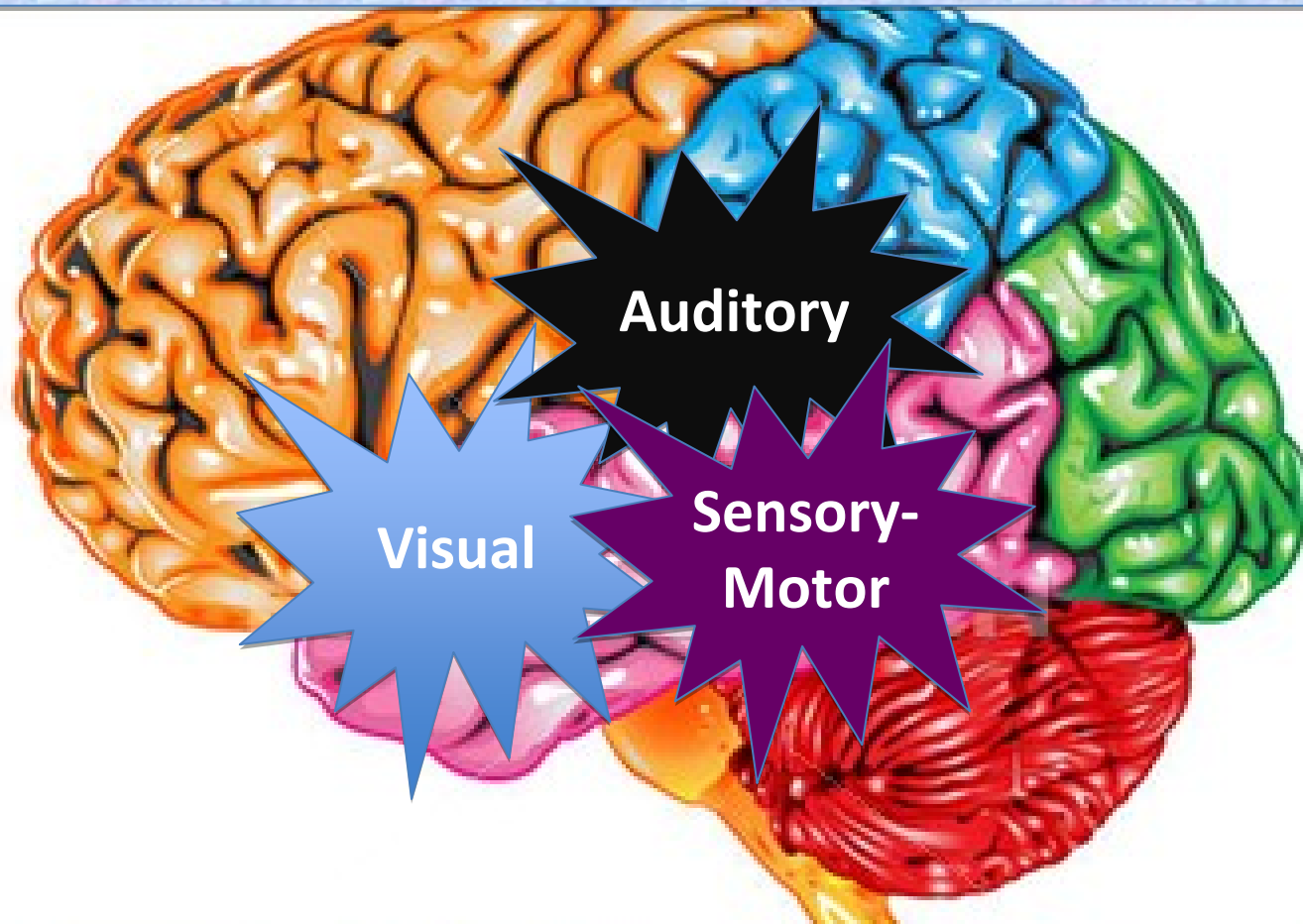
Three Modes of Instruction:

Multi-sensory Instruction

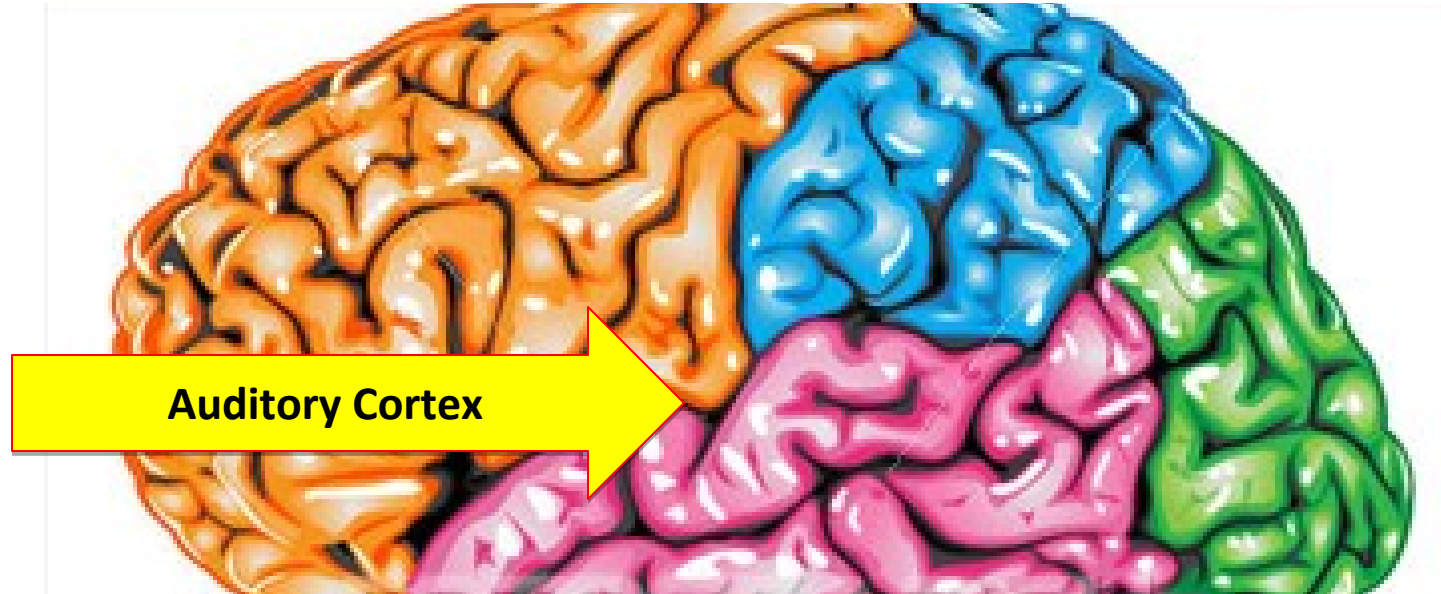


Three Modes of Instruction:

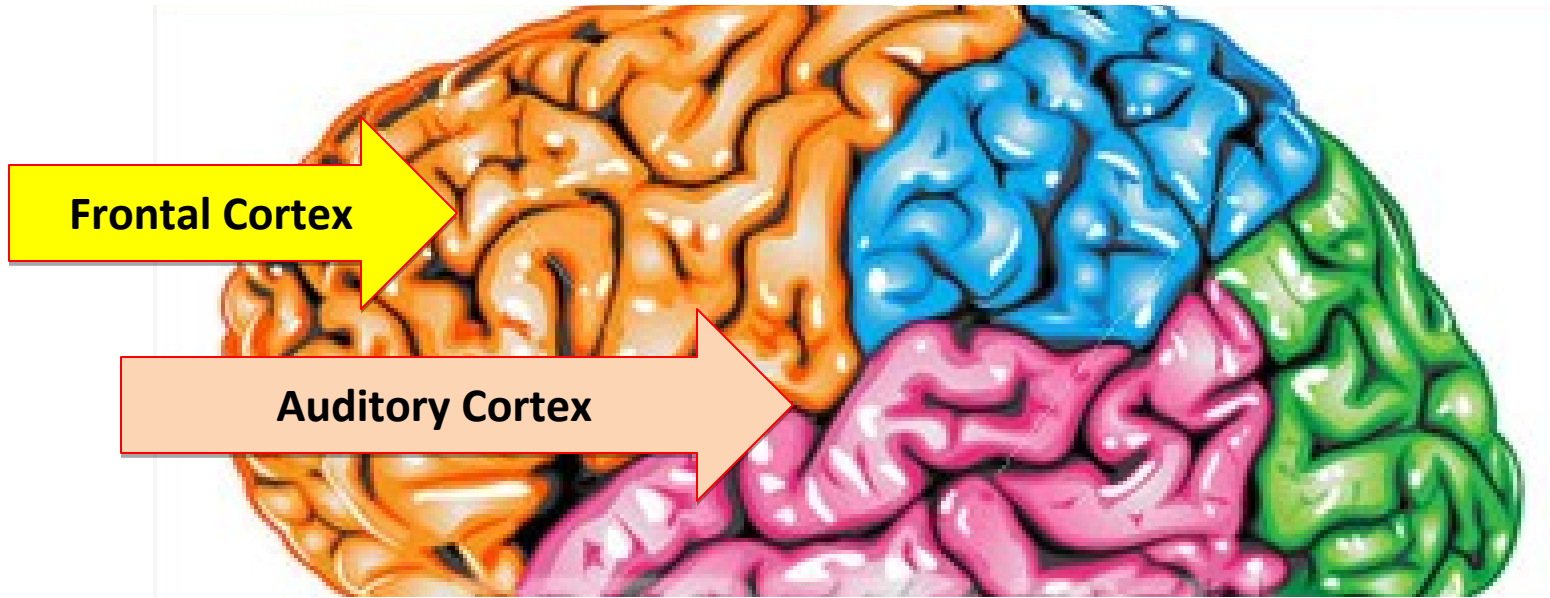
Multi-sensory Instruction



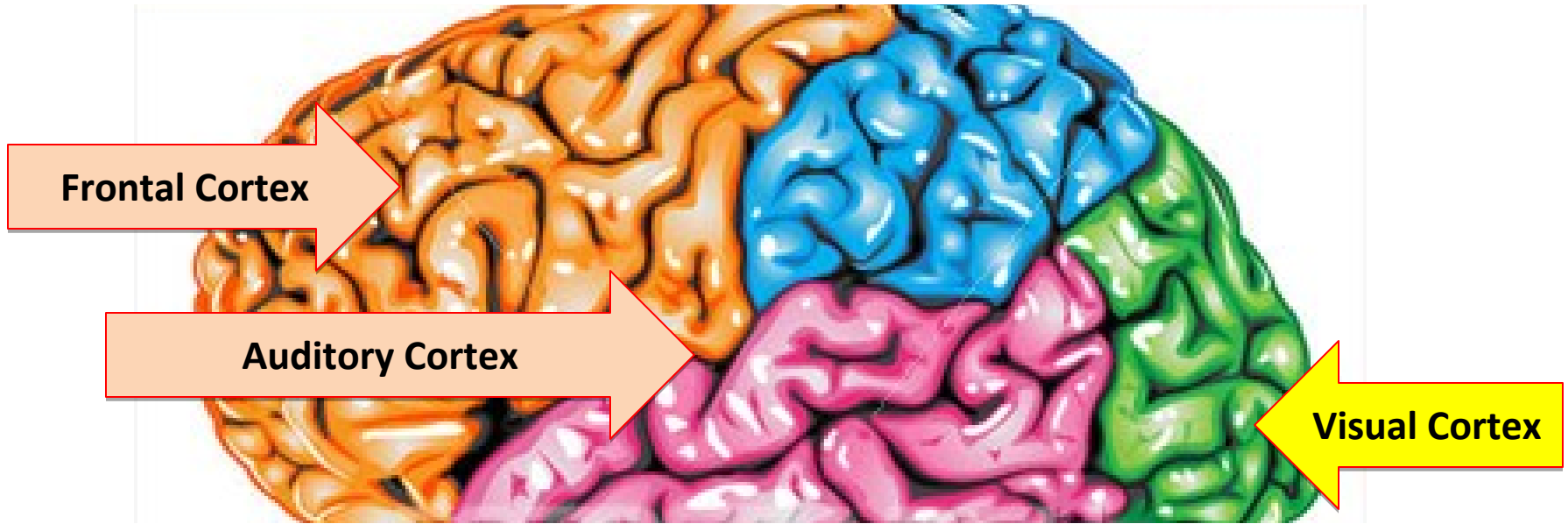
**What does Multi-sensory Learning
Look like in the Brain?**



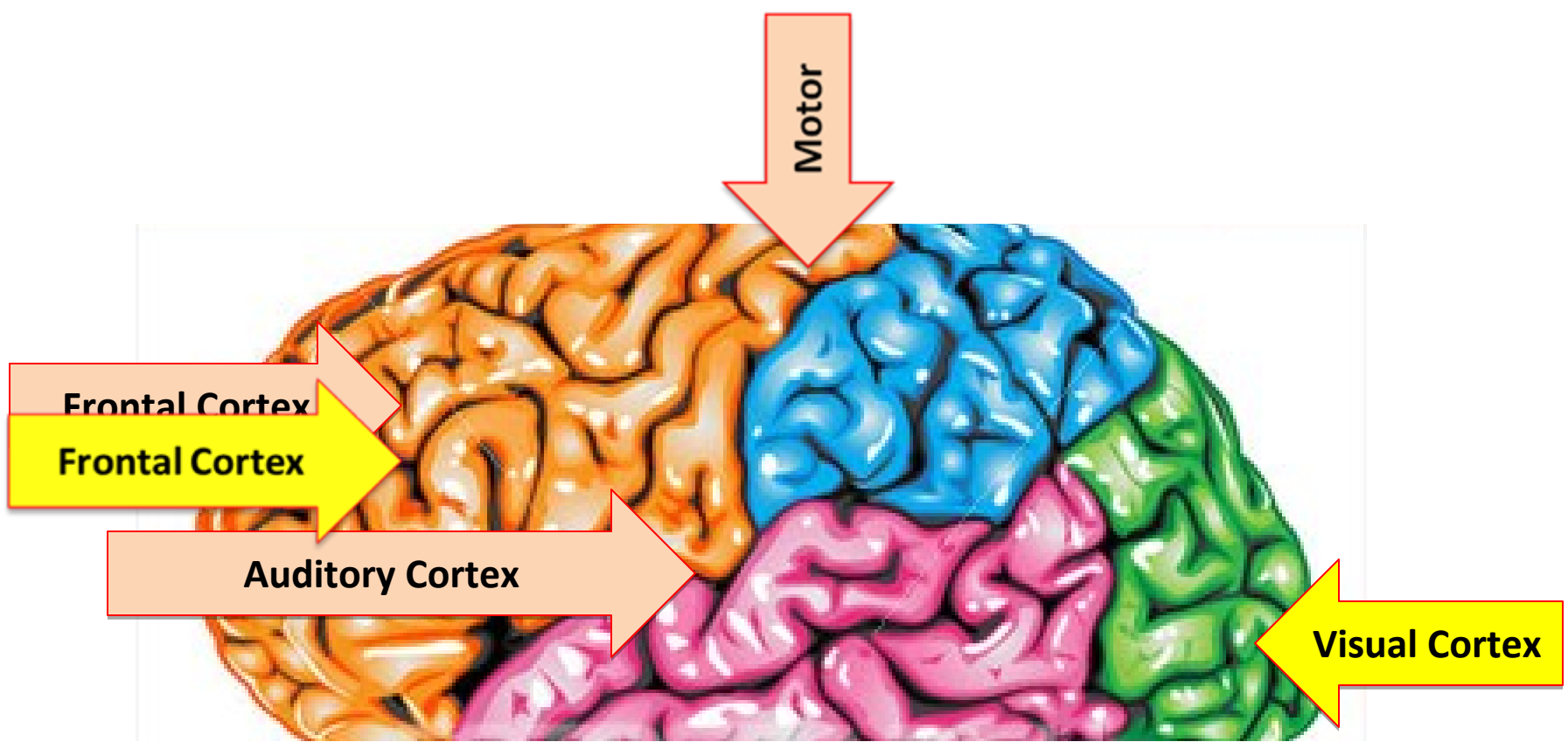
**As you are listening to this webinar
your auditory cortex activates**



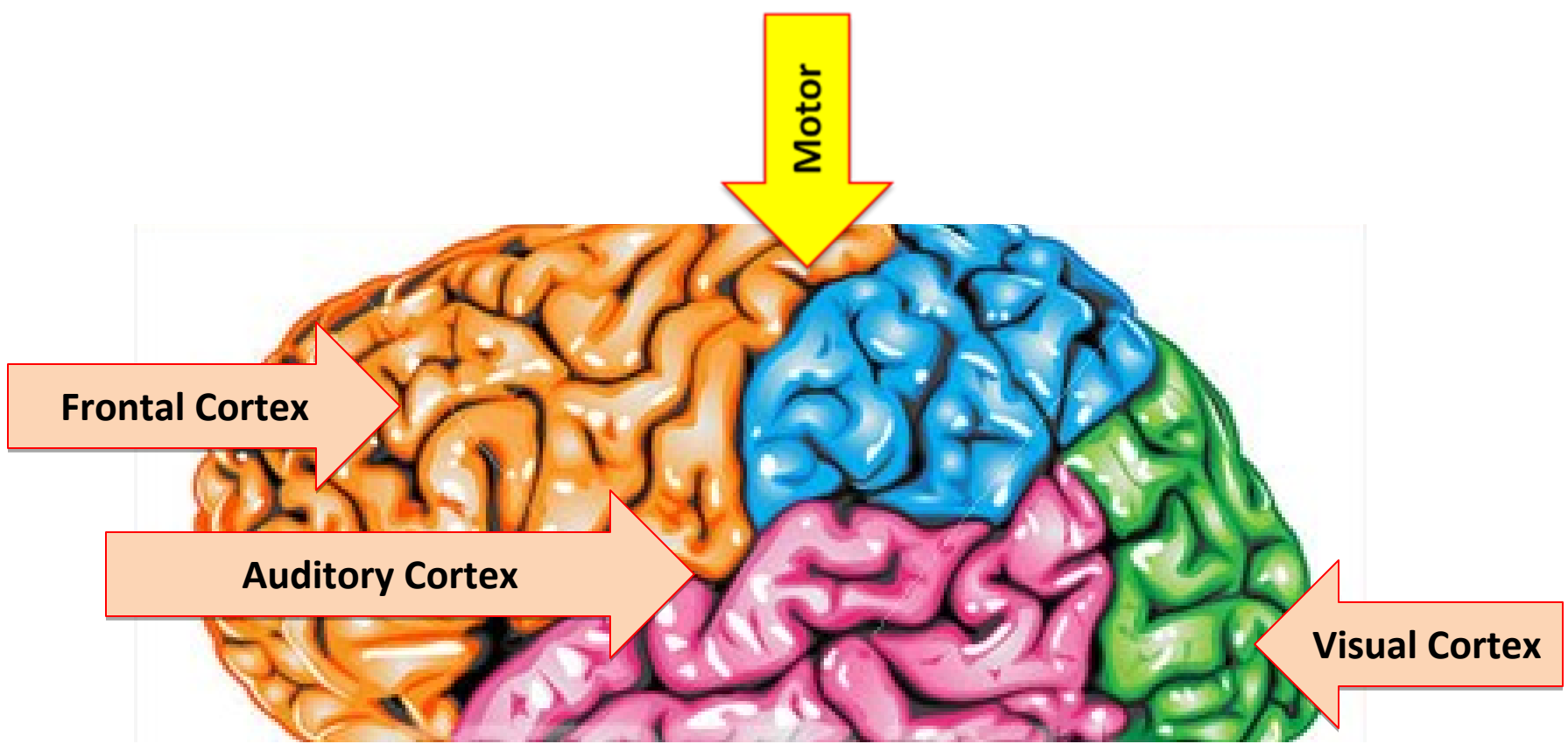
**As you process incoming information
compare it to what you already know
many areas throughout your frontal cortex are activated**



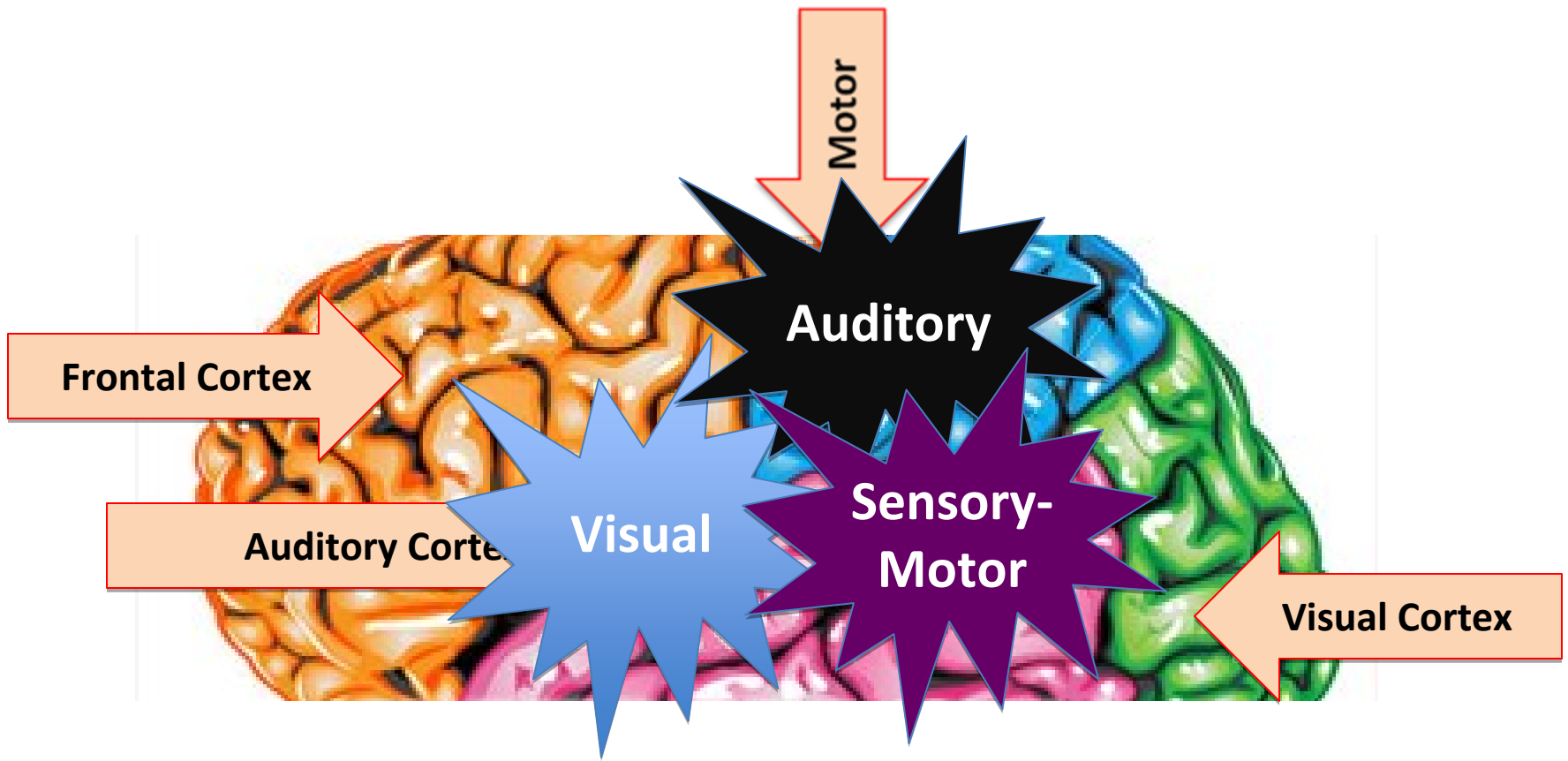
**As you attend to the
Your visual cortex is activated**



**As you recalled ideas
the frontal cortex,
where your executive functions
and higher thinking happen,
are activated**



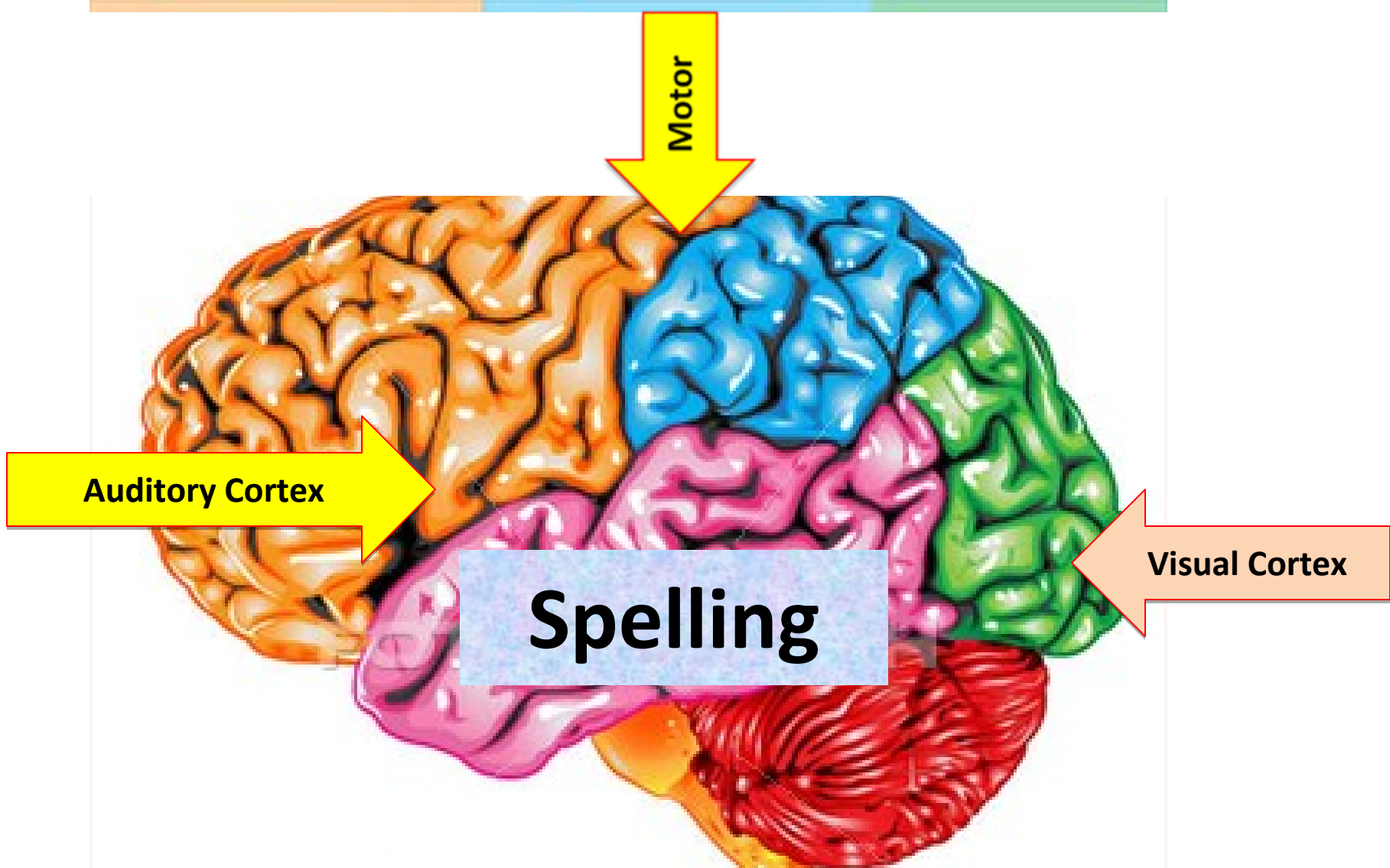
**As type into the poll
Your motor cortex is activated**



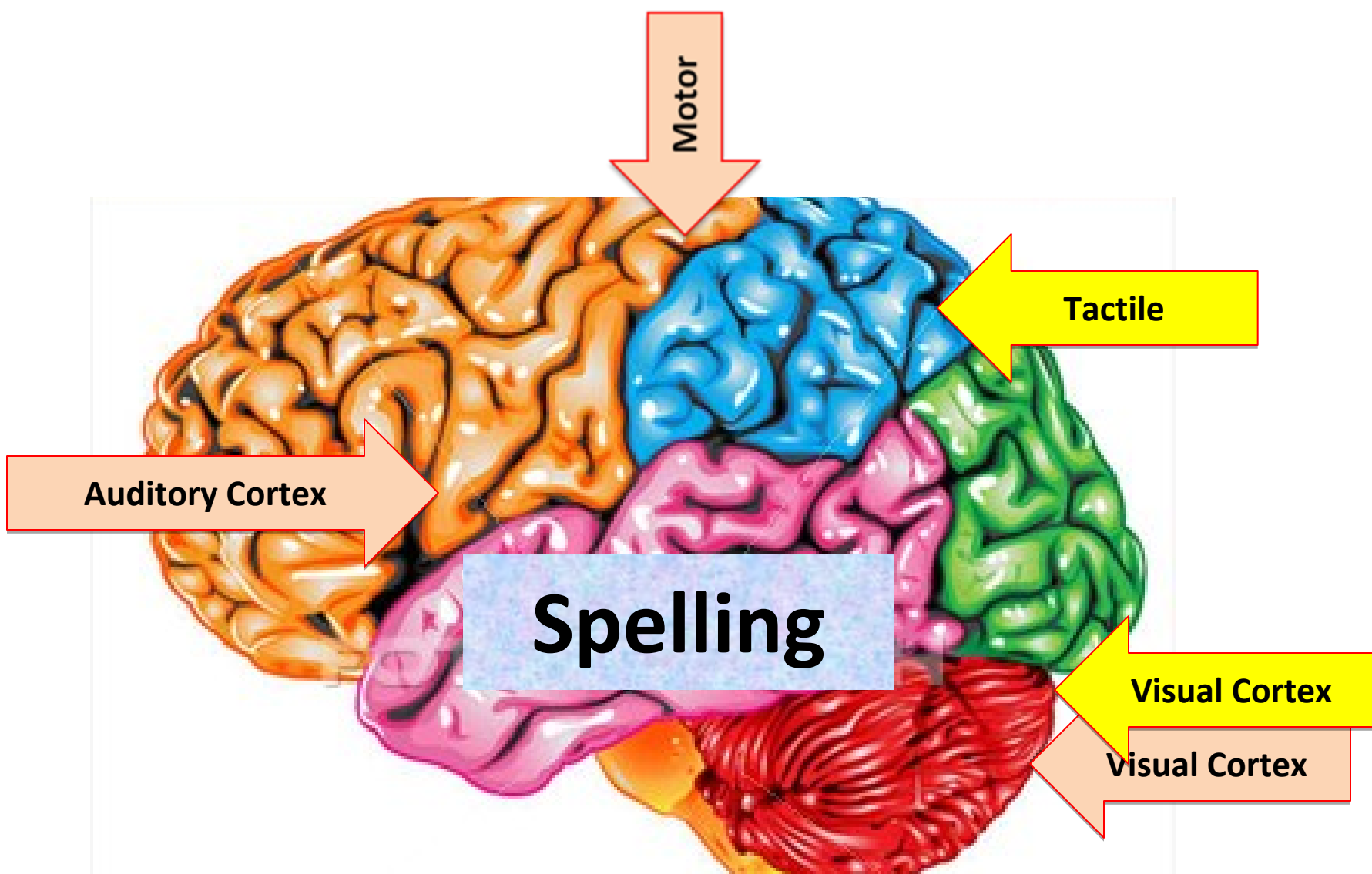
Our chances of successfully retrieving information are influenced by the number of pathways we create to find it.



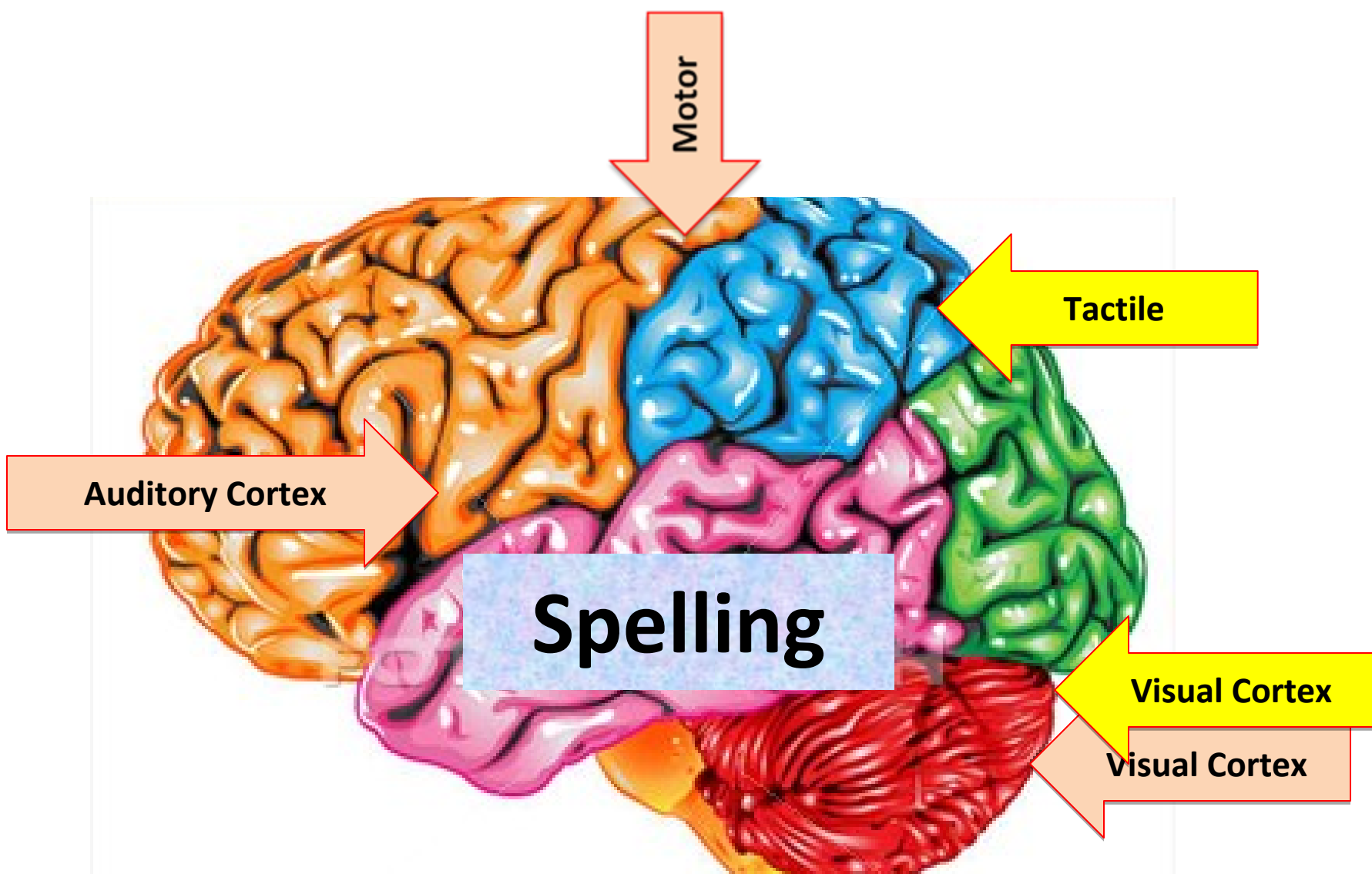
Look



Spelling ... say the word aloud



Writing... say the word aloud



Teachers who fully understand the impact of multisensory instruction on the brain are more likely to use multi-sensory instruction in their classroom.

Poll

Experiencing bias or living in a highly stressful setting can reduce one's emotional intelligence (EQ) and negatively impact academic performance.

- True**
- False**

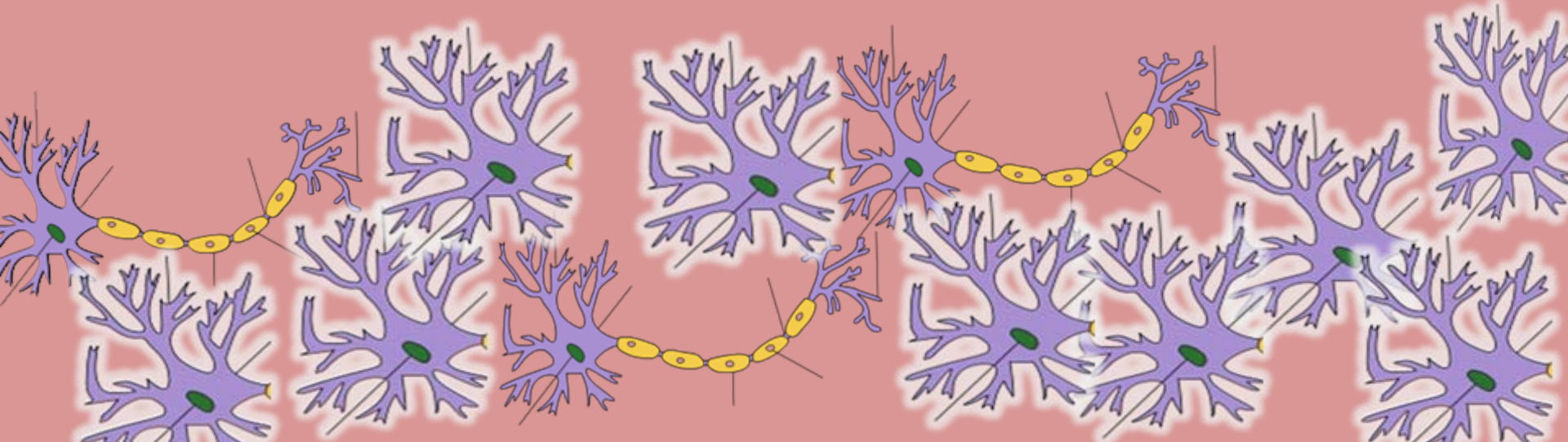
The frontal cortex is essential for multisensory education.

- True**
- False**

When?

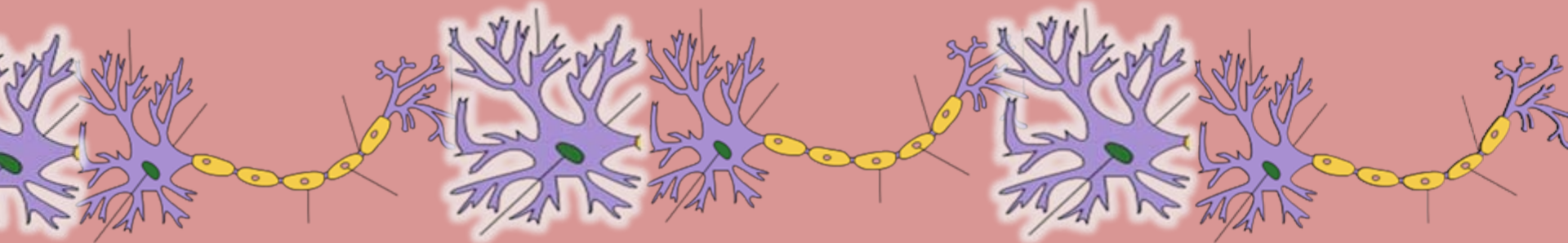
(Frank & Styker, 2001)

- Research showed a tremendous amount of branching and subsequent learning took place during sleep
- Especially non-REM sleep (non-dreaming cycle)



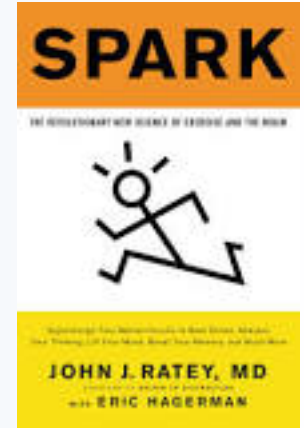
Implications for Teaching

Students **MUST** get sufficient sleep following the learning of new information if we want that information stored in a long-term memory.



Remember to learn something new today. . . then sleep on it!

John Ratey Harvard Medical School Spark



- Exercise optimizes brain function
- Promotes the growth of brand new brain cell
- Chemicals in the brain changed that encourage development of new neurons and synapses

What is a good school-based exercise program?

- Finland
- Hour long class, 15 minutes of exercise

Ideal Program?

- Get everybody moving.
- No large games, Rather play 2 on 2 and play 3 on 3
 - Less waiting for turn.
 - Less choosing sides

Three Educational Practices That Work!

1. Curriculum should develop children's cognitive, emotional and social intelligences

The brain is impacted by emotions.

- For complex learning to occur, the classroom has to be a **low threat and high challenge environment** (Caine & Caine, 1997).

2. Brain development and learning is support by good nutrition, physical activity and sleep.

- Encourage gym and recess**
- Give appropriate amounts of homework**
- Encourage good eating habits**



3. Encourage students to use all senses to create multiple pathways in the brain.

- Help students develop and practice creating pathways while you're teaching the curriculum.**
- Using maps, timelines, and other spatial representations to help students visualize new content, understand relationships, and solve problems.**

Poll

In the comment area, share the idea (s) you are most likely to implement or that you feel are most valuable to you.