

“Ask Dr Judy” Webinar Long-term Memory

*How can students remember
next year what they learn this
year?*

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HI, I'M FROM TECH SUPPORT... I WAS TOLD YOU'RE HAVING TROUBLE WITH MEMORY INSTALLATION...



Off the Mark
by Mark Parisi

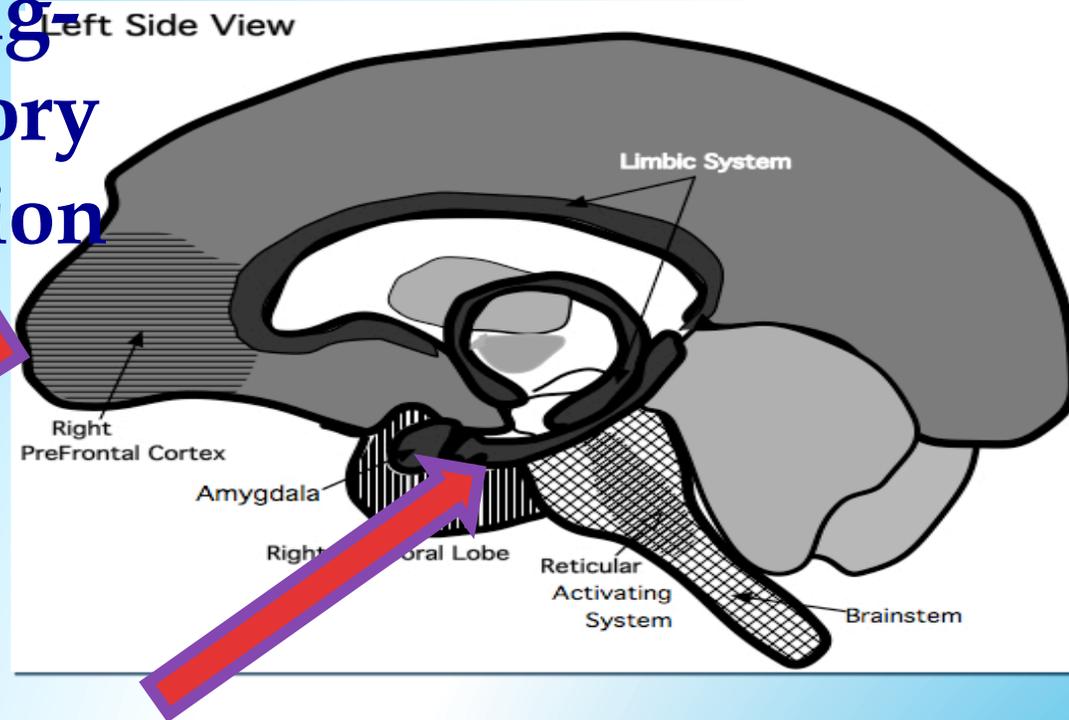
Participant Poll

Which part of the brain is most active in consolidating working memory into long-term memory?

1. Thalamus
2. Hypothalamus
3. Amygdala
4. Prefrontal cortex

Long-term Memory

Prefrontal Cortex: long-term memory consolidation



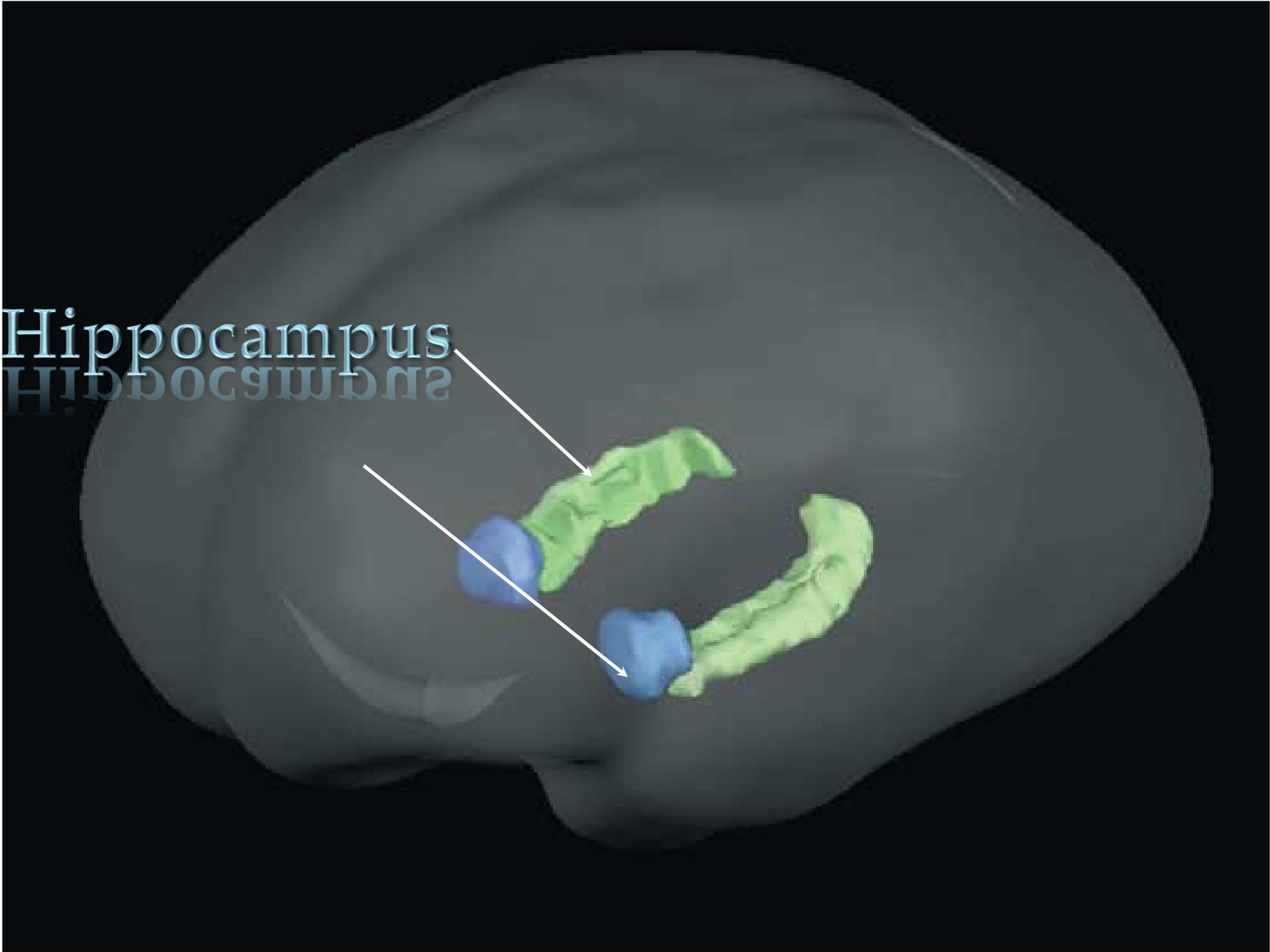
Hippocampus: encodes working memory

Review: Working Memory Construction



□

Hippocampus
Hippocampus



Pattern Matching For Working Memory



The brain interprets new information based on existing patterns.

If there is no pattern waiting...



new input is
misinterpreted,
rejected, or



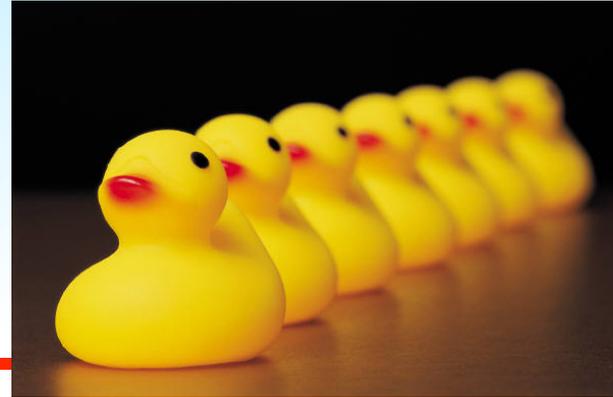
▫ disappears

When there is a successful
pattern match...



The new sensory input
is encoded into a
working memory

Patterning Recognition



Prior knowledge activation sends related memories (with similar patterns) to the hippocampus to meet the new input

Activate Prior Knowledge Bridges

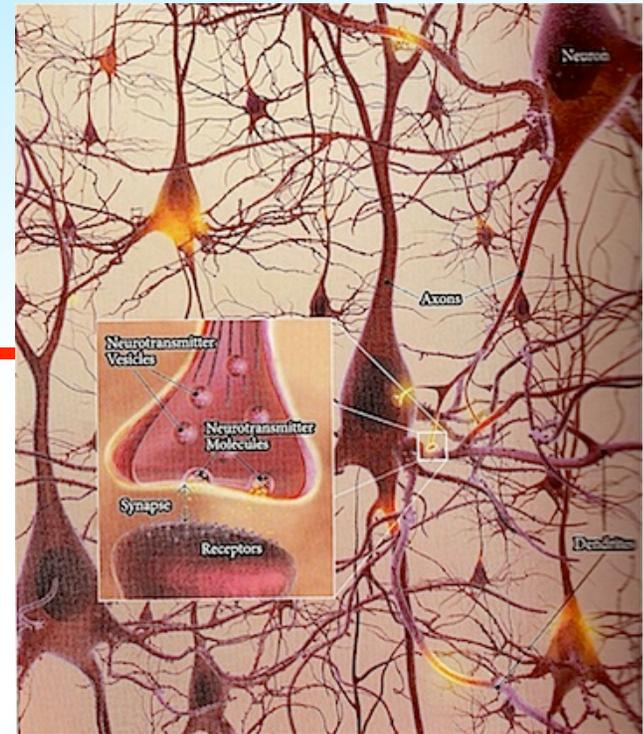


- * Bulletin boards that preview
- * Predict/KWL
- * Pre-unit assessments
- * Videos or images that remind students of prior knowledge
- * Cross-curricular and spiraled curriculum

Working Memory

Holds data
in mind

temporarily while the
brain manipulates it



Working memory (short-term memory)

Unless something is done with
new relational memory, it is lost
in less than a minute





What is 11×15 ?
(with mental math)

What is
 137×624 ?



Too much for
working memory

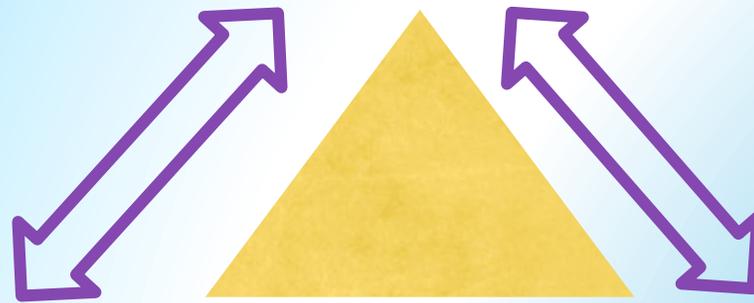
Prefrontal Cortex Directs



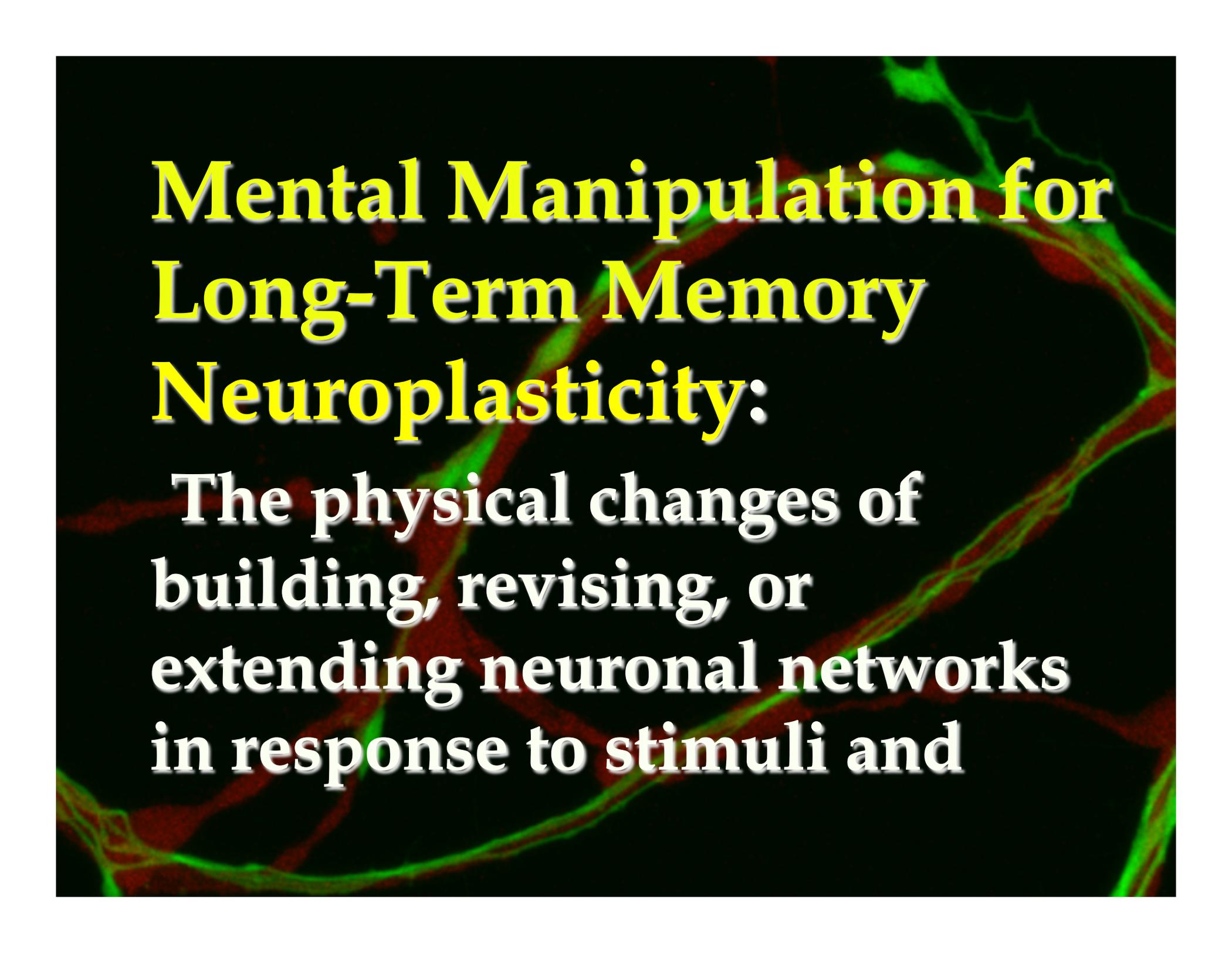
Emotional management



**Long-term
memory**



Executive function

A microscopic image of neurons, likely from a rodent brain, showing a complex network of cells. The neurons are stained with green and red dyes, highlighting their intricate branching structures and connections. The background is dark, making the brightly colored neurons stand out.

Mental Manipulation for Long-Term Memory Neuroplasticity:

**The physical changes of
building, revising, or
extending neuronal networks
in response to stimuli and**

Prefrontal cortex



Axon with myelin



Dendrite



Neuron



Synapse

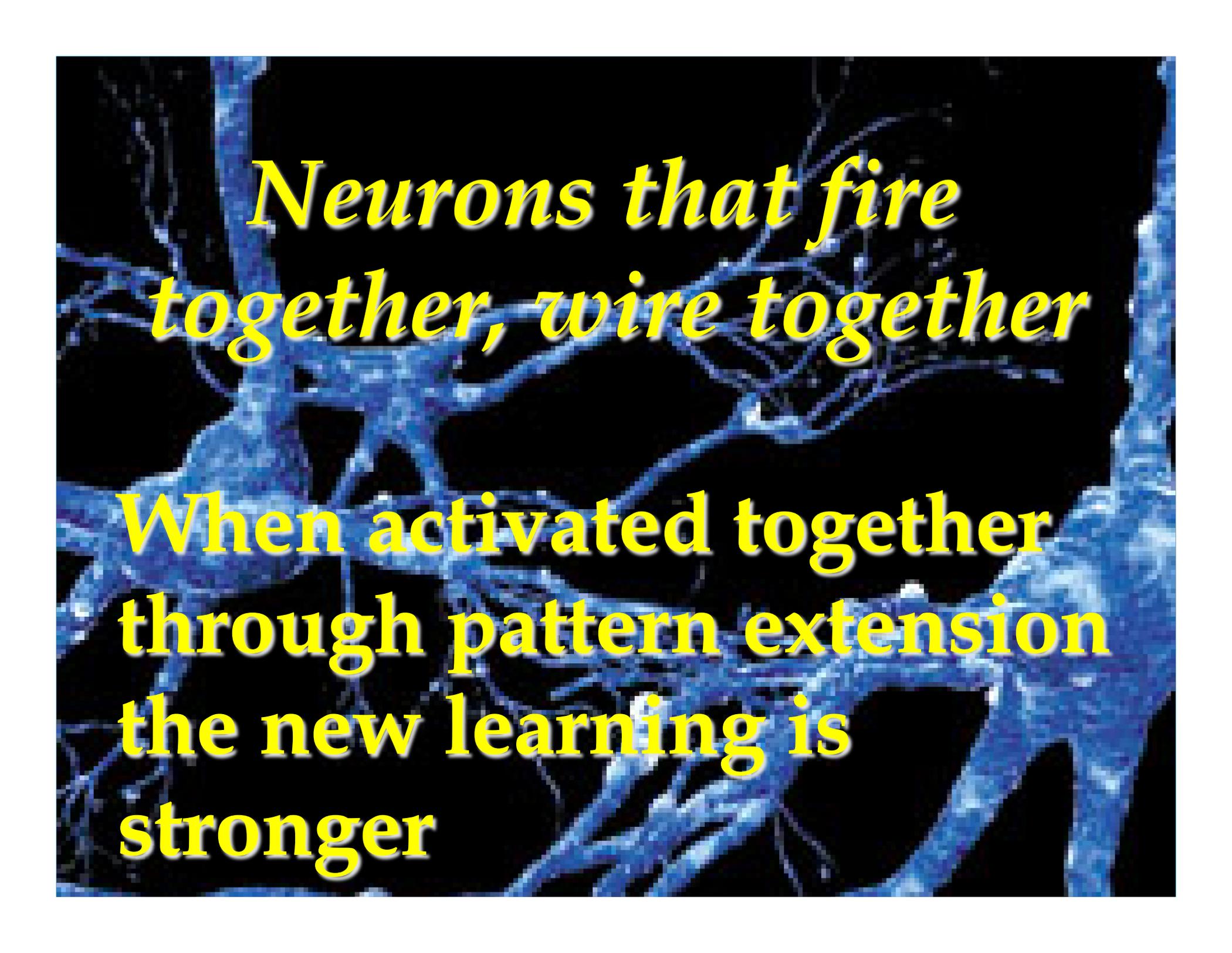


Neuroplasticity

Thicker myelin

More dendrites

More synapses

A network of glowing blue neurons on a black background. The neurons are interconnected by thin, branching lines, creating a complex web of connections. The text is overlaid on this network.

*Neurons that fire
together, wire together*

**When activated together
through pattern extension
the new learning is
stronger**

Experience Your Neurons that are Wired Together

1. While sitting, lift your right foot off the floor and make clockwise circles
2. While doing this, draw the number '6' in the air with your right hand

Participant Poll



What happened to your right foot?

1. It changed direction
2. It slowed down
3. It stopped rotating

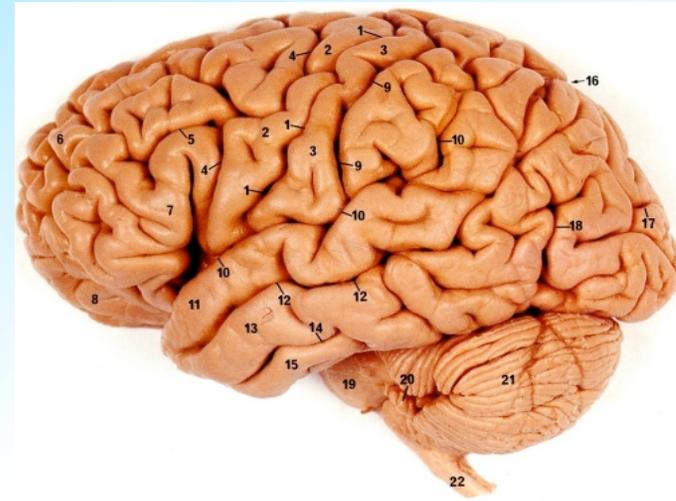
Pruning

Unused neurons
circuits are
eliminated



Use it or loose it

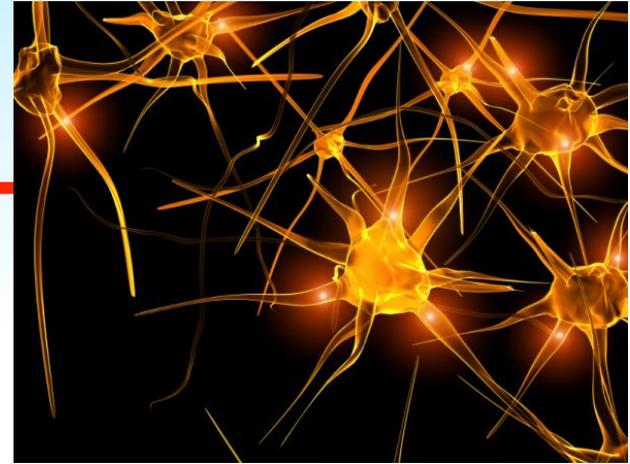
Why Prune?



- ▣ An adult brain weighs about 3 pounds
- ▣ Consumes 20% of the body's energy
- ▣ Brain trims itself to be efficient

Long-term Memories are Not Created Equal

Short-term memory can
become long-term memory by
repetitive practice



Even greater memory strength,
permanence, & retrieval with linking
new memory into existing networks

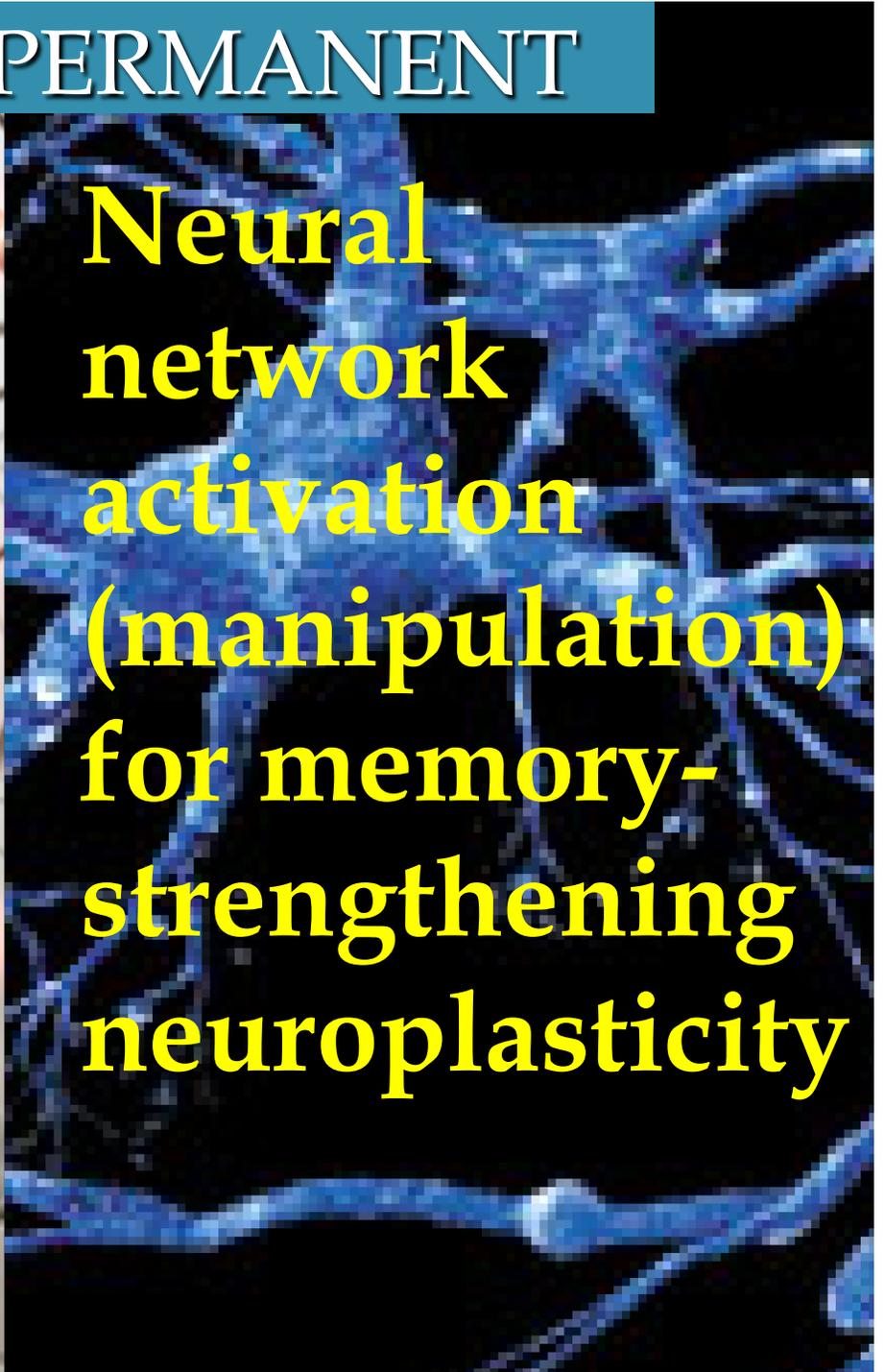
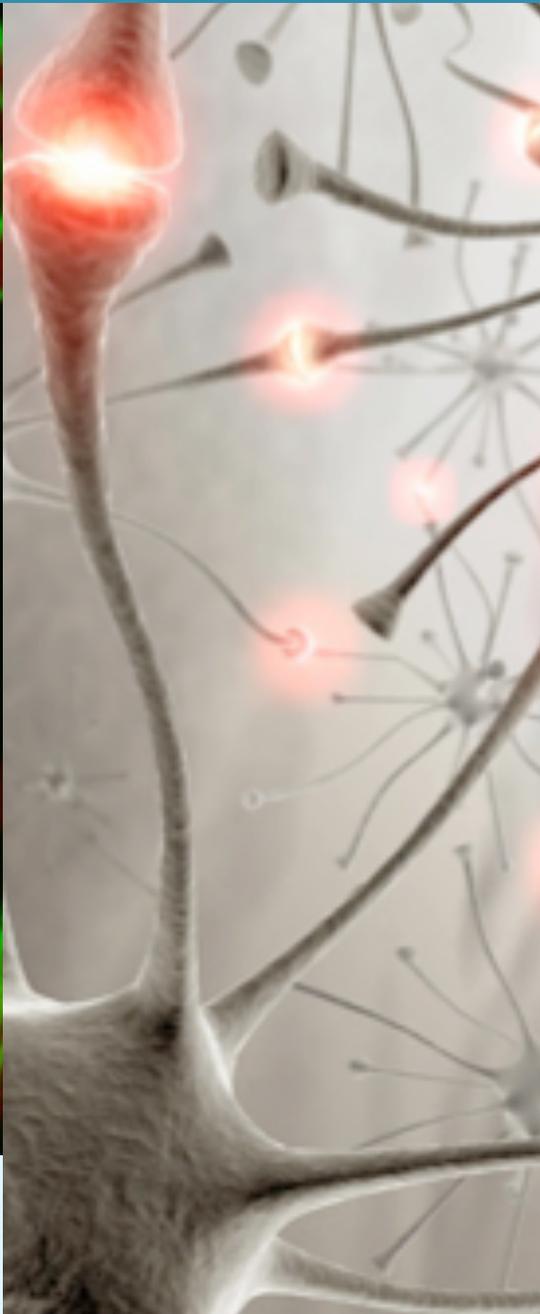
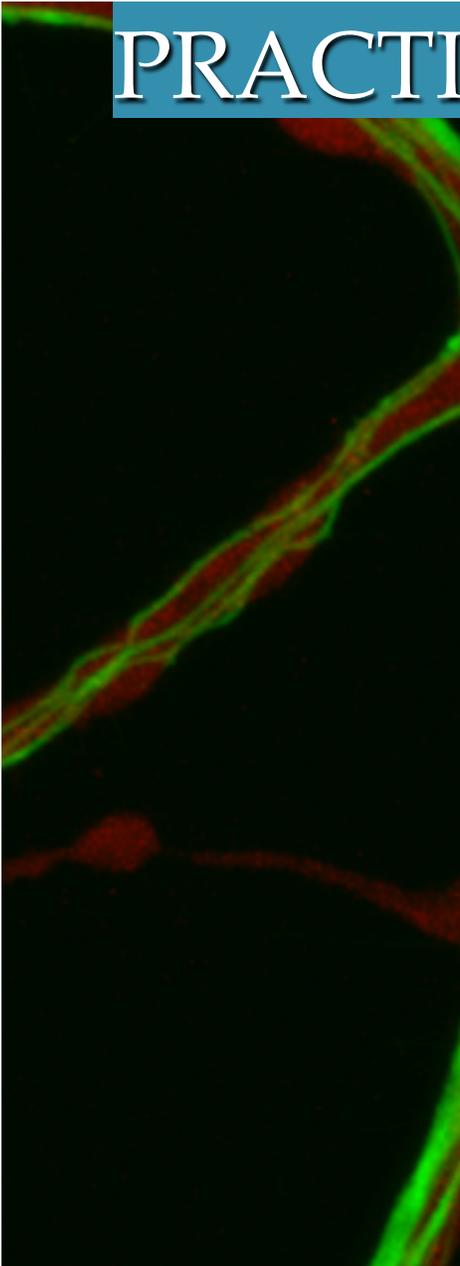
* Mental manipulation with pattern
extension-relationships)

*Multisensory practice

* Transfer

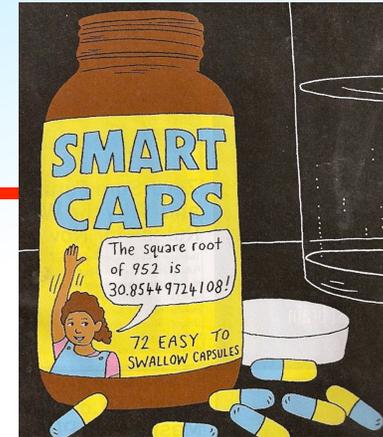
PRACTICE MAKES PERMANENT

**Neural
network
activation
(manipulation)
for memory-
strengthening
neuroplasticity**

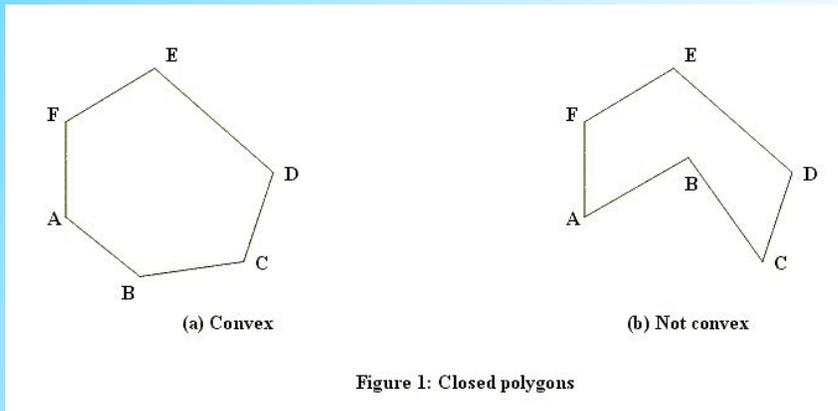


First 24-hours

1. Narratives & videos
2. Teach someone
3. Relationships for patterns extensions
(*categories, graphic organizers, analogies, similarities/differences*)
4. Summarize
5. Symbolize: Personalized & humorous mental manipulations add emotional memory



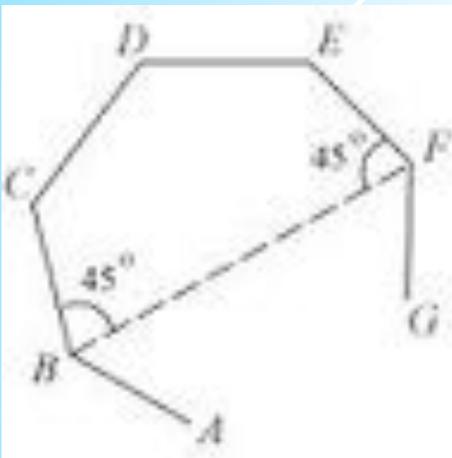
Closed Polygon



Connected line segments
with all sides closed

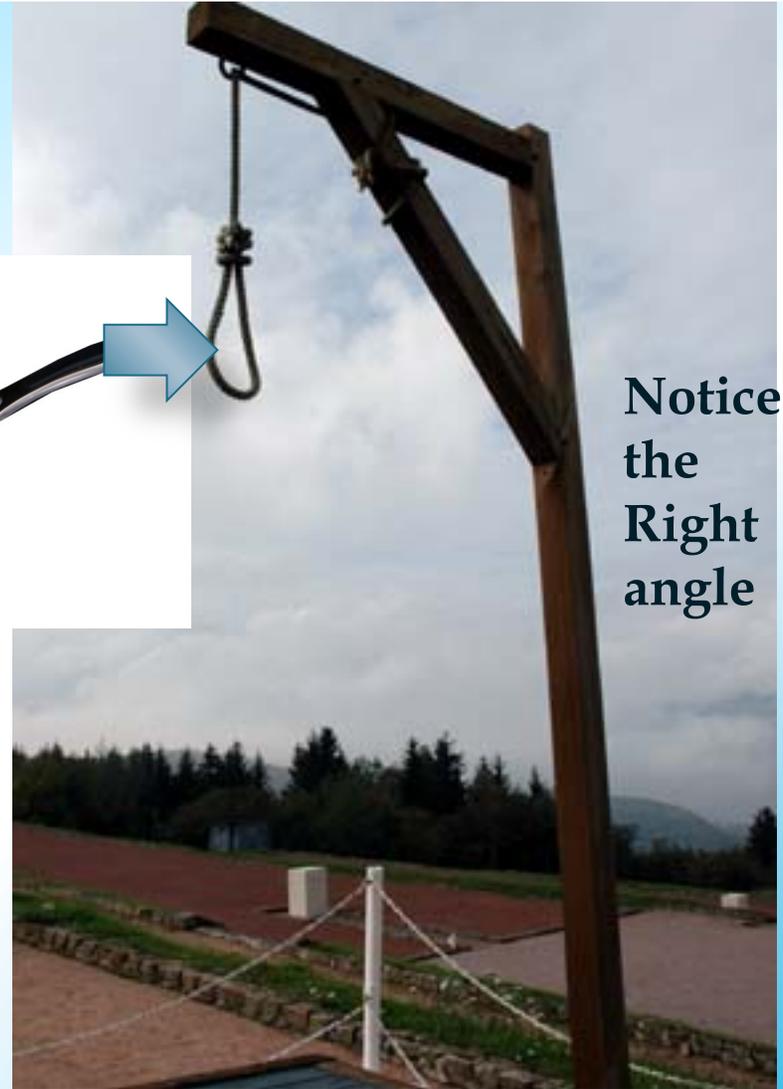


Open Poly-gon



POLLY IS GONE

High pot
in
noose



Notice
the
Right
angle

hypotenuse

PERSONALIZED SUMMARIZING



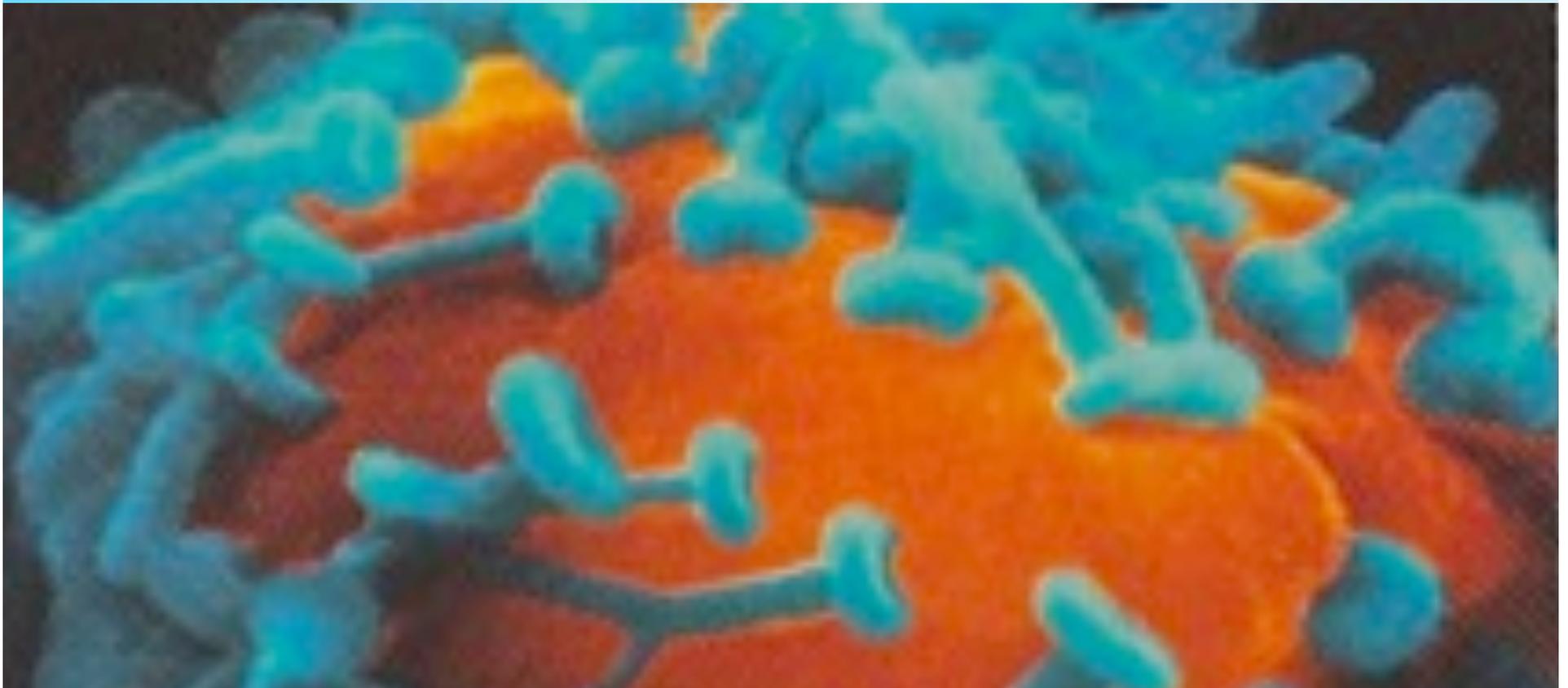
Students summarize
new learning with
cardboard
“phones”, text
messages, blogs,
or tweet format



twitter



Dend-*Writes*
**Mental Manipulation,
Personalization, &
Relationship for Memory**



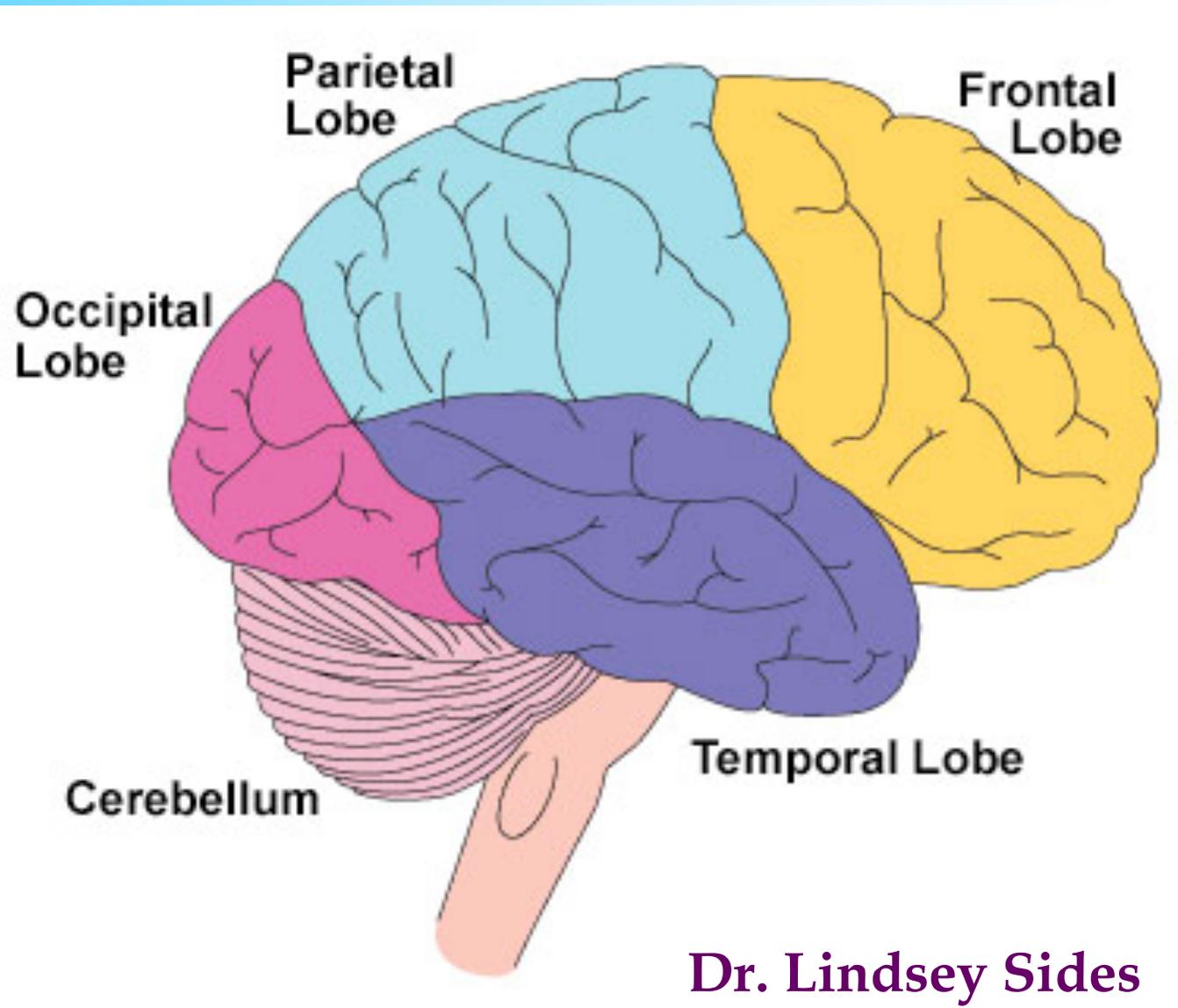
Dend-Write Prompts

- ▣ What did you learn that reminded you of something you already know? Create an analogy. (relationship)
- ▣ How does something you learned relate to your life or goals. (personalization)
- ▣ Something that made you wonder or surprised you; a new insight or discovery. (emotional)
- ▣ The “So What?” – What parts of the new learning do *you* think were especially important things and why? (relevance)

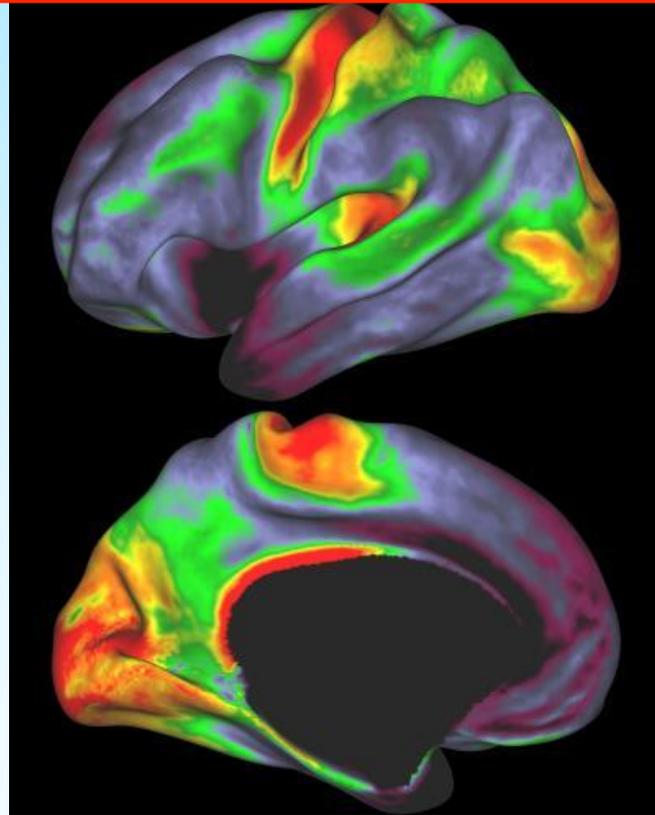
MULTISENSORY Learning



Multiple Storage Centers



Neuronal circuits of related information stored in different sensory contexts remain connected



M. F. Glasser, D. C. Van Essen. **Mapping Human Cortical Areas In Vivo Based on Myelin Content as Revealed by T1- and T2-Weighted MRI.**
Journal of Neuroscience, 2011; 31 (32): 2180-2188.

Conceptual Long-term Memory

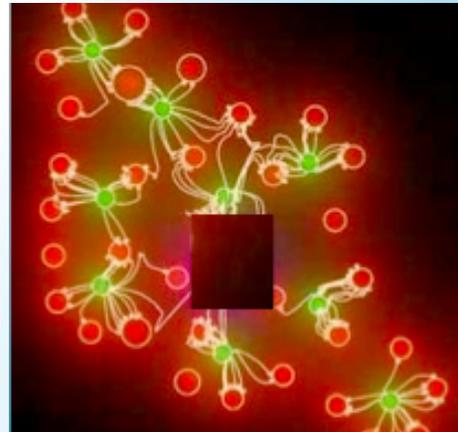


TRANSFER for Concept Memory Construction

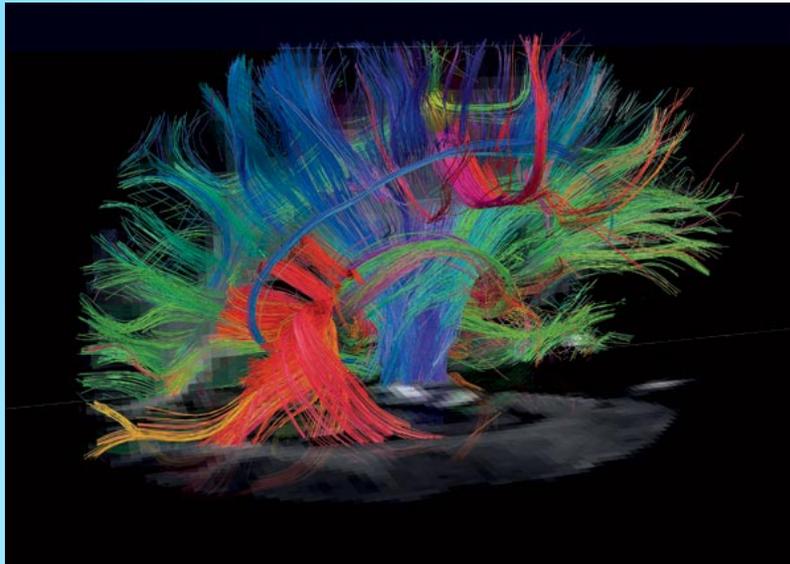
Apply learning to new contexts &
problems

“Mental Velcro” links new information
to existing neural networks

Isolated “factlettes”
incorporate into larger
networks



Extended Connections

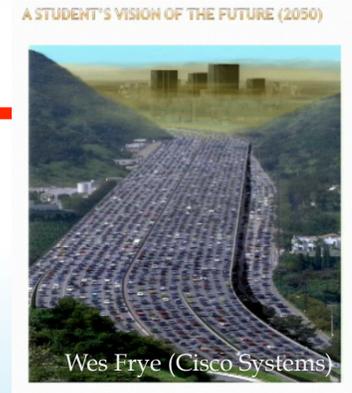


**New information
incorporated into larger
networks**

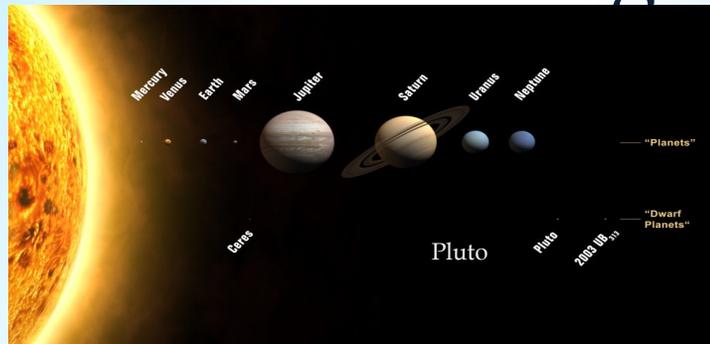
- Faster retrieval
- New learning durable against pruning
- Knowledge available for new future applications

CONCEPT NETWORKS PREPARE STUDENTS

To find solutions for problems we have yet to recognize

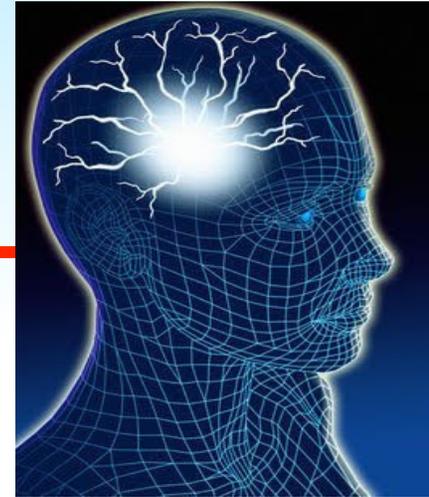


Adapt when “facts” change



Use the new information as it becomes available – creatively innovate

Concept Memory Success Cycle



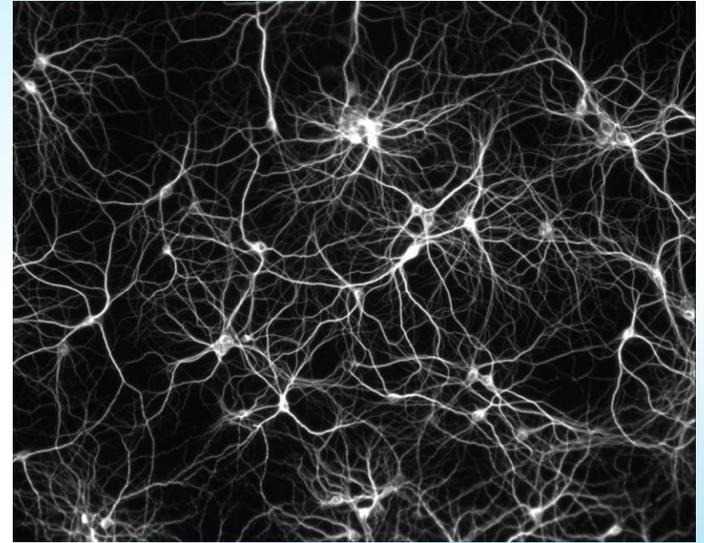
Priming-Previewing

Activates Networks of Prior Knowledge

Patterns are Recognized

Mental Manipulation with Transfer Extends
Networks

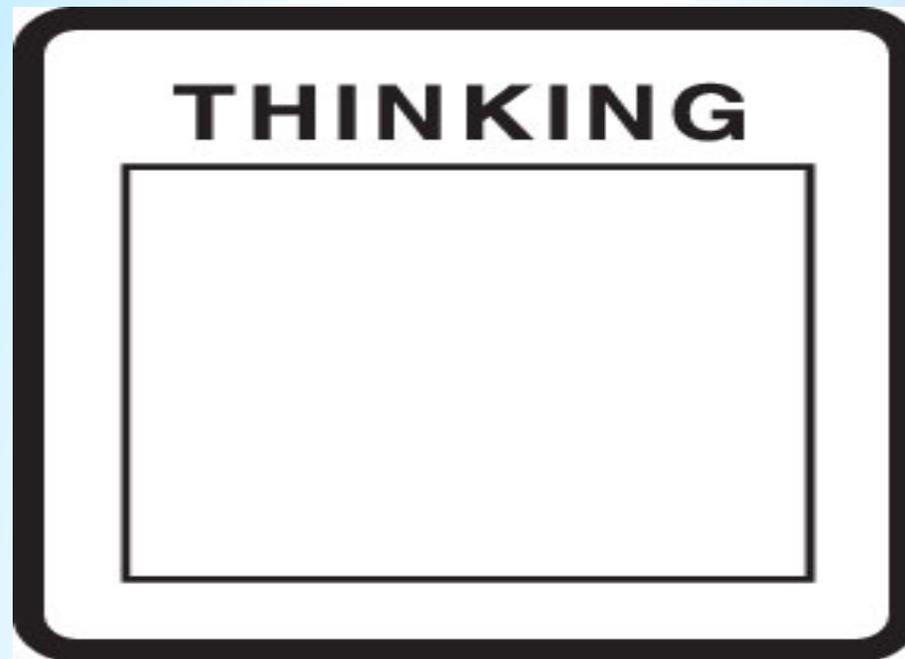
More frequent
activations
strengthens memory
(neuroplasticity not
pruning)



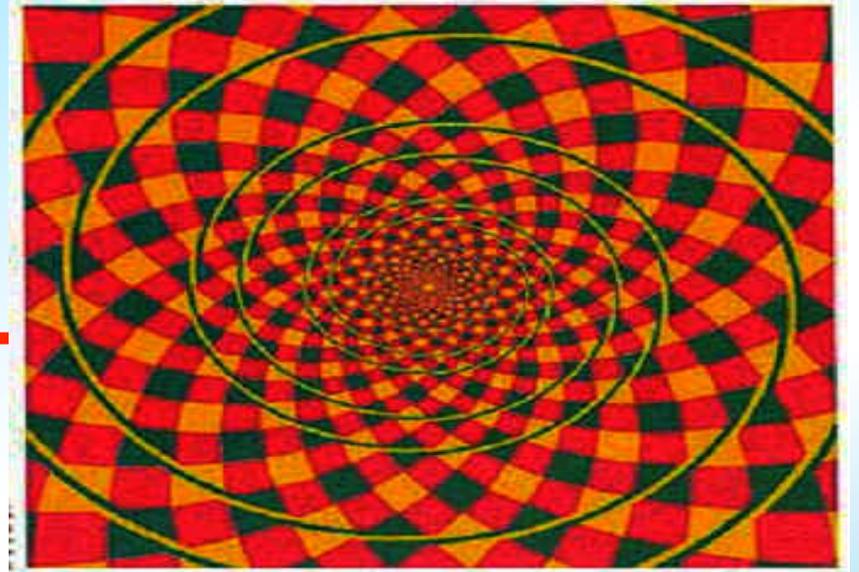
Isolated factlettes connect into
concept networks

Transferable Concept Knowledge

Creative solutions for
future problems and
innovative uses for future
discoveries

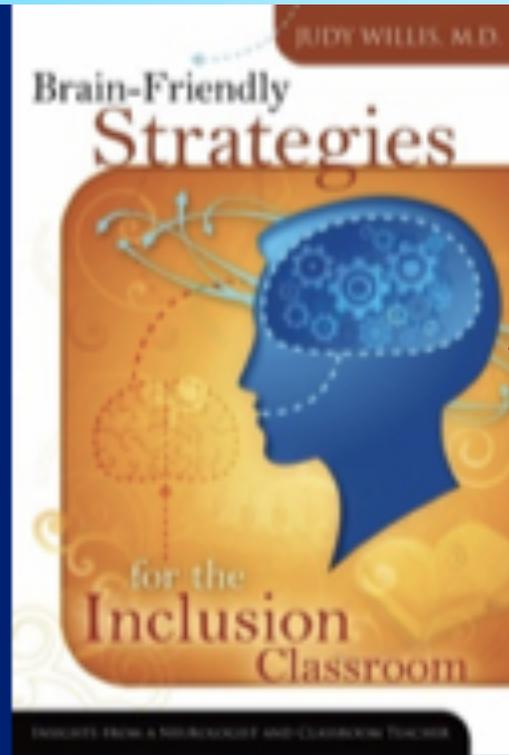
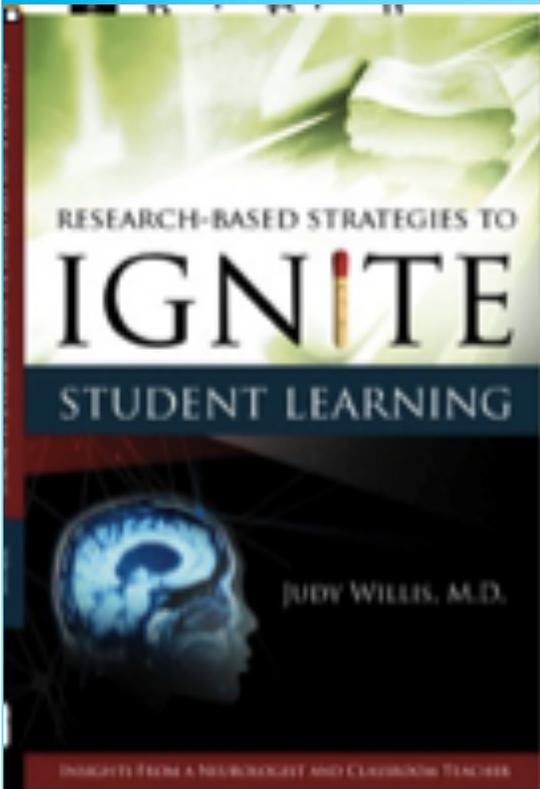


WEBSITE

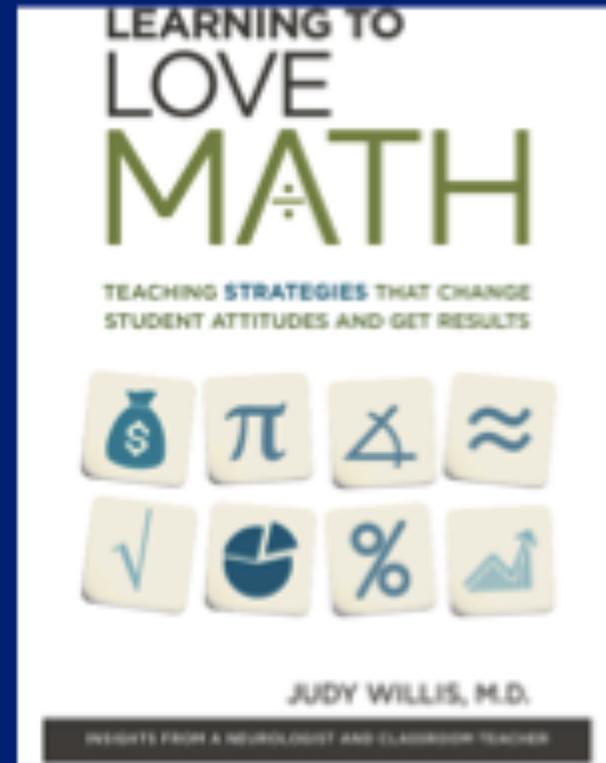
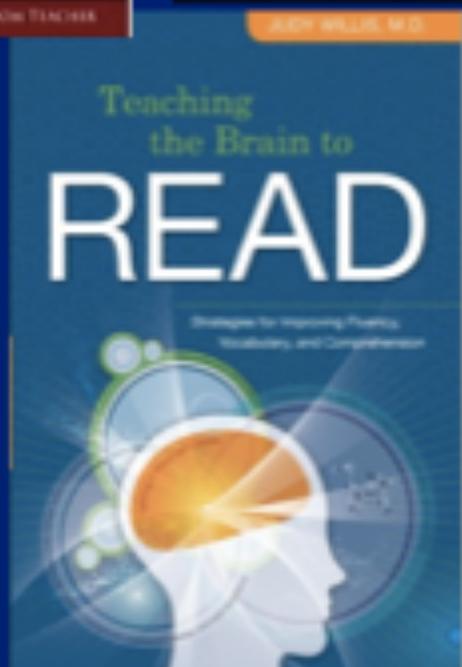


Judy Willis

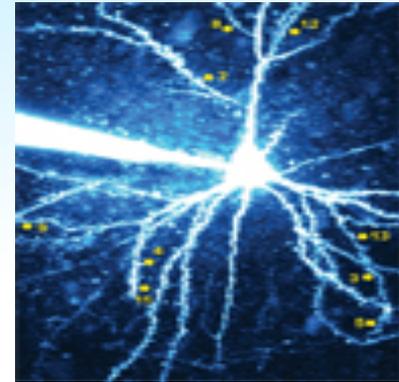
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**NEXT “Ask Dr. Judy”
ASCD Webinar**



**What Neuro-logical
Emotional Interventions Promote
Growth Mindset, Academic,
Social, and Emotional Success?**

February 8, 2012 3pm EST

**Dr. Judy's WEBSITE
www.RADTeach.com**