Minnesota State University Mankato

Enhancing Memory and Attention Through the Science of Learning

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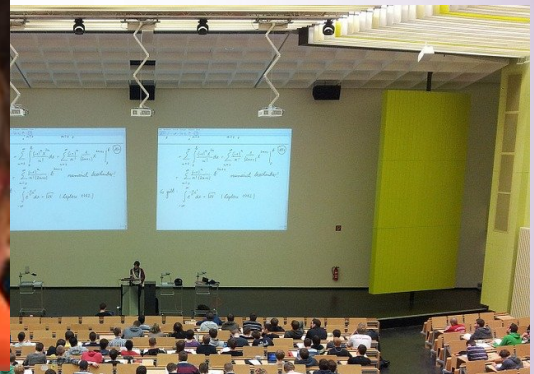
41st Annual Frontier Forum

College of Social & Behavioral Sciences

Big ideas. Real-world thinking.

Curious Learner: What does learning look like?



[Curiosity in learning]

Attention Defined

Concentration and focusing of mental effort

- Selective
- Shiftable
- Divisible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MAYO CLINIC HEALTH SYSTEM EVENT CENTER
CAMBRIA
COURTYARD BY MARRIOTT
kato insurance agency
Luther Mankato Honda
MINNESOTA 93
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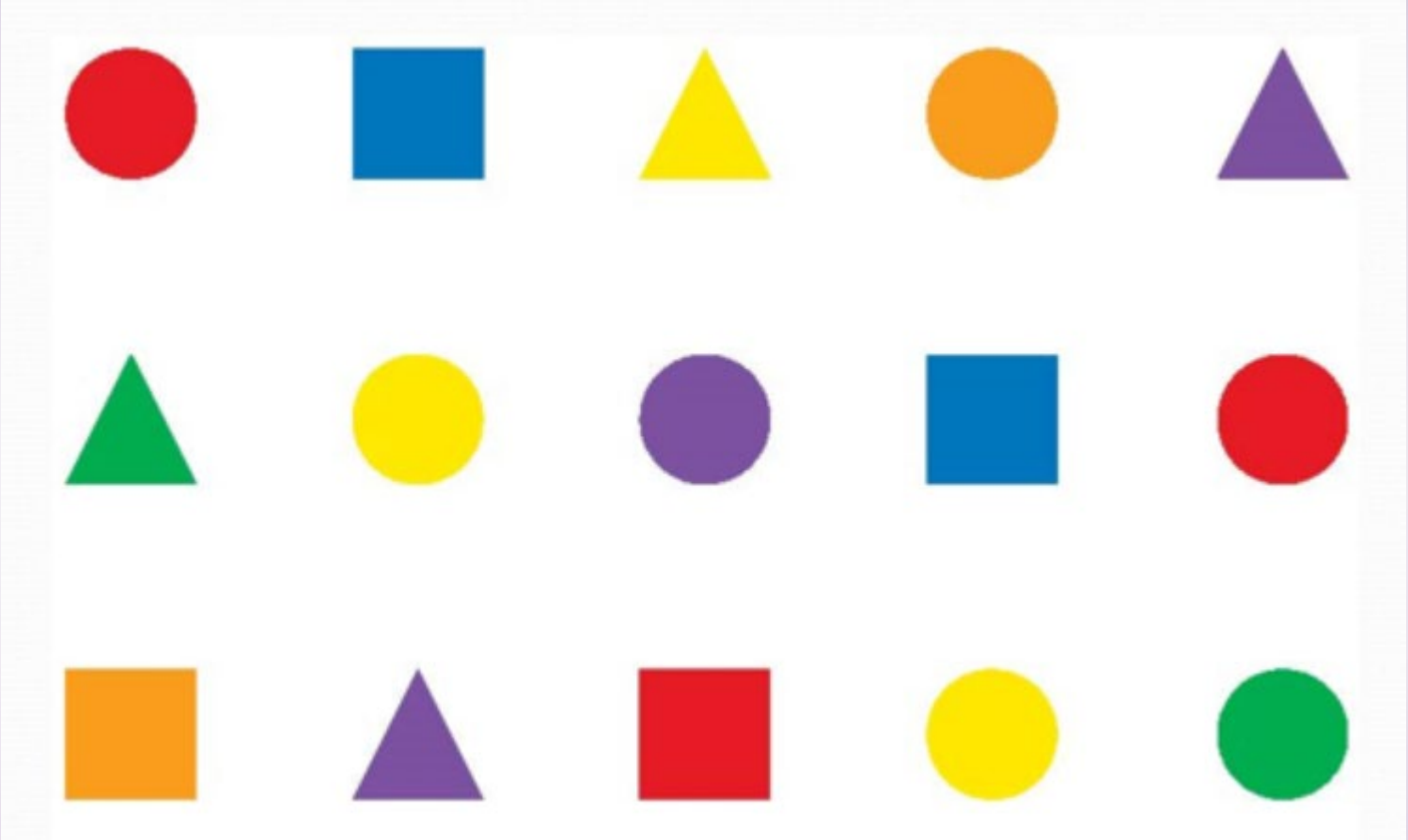
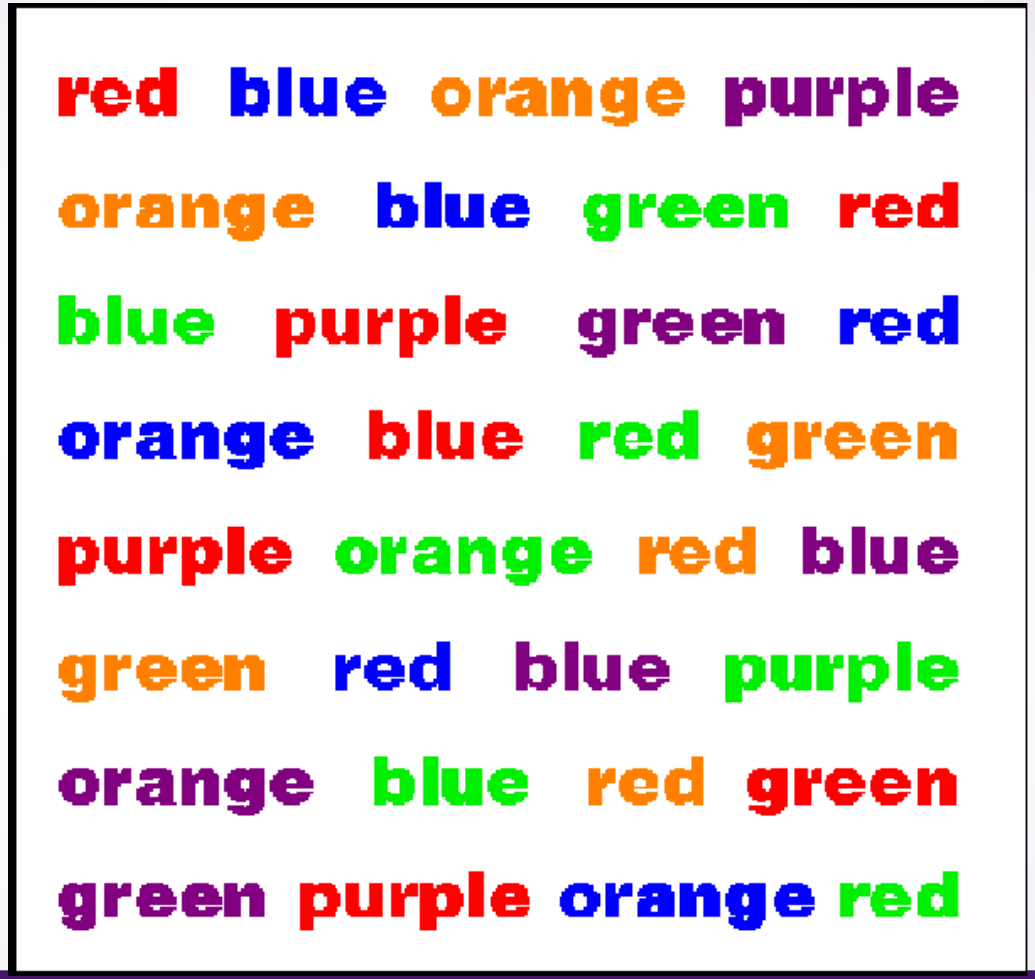
www.ssmotors.com
SIGN PRO of Mankato

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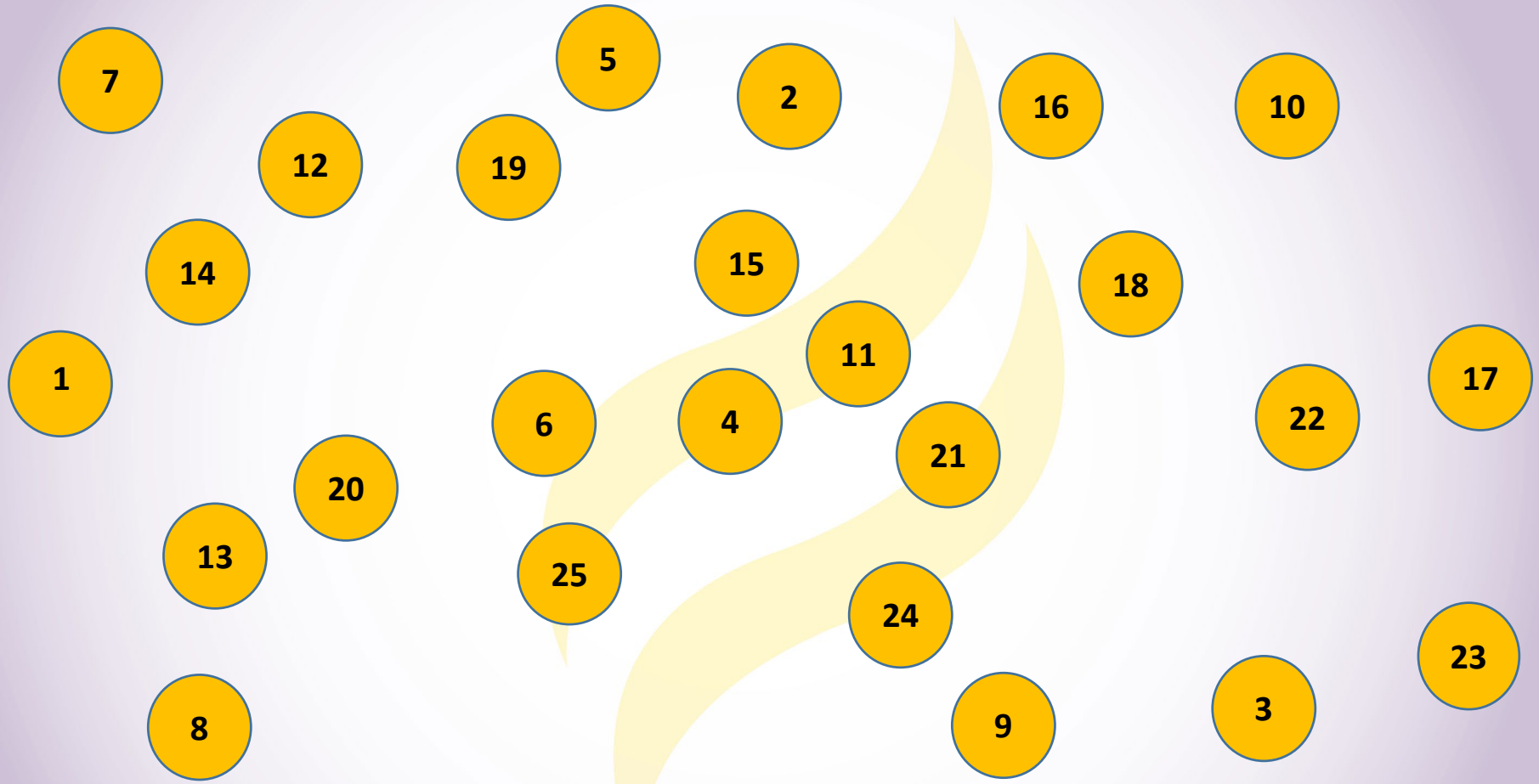
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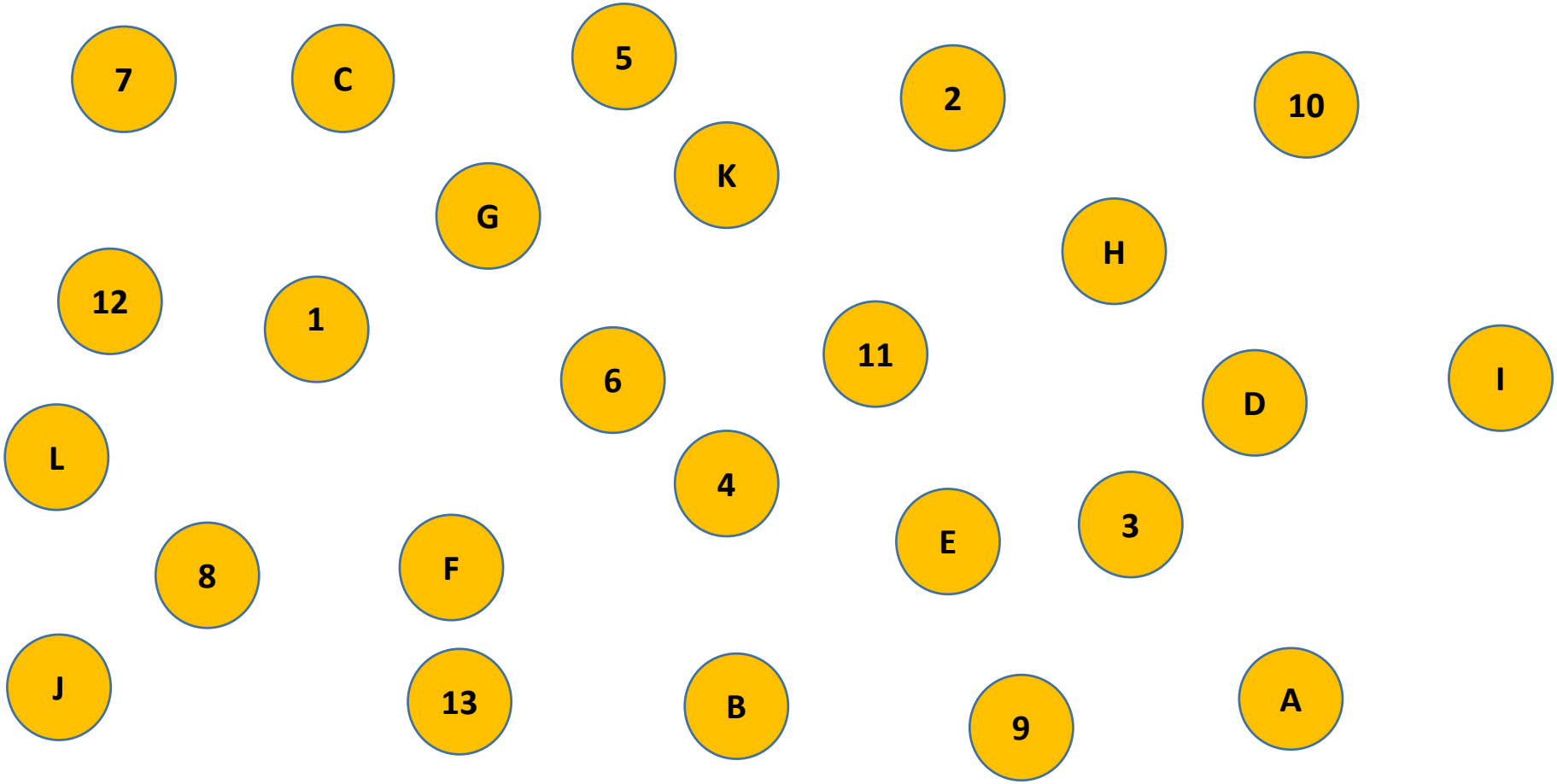
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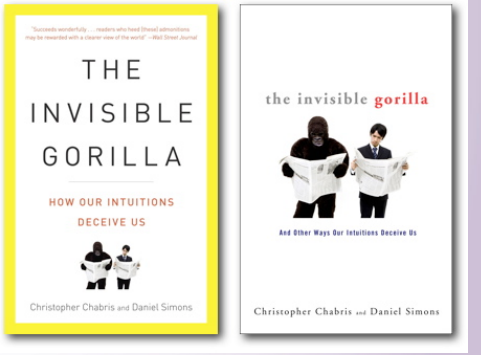
Attentional Blindness

Monkey Business



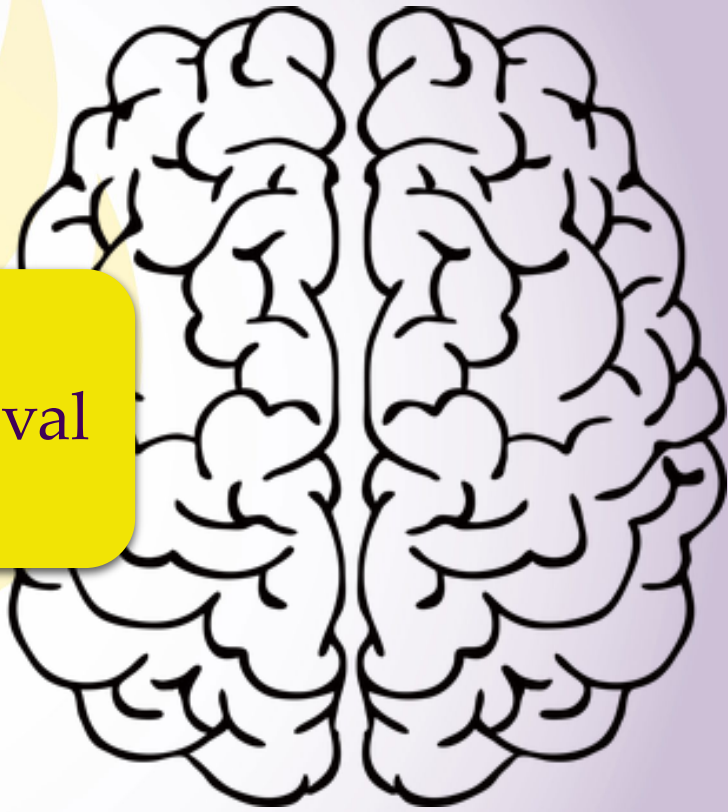

JAZZMAN'S
CAFE & BAKERY

Creating Memory

Encoding

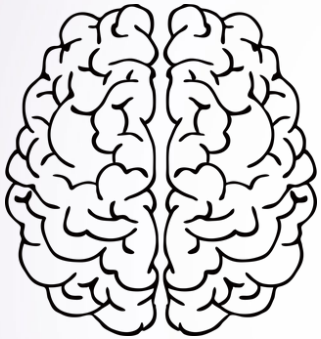
Storage

Retrieval



Limitations of Memory

Short-Term Working Memory



- Conscious Memory
- Limited Capacity
- New & Old Information

Long-Term Memory

- Stored Memory
- Unlimited Capacity

Short-term Working Memory

Digit Span (STM) Assessment

Write down the digit as you remember it

3156034

84321972

6421967325

Operation Span (ST/WM) Assessment

You are going to see a list of math problems

Example: 1 + 4 + 3 –2 = ___

1st: Calculate the answer for each problem and say it to yourself

Say "6"

2nd: Remember the last number in the problem

Remember "2"

3rd: Another math problem will appear; repeat

$$5 + 1 - 3 + 1 \quad = \quad ?$$

$$7 - 4 + 2 - 3 \quad = \quad ?$$

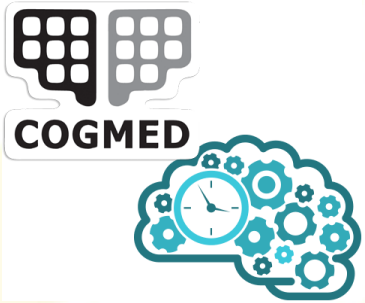
$$6 - 3 - 2 + 8 \quad = \quad ?$$

STOP

Write down the three remembered numbers

POLL #1

So, I have a terrible memory…



- "Cognitive Training" is a billion $ industry and growing!
- Memory improvement?

POLL #2

Human Memory Class: Improvement Research

Instruction Only

- 36 Students
- Course Instruction
- Memory Improvement Techniques
- Classroom Theory
- Student Assessment
    - 3 times in term

Instruction+Lumosity

- 33 Students
- Addition of Lumosity
    - ✔ 3 or more training sessions per week
    - ✔ ~ 15 minute sessions
- Student Assessment
    - ✔ 3 times in term

Study these names and faces


Sophie Wallace
Vincent Fratelli
Maria Navarro
Ben Winstone
Mario Bianco
Helen Knight
Ken Akatsuka
Rachel Goldacre
Jason Sinick
Suzanna Flores
Nick Rushton
David Morales
Georgia Williams
Michael Deane
Carla Silva
Jenny Patricks

Write down anything you can remember even if it is only part of the name

NAME #1

NAME #2

NAME #3

NAME #4

NAME #5

NAME #6

NAME #7

NAME #8

NAME #9

NAME #10

NAME #11

NAME #12

NAME #13

NAME #14

NAME #15

NAME #16

Results: Classroom Memory Improvement

- Similar task improvement in each class
- Lumosity made no additional improvements on memory assessment
- More students from course instruction only perceived memory improvement **69%** to **39%**
- Overall students enjoyed Lumosity **89%**
- Students would recommend Lumosity to a friend **71%**

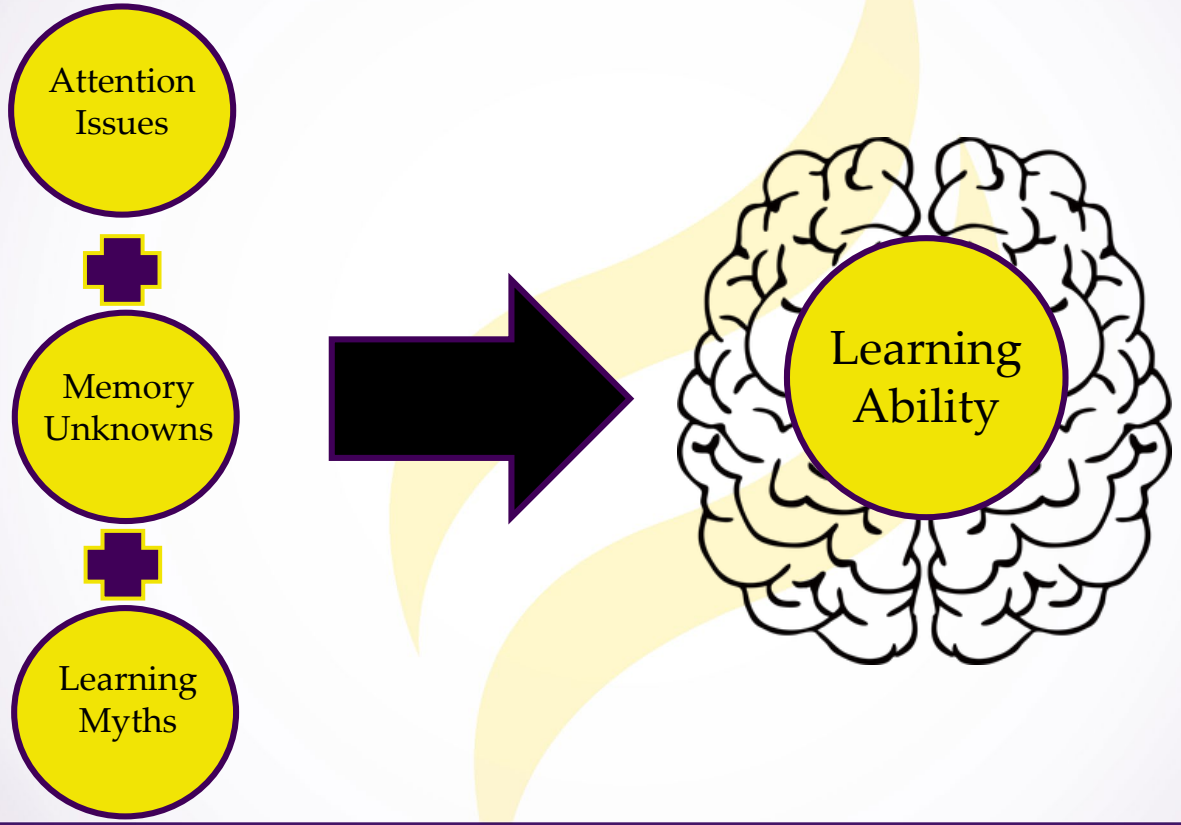
POLL #3 & #4

Learning Myths Research

- Learning Myths are some of the most common psychological misconceptions (Lassonde et al., 2016; 2017)

- 90% of 79 students surveyed adhere to the following learning ideas (Lassonde et al., 2019)
  - You are more likely to learn when your teacher uses examples in line with your preferred learning style
  - Some people are born with a superior memory so learning comes easily to them
  - Re-reading and highlighting are the most common strategies

Misconceptions of Learning



Learning Instruction

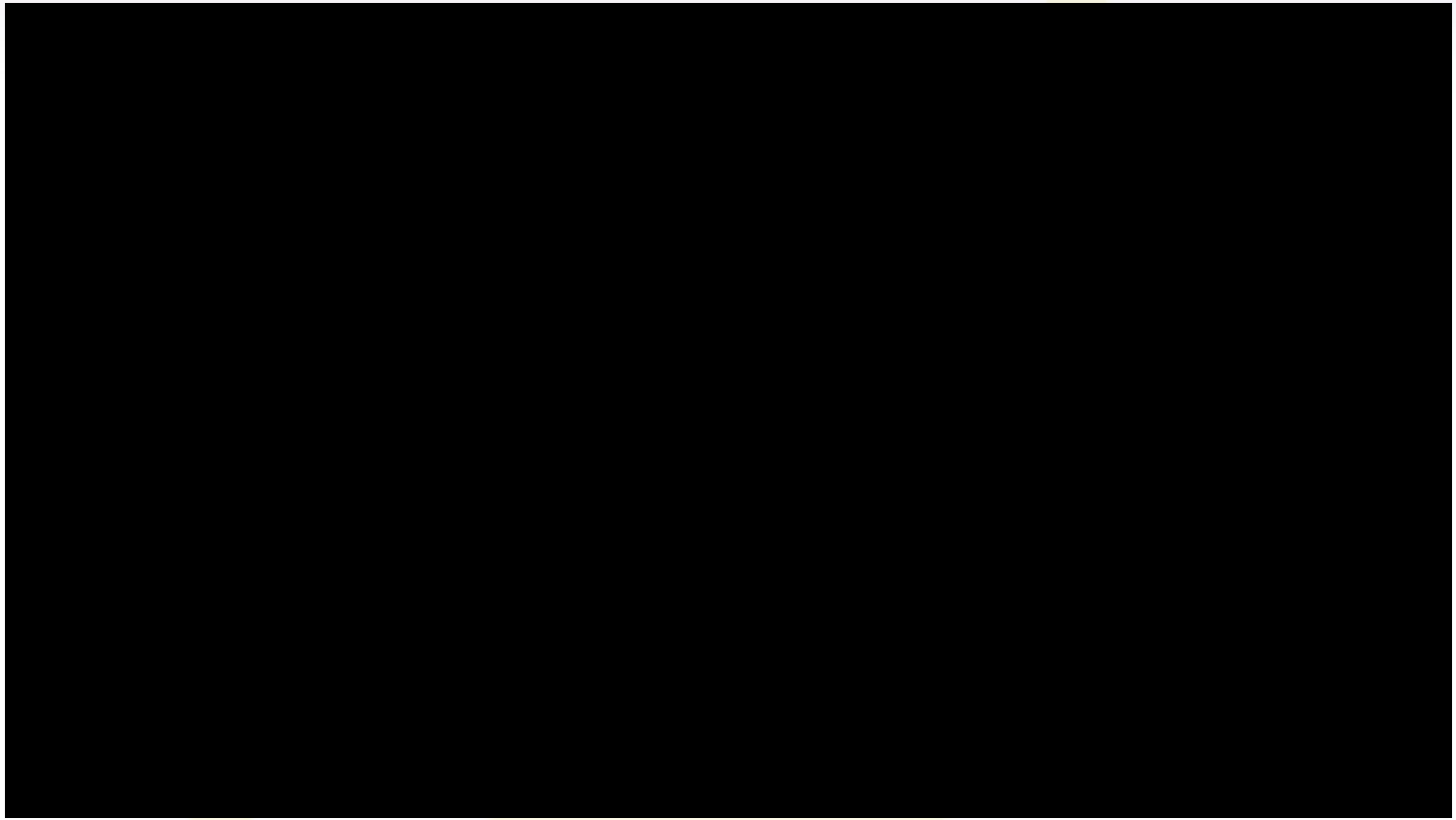
- ✓ **Do students learn how to learn?**

  Very few schools have learning instruction.

- ✓ **Do students know how the brain learns?**

  Cognition and memory are the foundational topics for learning instruction and are not formally taught

POLL #5

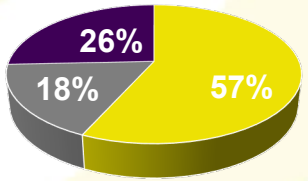


College Learning Strategies

"Imagine you are reading a textbook chapter for an upcoming exam. After you have read the chapter one time, would you rather…"

***177 College Students**

Study Method



Restudy Chapter **Recall Chapter** **Other**

Taking Action!

- **Develop teachable method**

L Listen

E Elaborate

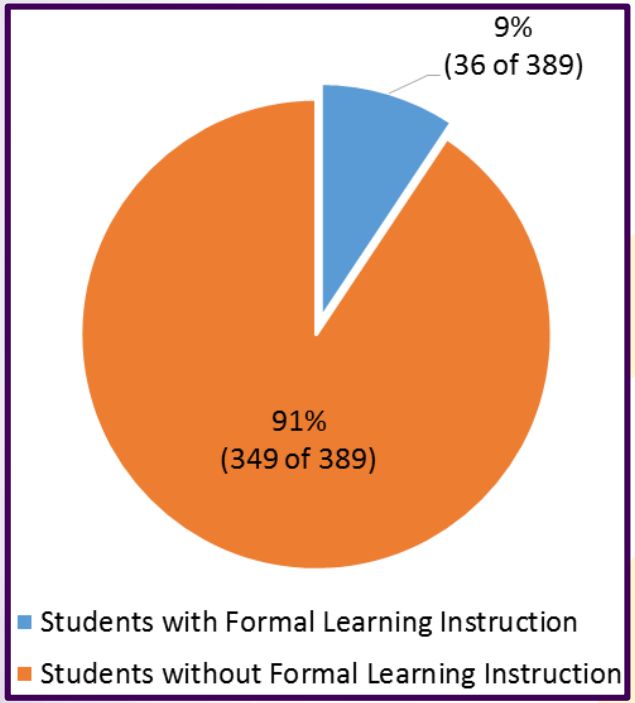
A Associate

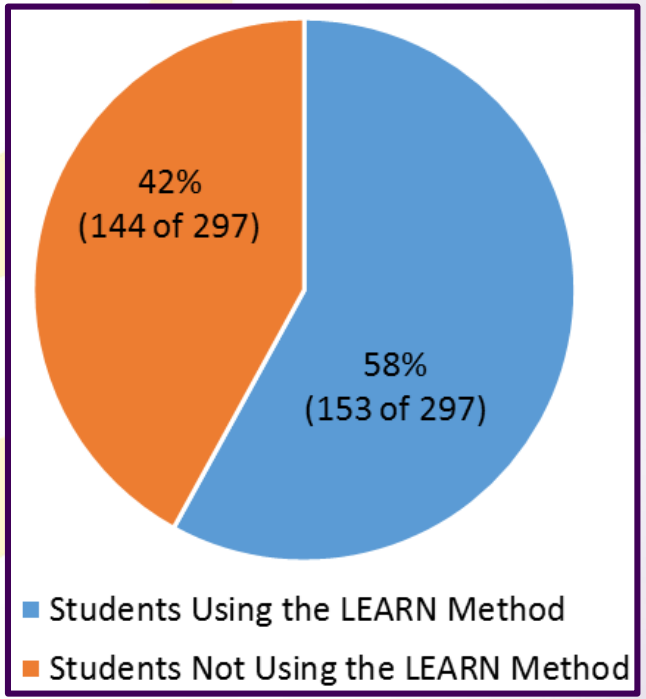
R Retrieve

N Night (Sleep)

- **Create PSYC: 150 Science of Learning for College Student Success**
  - Identify facts vs. myths of learning and memory
  - Apply fundamentals to student learning and remembering

Learning Instruction: 389 MSU, Mankato Undergraduates (Lassonde et al., 2018)





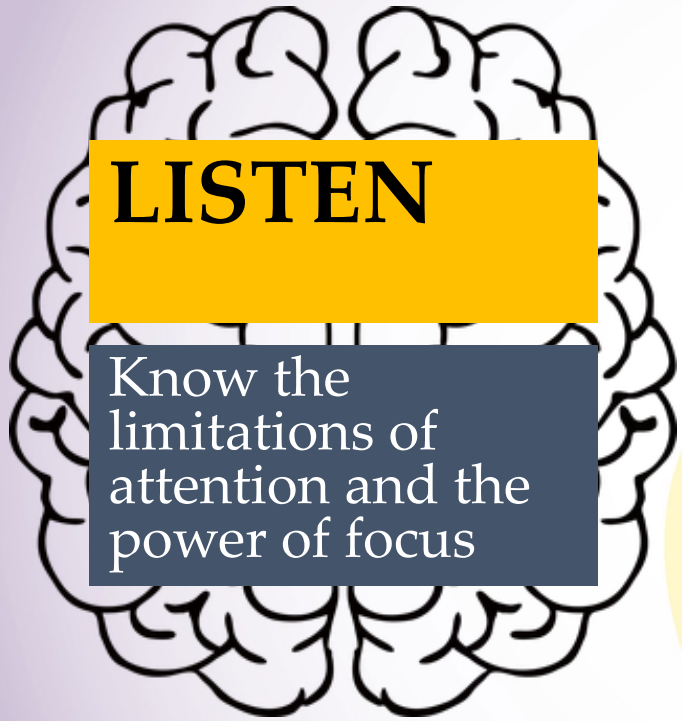
L Listen

E Elaborate

A Associate

R Retrieve

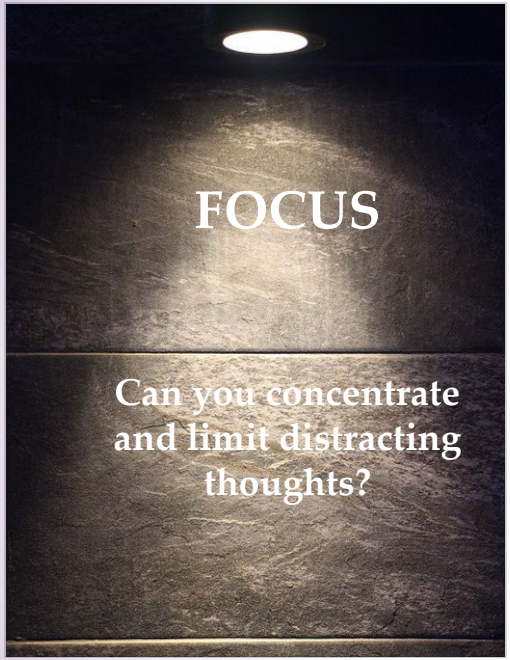
N Night (Sleep)

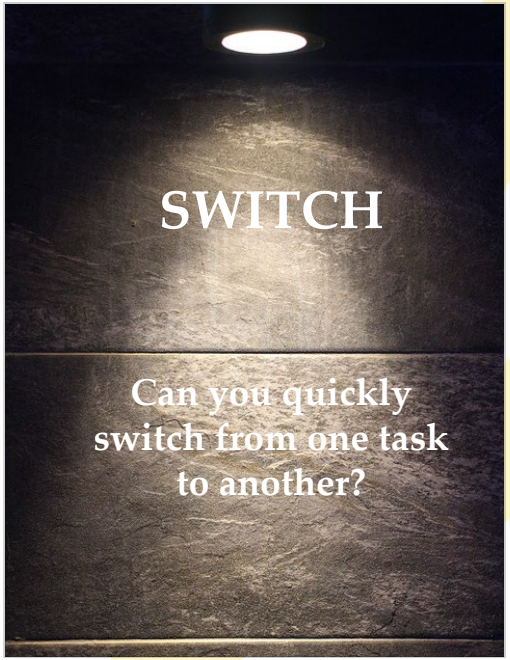


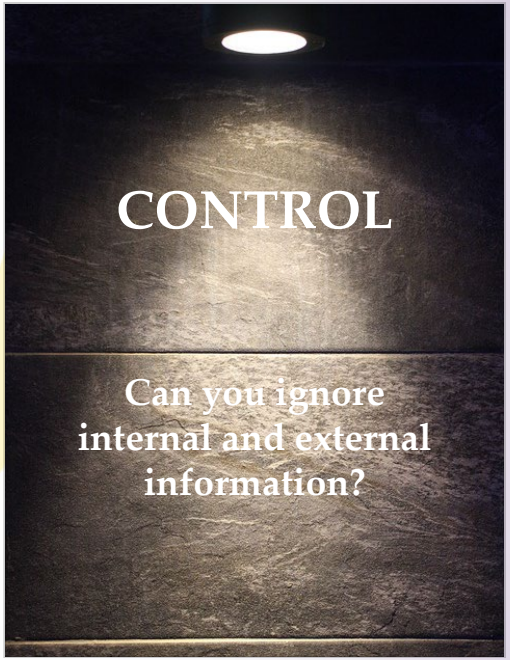
LISTEN

Know the limitations of attention and the power of focus

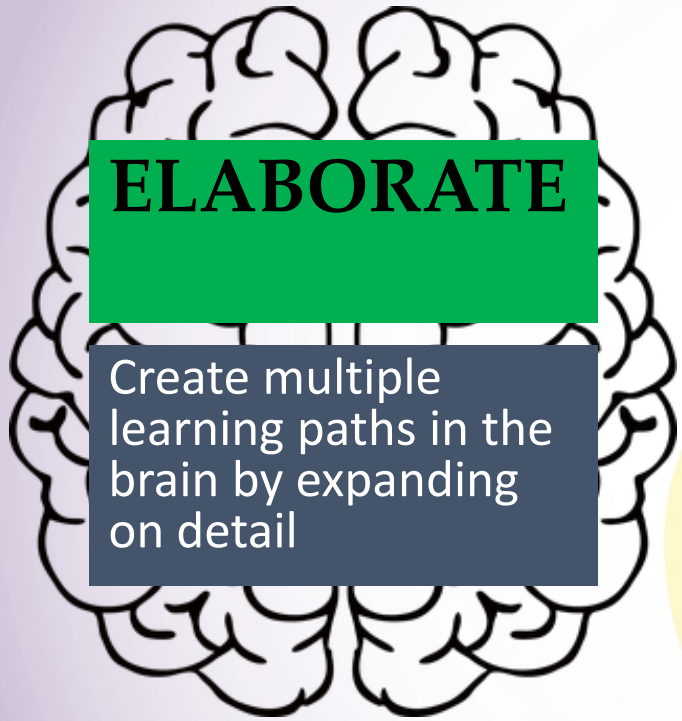
- Use basics of attention and memory to inform learning
- Be prepared to learn
- Limit distractions
- Check motivation







Attentional Control Scale:
Derryberry, D., & Reed, M. A. (2002).



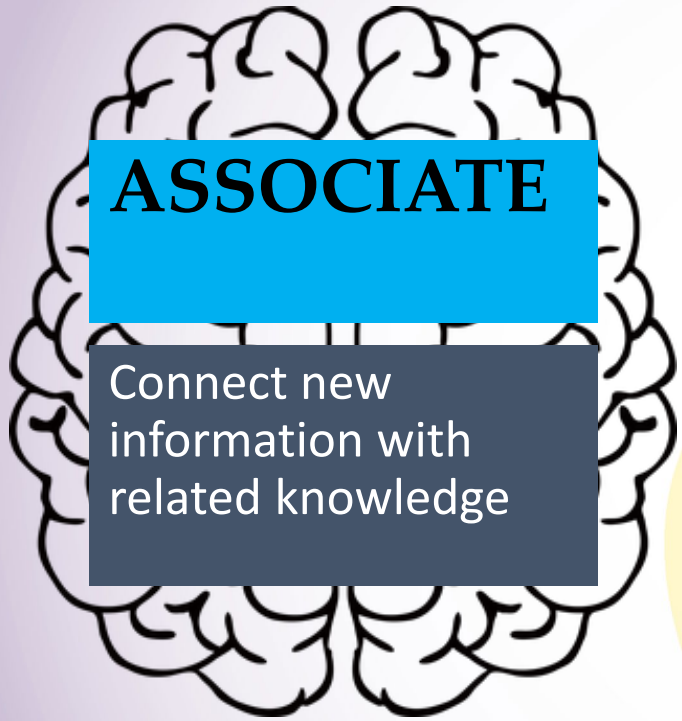
- ELABORATION = Describing and explaining ideas with as many details as possible
  - Sound (rehearsing words)
  - Images
  - Action
  - Personal (thoughts/doodles/notes)

Tree

"A woody perennial plant having a single usually elongate main stem generally with few or no branches on its lower part." (Merriam-Webster.com)

ELABORATE
"Tree"

- Sound -- Saying "tree" and learning basic definition
- Imagine -- Seeing types of trees
- Question -- What? Why? How?
- Personalize



- Relate knowledge
- Connect new information with old
- Connect new information with preferences

ASSOCIATE Anchor

- CONTEXT = placement of an idea to enhance meaning
- Better learning can occur when you have something old to attach new information to
- Students may use the anchor to jumpstart initial learning and motivation to learn

Name Association

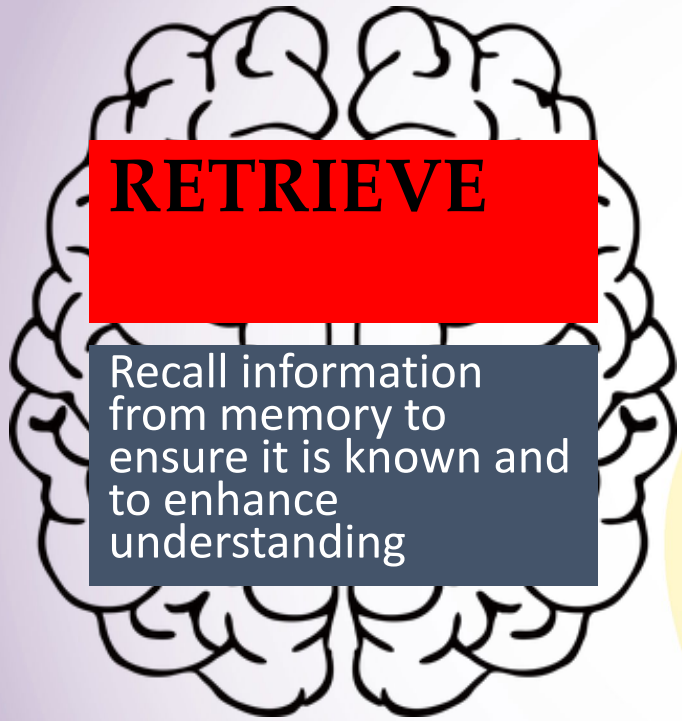
- **Basic principle**
  - Give meaning to meaningless information
  - Need to learn name Prof. Prlwitzkowski
- Break up into words that sound similar
  - Pearl with cow ski *verbal cue
- Find an image to connect name to
  - Cow skiing down hill with pearl necklace *visual cue

Professor Prlwitzkowski

Baker/baker paradox

- Last name Baker

- Person who is a baker



- To pull out of memory
- Most students read passively = SIMPLE STUDYING
  - Reading only provides one memory trace
- Retrieval practice enhances memory

RETRIEVE
"Retell/test"

- **TESTING YOURSELF**
  - Leads to Enhanced Memory
  - Memory is learned and when tested over a period of time, using different tests is long-lasting (LTM)
  - Knowledge becomes part of LIFE and is NOT LOST

Retrieval Planning

All at once: Cramming

- Several hours night before
- It does work but…
  - 24 – 48 hour memory
  - Compromises sleep

Over time: Spacing

- Several short sessions over days
- It does work but…
  - Requires planning
  - Requires habit change
  - Long-term learning
  - Reduces stress overtime

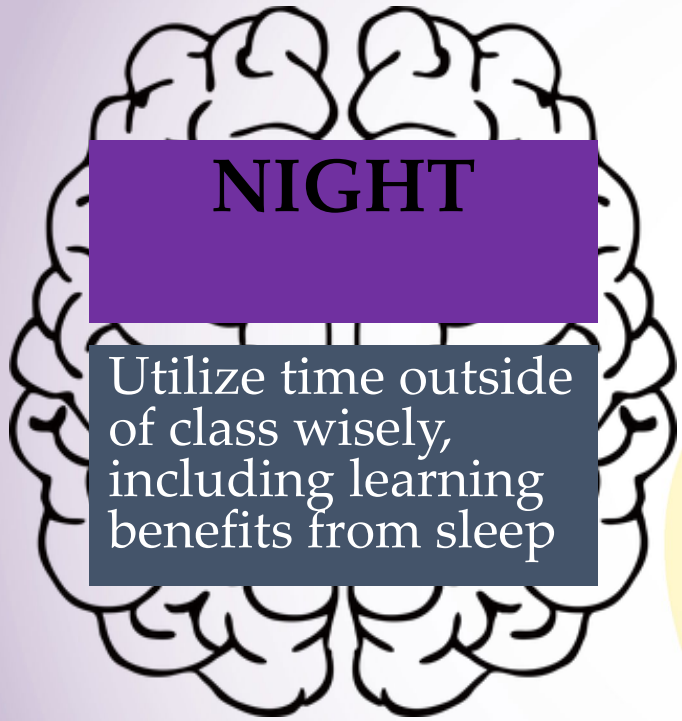
Retrieval Benefits: Educators

Foster Retrieval:

- Provide quizzes
- Practice retrieval during class
- Less content, more quizzing
- Encourage self-testing
- Carry forward “learned” information to new tests

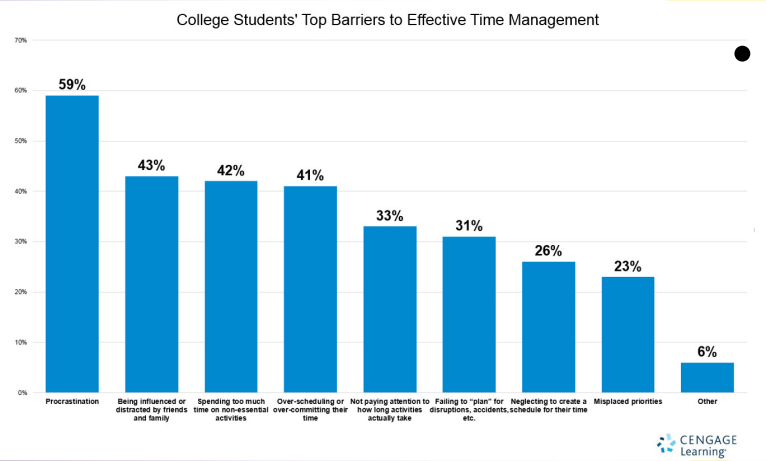
Retrieval Benefits: Learners

- **Change reviewing into retrieval**
  - Read then quiz
  - Review concepts and retrieve
  - Find study partners
  - Teach others



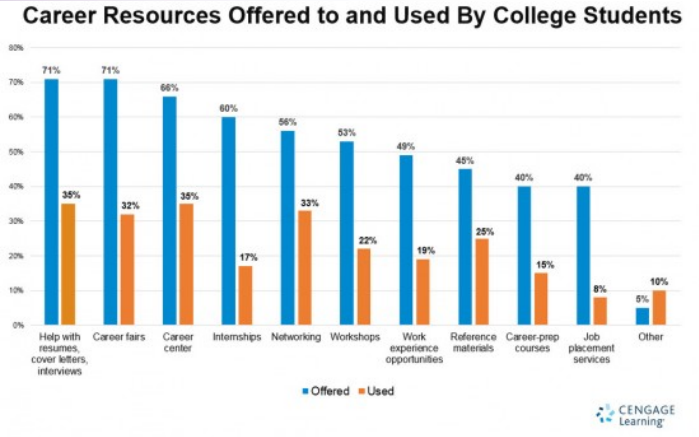
- Time outside of class matters
- Resource use by students
- Sleep is more important than you know

NIGHT Time Mgt.



- Learners need organization
- Learners rely on scheduling
- Learners must understand mental health

NIGHT Resources



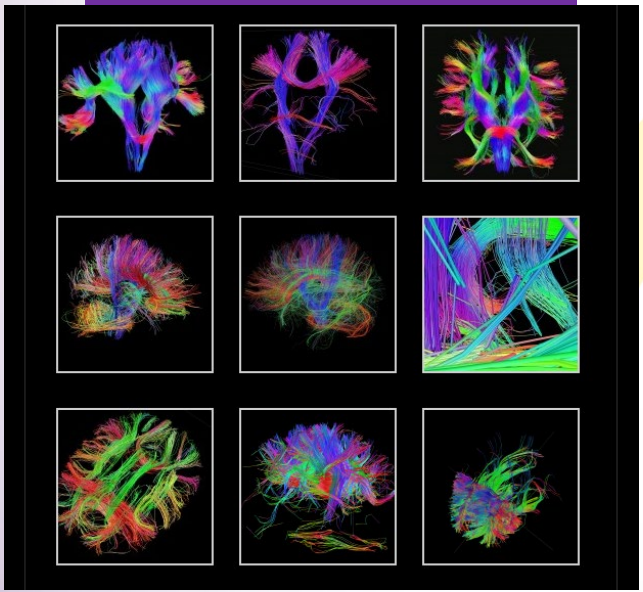
- See the MSU, Mankato List of University Resources
- See how student resources have changed to meet the CURRENT DISTANCE LEARNING-RELATED NEEDS of students
- Did you know that MSU, Mankato students who have a college-related financial need (including things like cost-of-living, medical bills, even a totaled car) can apply for an EMERGENCY FINANCIAL GRANT?

NIGHT
Sleep

- During SLEEP your body is relaxed but your mind is active
- You move through light and deep SLEEP through stages
- During one stage, called Rapid Eye Movement or REM, your eyes move and your brain is very active
- You can die from severe SLEEP deprivation

POLL #6

NIGHT
Sleep



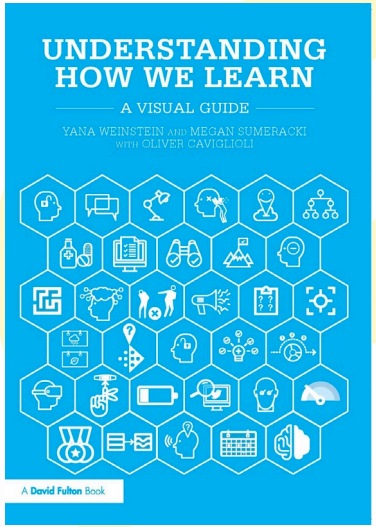
- During SLEEP brain cells clean/clear away other useless cells
- Sleep induces both remembering & forgetting
- Sleep consolidation = neurons fire in patterns (hours/days)
- Patterns form circuits and connections (months/years)

Mapping of neural connectivity
http://www.humanconnectomeproject.org

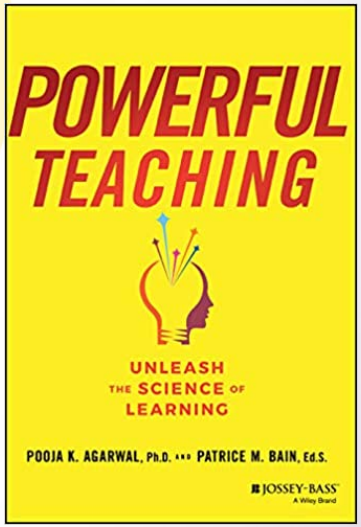
Learning Science Resources

LEARN (Lassonde)

Learningscientists.org



Retrievalpractice.org



Student Researchers:

Teana Krolak	Dorothy Nakibirige	Dalyon Waldner
Linda Zheng	Madison Glende	Faithe Patrick
Becky Osborn	Brittany Seth	Luke Zabel
Jackie Gehling	Ibelizet Dominguez	Sierra Peters
Molly Kolquist	Ali Barjis	PJ Gurung
Meghan Vergin	Steven Arriaza	Wesley
Ester Okaro	Isabella Cock-Villafane	Gabby Kailing

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Lab Research

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