

# INFORMATION JUNCTION: BRAIN CONNECTIONS

## How Students Learn



Research taken from *How the Brain Learns* by David Sousa

*“Educators are not neuroscientists, but they are members of the **only** profession whose job is to change the human brain every day.”*



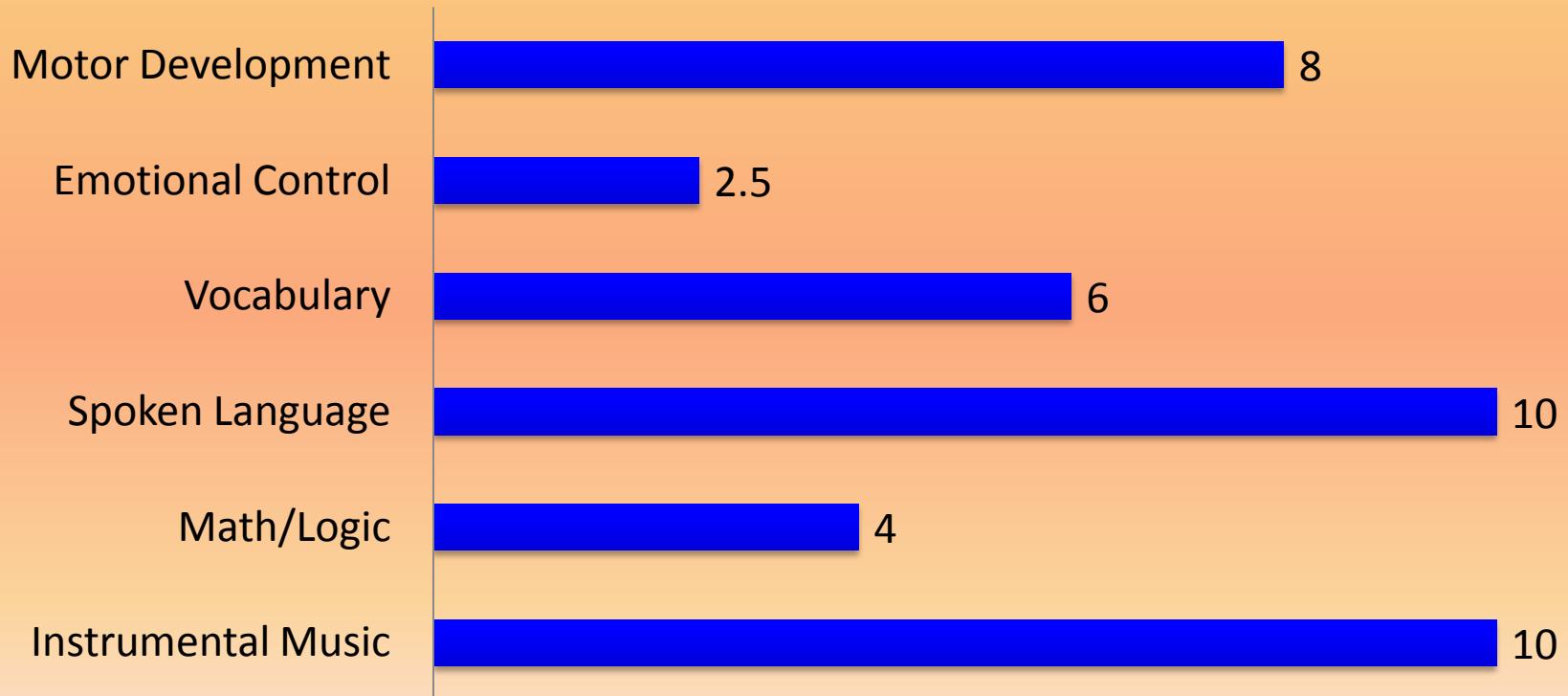
# What are we going to learn?

- How the human brain continually reorganizes itself, especially during youth
- How emotions affect learning, memory, and recall
- How chunking information along with movement and exercise enhances cognitive processing

# Window of Opportunity

The chart shows some of the sensitive periods for learning during childhood

■ Age in Years

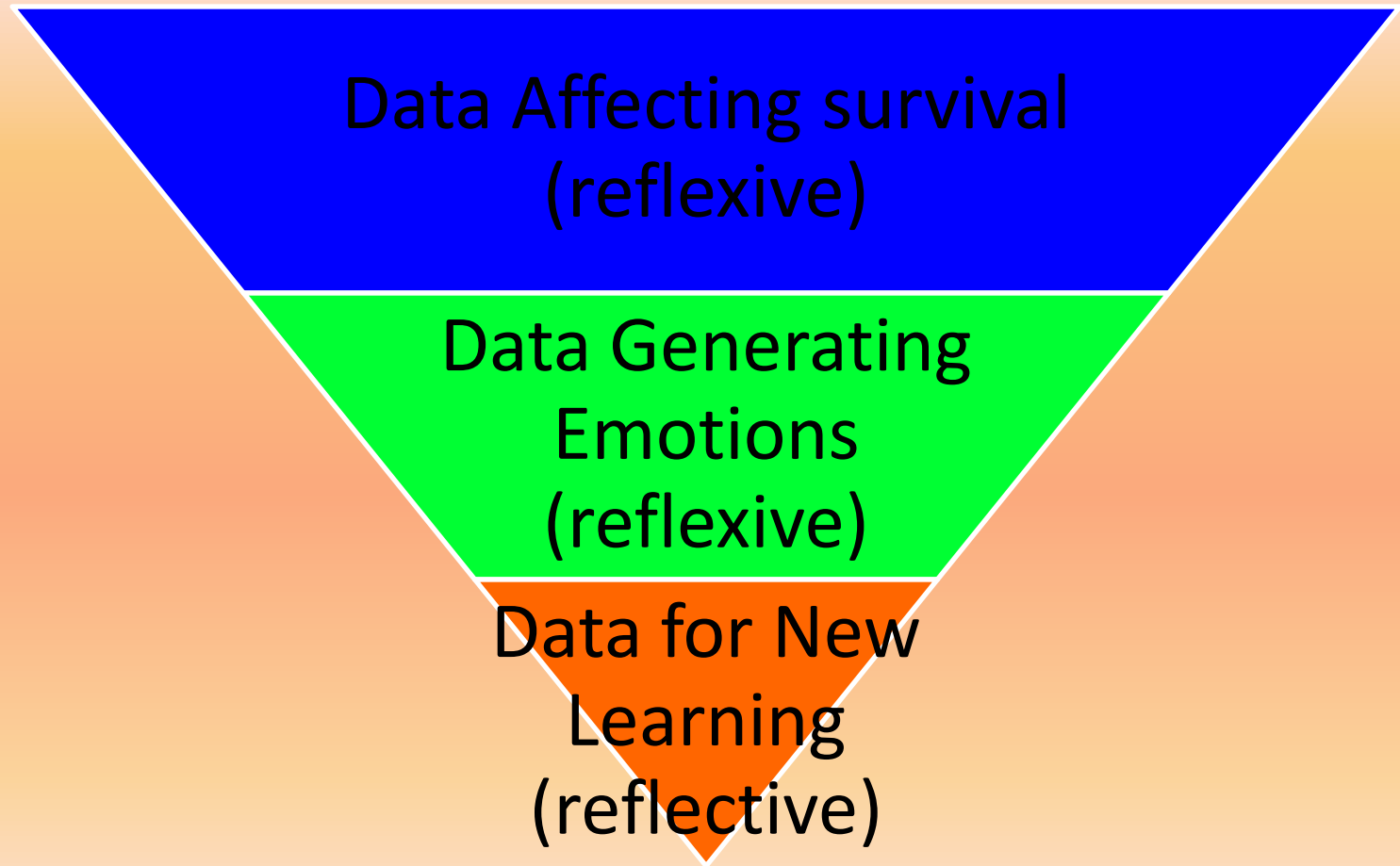


# Student emotions in Afterschool...

- Educators are trained to focus on reason
- Emotions consistently affect attention and learning in the classroom
- Before students can turn their thoughts to learning, they must feel physically safe and emotionally secure.

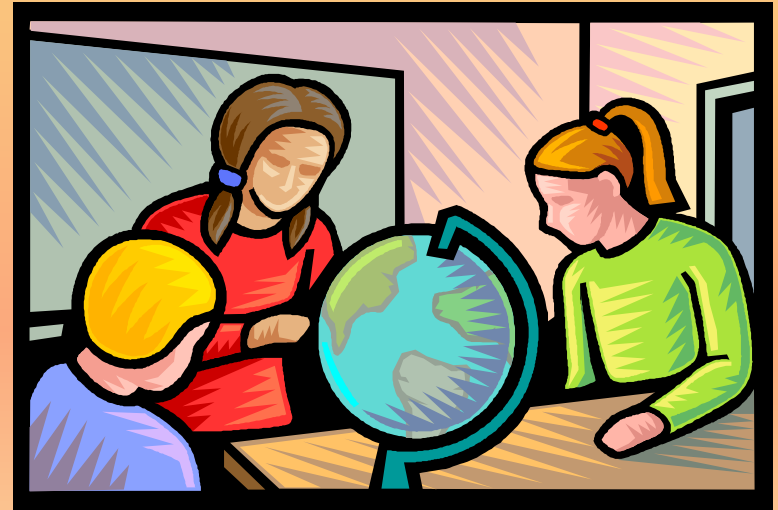


# Emotions Effect Memory Processing



# Emotional Memory and Learning

- Non-Declarative Learning (environment)
  - How emotions react to the environment
  - Having routines/procedures
  - Consistency
  - Respect from teacher to student

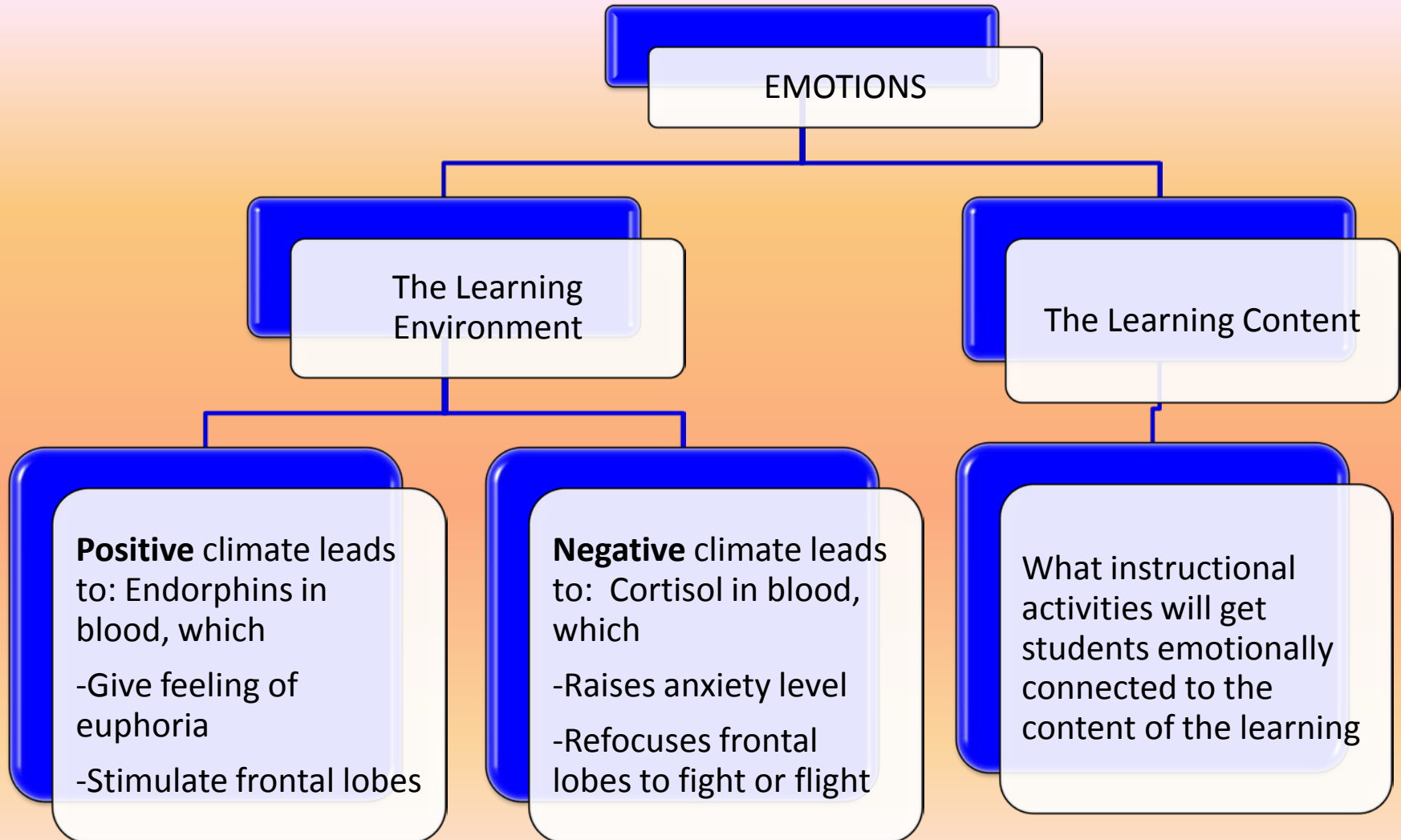


# Emotional Memory and Learning



- Declarative (content)
  - Strategies a teacher would use to reach content
  - Engaging, captivates their imagination
  - Uses cooperative learning
  - The arts (music, art, poetry, lyrics, etc...)

# Emotional Memory and Learning



# How can Afterschool Providers promote emotional security in the program?

- Establishing a positive climate
- Encouraging students to take appropriate risks
- Students must sense that program staff want to help them be right rather than catch them being wrong.



# Learning, Retention, and Rehearsal



**Let's play a retention game!**

# Retention Game

1. KEF
2. LAK
3. MIL
4. NIR
5. VEK
6. LUN
7. NEM
8. BEB
9. SAR
10. FIF

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# Primacy-Recency Effect

In a learning episode, we remember best that which comes first, second best that which comes last, and least that which comes just past the middle.



# Factors Affecting Retention of Learning

**Is Meaning Present?**

Yes

**Moderate to High**

**Very High**

No

**Very Low**

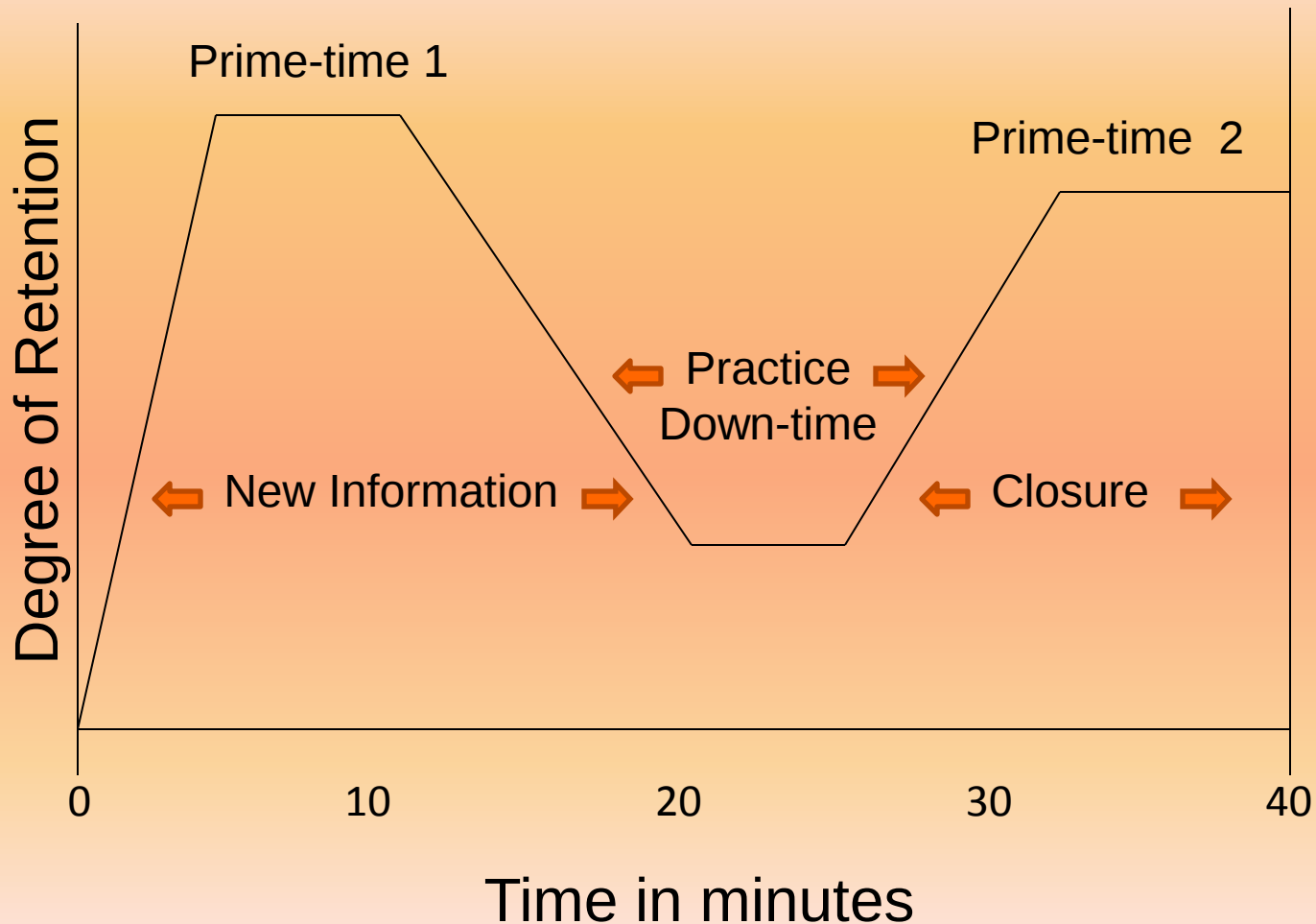
**Moderate to High**

No

Yes

**Is Sense Present?**

# Retention During a Learning Episode



# Rehearsal

- Rote Rehearsal
- Elaborative Rehearsal

## Quote

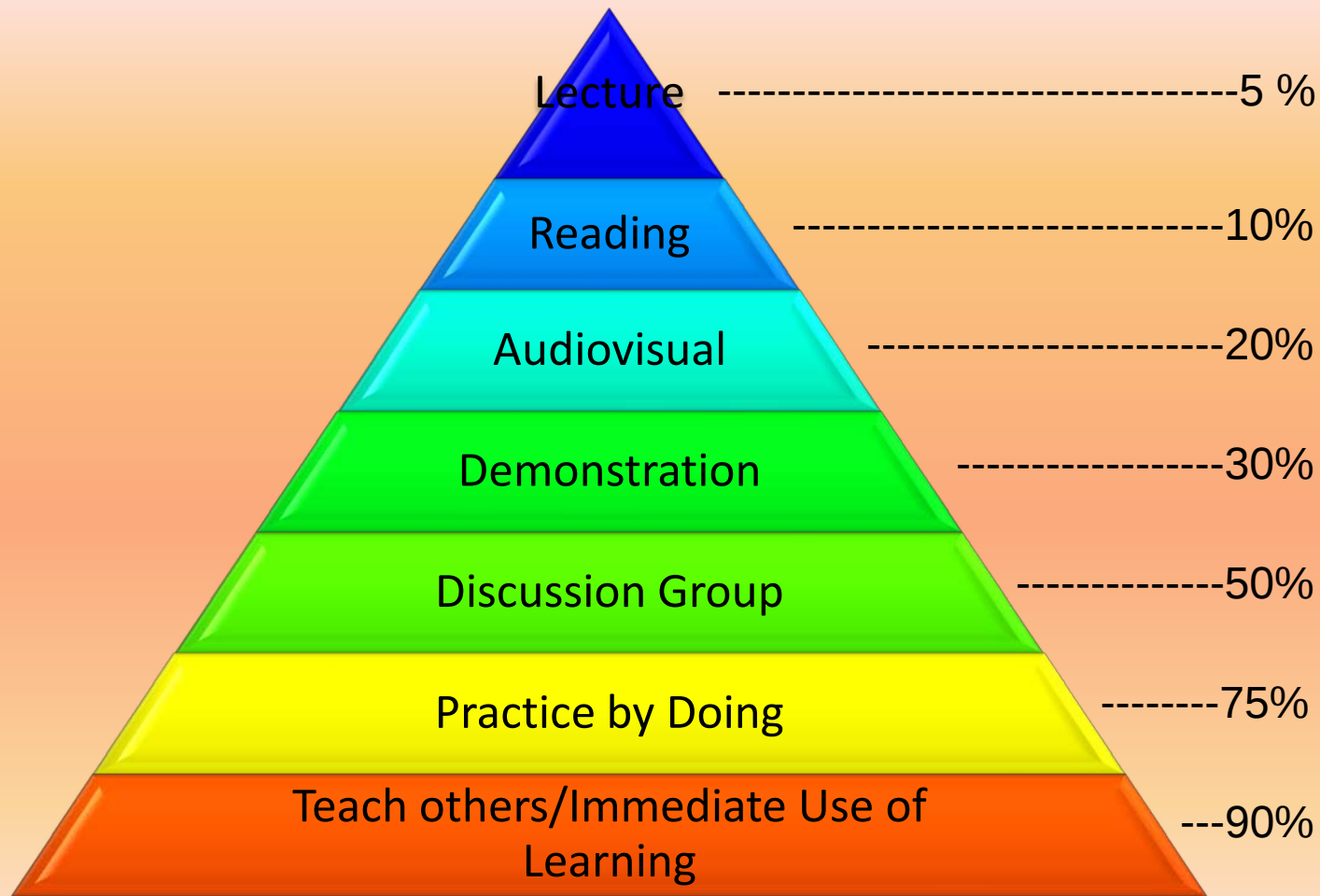
*“Brain research tells us that we forget up to 80 percent of what we learn within 24 hours if we do not practice it.”*

# Tower Challenge

## Directions:

- Break up into groups of 4 or 5
- Plan your tower before you start
- The winner will be the group with the tallest tower that can stand by itself for at least 10 seconds.
- SUPPLIES: Each group will receive...  
(1) An 8.5 by 11 inch piece of paper (2) 12 inches of masking tape

# Average Retention Rate After 24 Hours



# How Movement and Exercise Enhance Learning

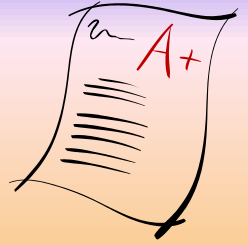
After about 20 minutes, oxygen begins to pool in extremities that are gravity-challenged.



Vigorous movement for about 2 minutes promote blood and oxygen flow to the brain.

# Using Chunking to Enhance Retention

Example: 3421941621776



## Pattern Chunking

- 342 (my house number)
- 1941 (the year the US entered World War II)
- 62 (my father's age)
- 1776 ( the Declaration of Independence)

Now the number is only four chunks with  
meaning: 342 1941 62 1776

It is better to teach smaller chunks, and have learners practice independently, than to teach large objectives that cannot be reached.

# What is the magic number of repetitions needed to master a skill?

About 24 repetitions to master a skill with 80% competency

The first 8 repetitions account for more than 60% of the way to mastery



## Quote

*“The memory should be specially taxed in youth, since it is then that it is strongest and most tenacious. But in choosing the things that should be committed to memory, the utmost care and forethought must be exercised; as lessons well learned in youth are never forgotten.”*



# Contact Information

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**Thank you!**

