

Minute Paper

Brainstorming Session

How do you physically learn and recall information?
What is the mechanism?



Zull's Biological Description

Brain contains 100 Billion neuron cells

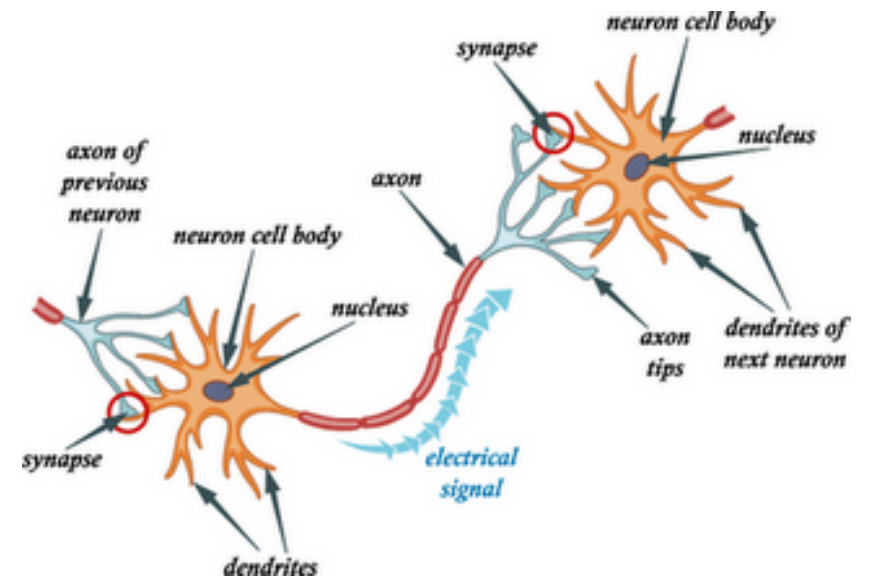
Axons fingers between neurons
to communicate with chemicals

Single neuron can have 10s of thousands connections!

Connections driven by sensations, thoughts or new actions!

Connections fade over time, thus need reinforcement

Neurons that *Fire together, Wire Together!*



Which class do you prefer? Why?

Blocked Class Sessions	Interleaved Class Sessions
Monday: Topic A, Problem-Solving Session	Topic A, Problem-Solving Session, Topic B
Wednesday: Topic B, Problem-Solving Session	Topic B, Problem-Solving Session, Topic C
Friday: Topic C, Problem-Solving Session, Quiz	Topic C, Problem-Solving Session, Review or Quiz

Blocked

Interleaved

How does this relate to how we learn and recall information?

Blockers Vs Mixers Study

Blockers

- Learned Shape A
- Answered Problems Shape A
- Progressed through shapes

Mixers

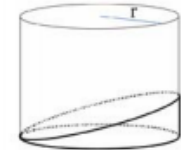
- Learned all shapes
- Answered a mixed problem set

Practice Tested on day of instruction

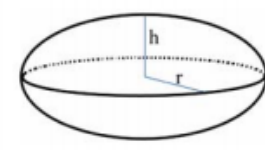
Tested after 1 week

A

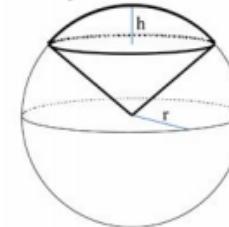
A **wedge** is the boldfaced portion of the tube.
Its bottom is a circle, and its top is a slanted oval.
Its volume equals $\frac{r'h\pi}{2}$



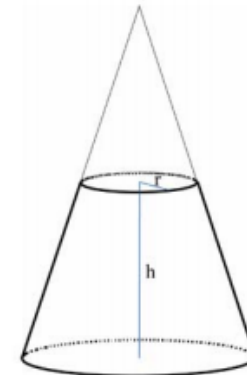
A **spheroid** is similar to a sphere.
But its height has been squeezed or stretched.
Its volume equals $\frac{4r'h\pi}{3}$



A **spherical cone** is the boldfaced part of the sphere.
Its bottom is at the center of the sphere.
The rim of the cone is on the surface of the sphere.
Its volume equals $\frac{2r'h\pi}{3}$



A **half cone** is the bottom half of a cone.
Both its top and bottom are circles.
Its volume equals $\frac{7r'h\pi}{3}$



B

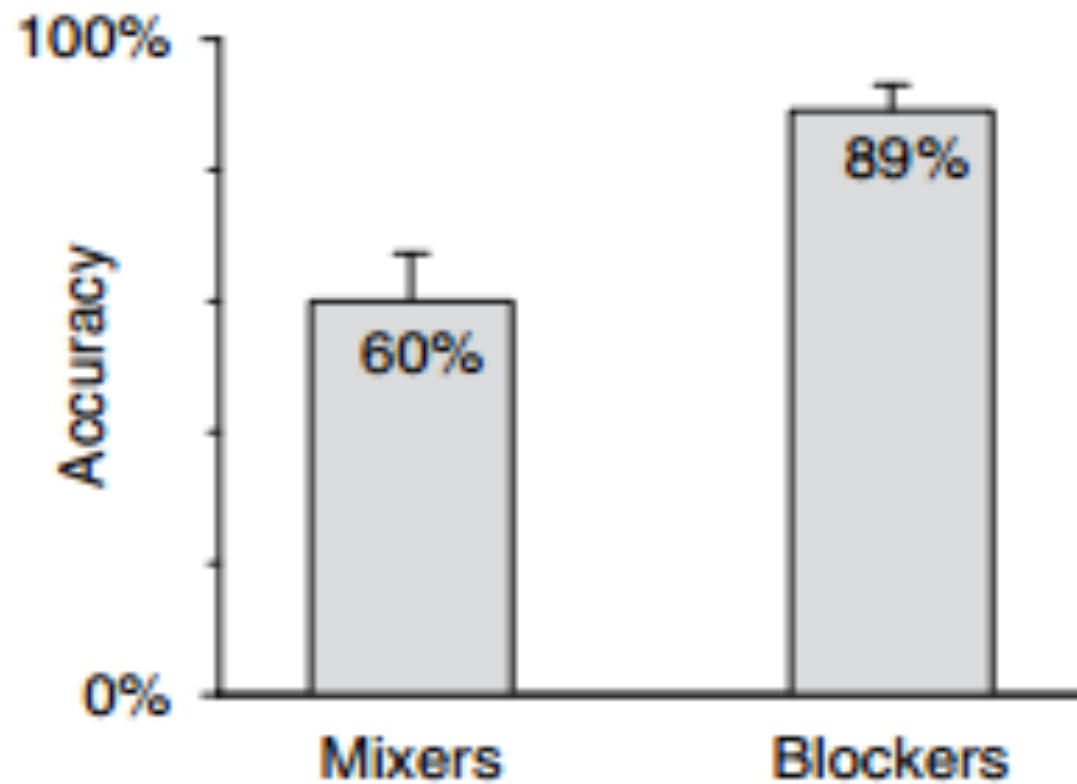
Problem
Find the volume of a wedge with $r = 2$ and $h = 3$.
Write the formula in the box; write the answer in the oval.

Solution

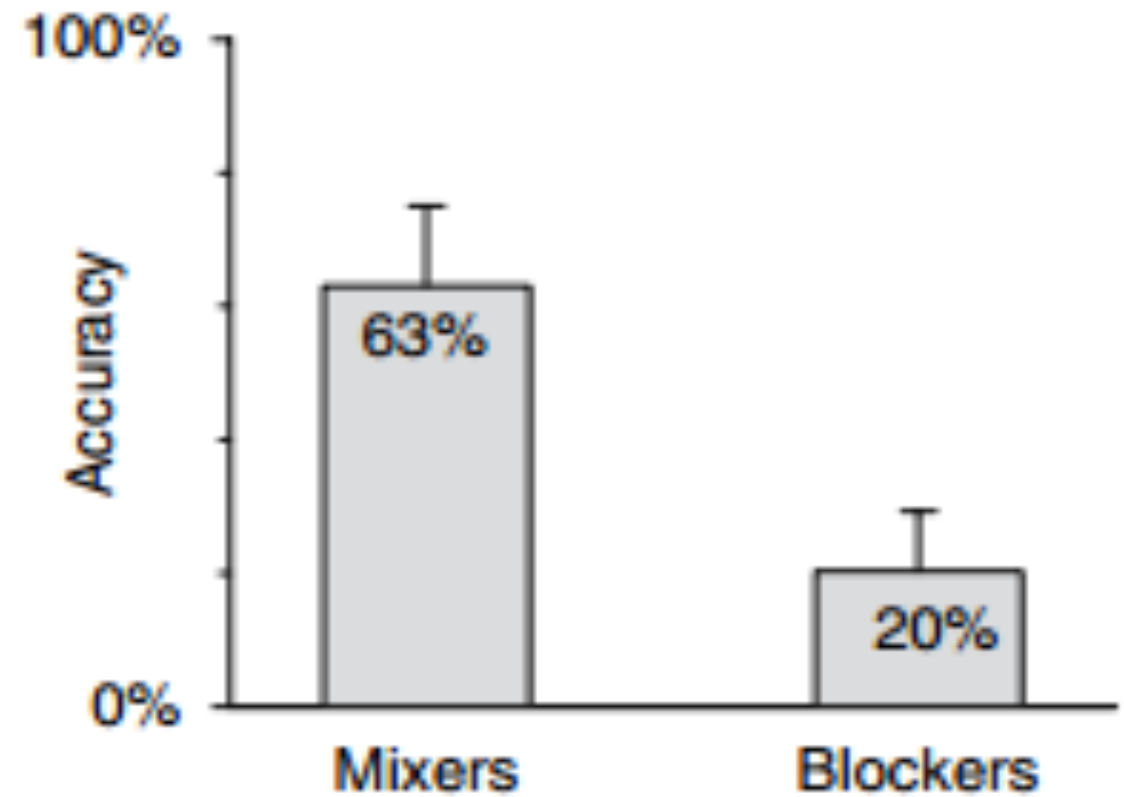
$$\frac{r'h\pi}{2}$$

Results

Practice Performance



Test Performance



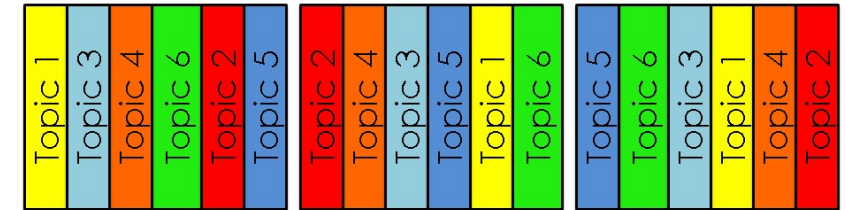
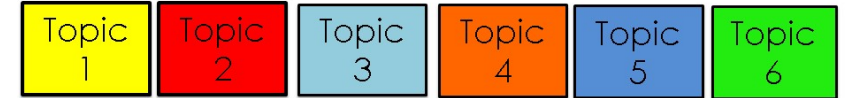
Principals of Structure

Blocked and Interleave Material

Keep it small, Keep it frequent

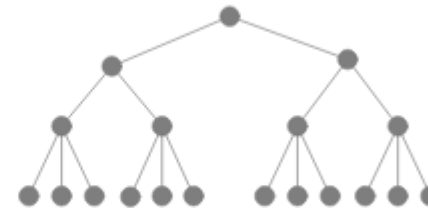
Explain and Support (and Support)

Blocking vs interleaving



Novice 1

Novice 2



Expert 1



Expert 2

Video Asking Questions

https://youtu.be/yRZZpk_9k8E?t=33s

Connection Techniques

Course Outlines

Interleaving Topics

Peer Reinforcement

