

What and how
should our
grandkids
learn?

From grandkids
to graduates



Check volume

- Dave Sobel, Judy Allerhand Willis – Presenters*
- John Chambers - Moderator
- (Rob Farnham, Steve Brown - Show Runners)

The water level falls

The water level *falls*



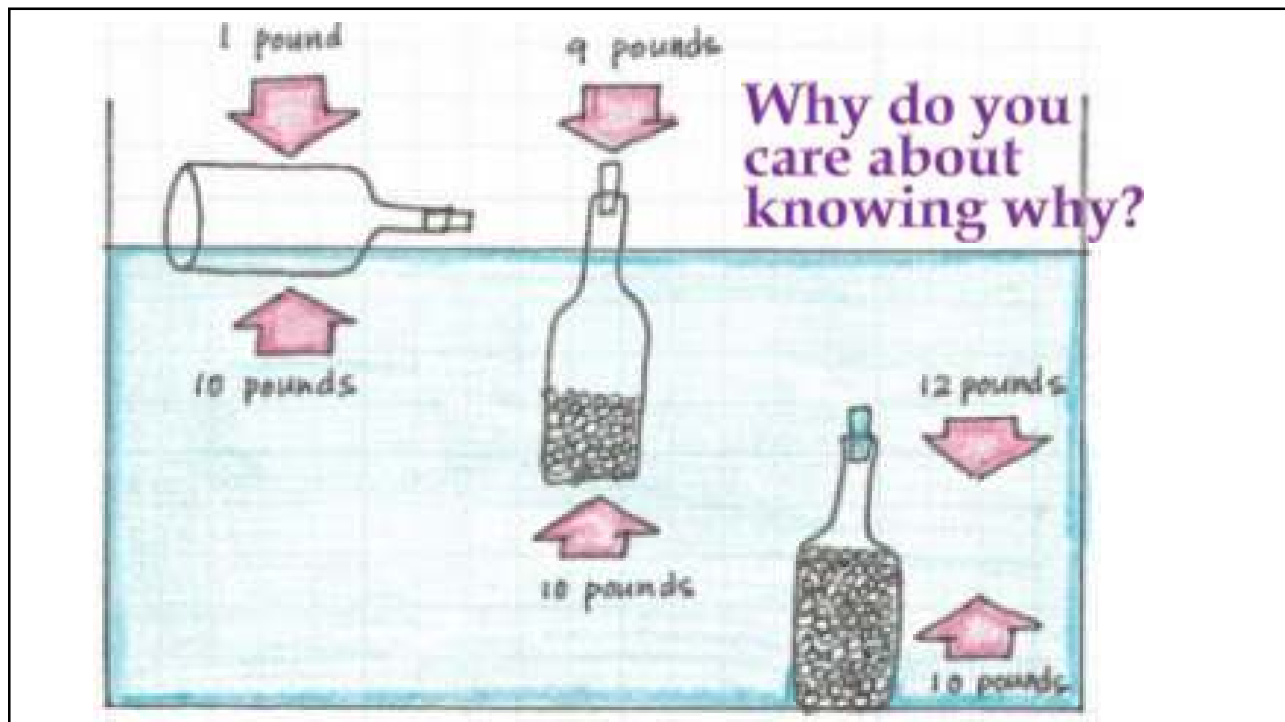
Regardless of whether your prediction was right or wrong, do you want to know why?

The Water Level Falls

The rock in the boat displaces an amount of water equal to its weight.

At pool bottom, it displaces water equal to its volume.

Because the same volume of water weighs less than the same volume of rock, the rock in the water displaces less water so the water level falls.



Lower the barriers, not the bar

Be at the control centers of your learning

Flexible opportunities for knowledge-building & active learning progress to mastery

- Variety of learning sources & media pathways
- Progressive levels of difficulty e.g. Newsela ,
Udio, digital texts, Khan, on-line learning
games, on-line “flash cards” e.g. from Juan

Lower the barriers, not the bar



Variable Learner Challenges

- Variable mastery: boring to challenge
- Variable past success and mindset
- Variable strengths
 - Decreased access to PFC = ↓ memory
 - Low brain takes control of behavior (fight/flight/freeze)

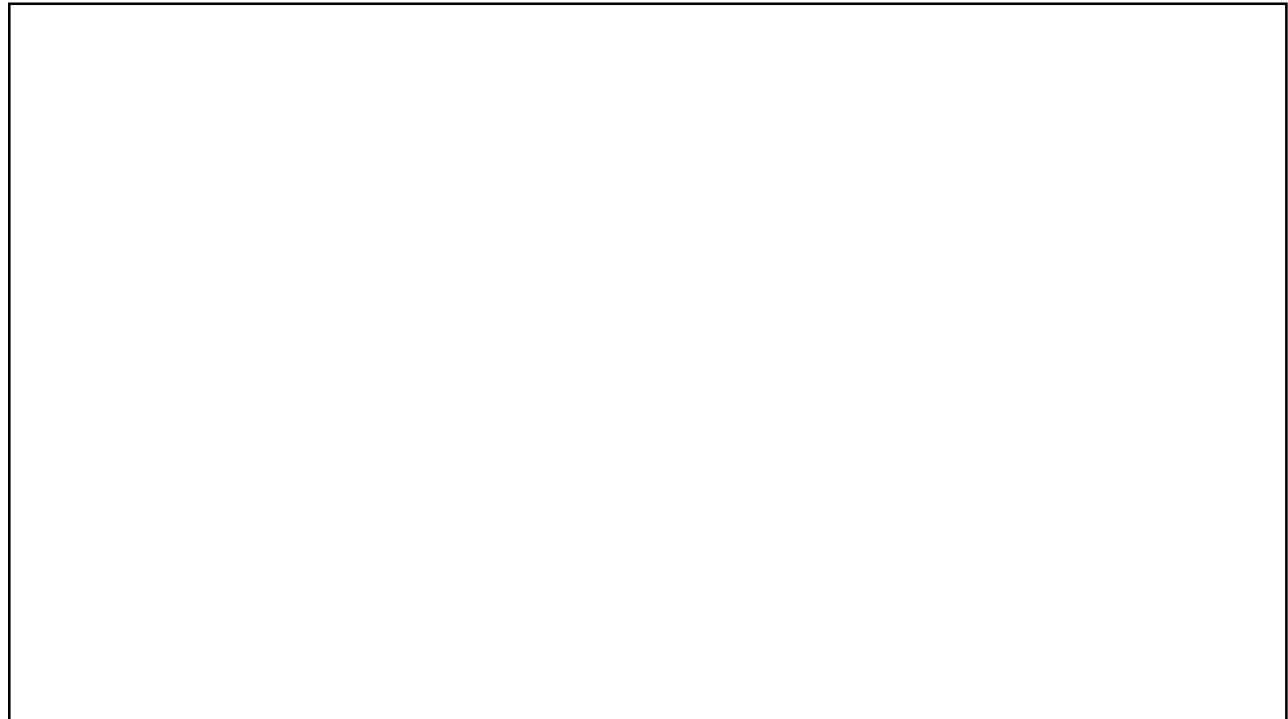


- **TEACHER KNOWLEDGE OF HOW THE BRAIN LEARNS.....IMPORTANT WHY KNOW NEUROSCIENCE**

- **My participant generated list of best (most meaningful and memorable) learning experiences**
- Safe environment/ Comfort
- Clear goal
- Applicable
- Meaningful & relevant to their interests
- Evidence of progress
- Sense of accomplishment
- Novelty and curiosity
- Hands on
- Interactive/Collaborative
- Evidence of progress

Teach kids their brain powers

Sam's ./Williams winter study.....conclusion was, "If children are taught that their minds will literally change to become better at what they most persistently work at, practice, and use, they will be more comfortable to work at their weaknesses. *There is no better motivator than to know that one's effort truly does pay dividends.*"



My ideas for williams ed talk may 1 2022

archimedes to show we never really learned it

**Learning focus is student constructed transferrable, adaptable conceptual understanding LEARNERS
CONSTRUCT UNDERSTANDING that is enduring, conceptual, TRANSFERRABLE AND COG
FLEXIBLE...technology and facts change, information sources biased**

**GRAPES OF MATH learners design labs like high tech high
project based learning, placed based education, maker movement.....david's expertise... that is meaningful and
does build/ construct their understanding
archimedes .**

more pathways that are constructed with coordination such as project-based learning that some central group at the school
or committee organizers in terms of fitting to the curricular demands and the degree of differentiation opportunities.

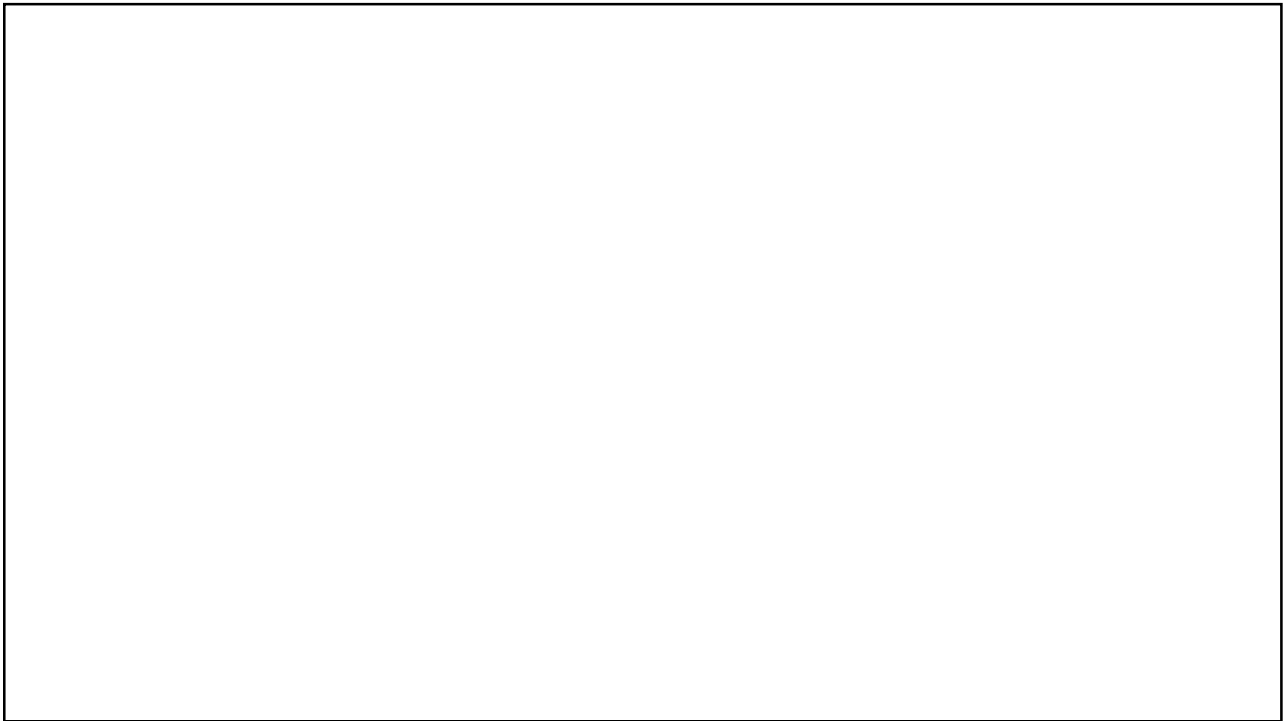
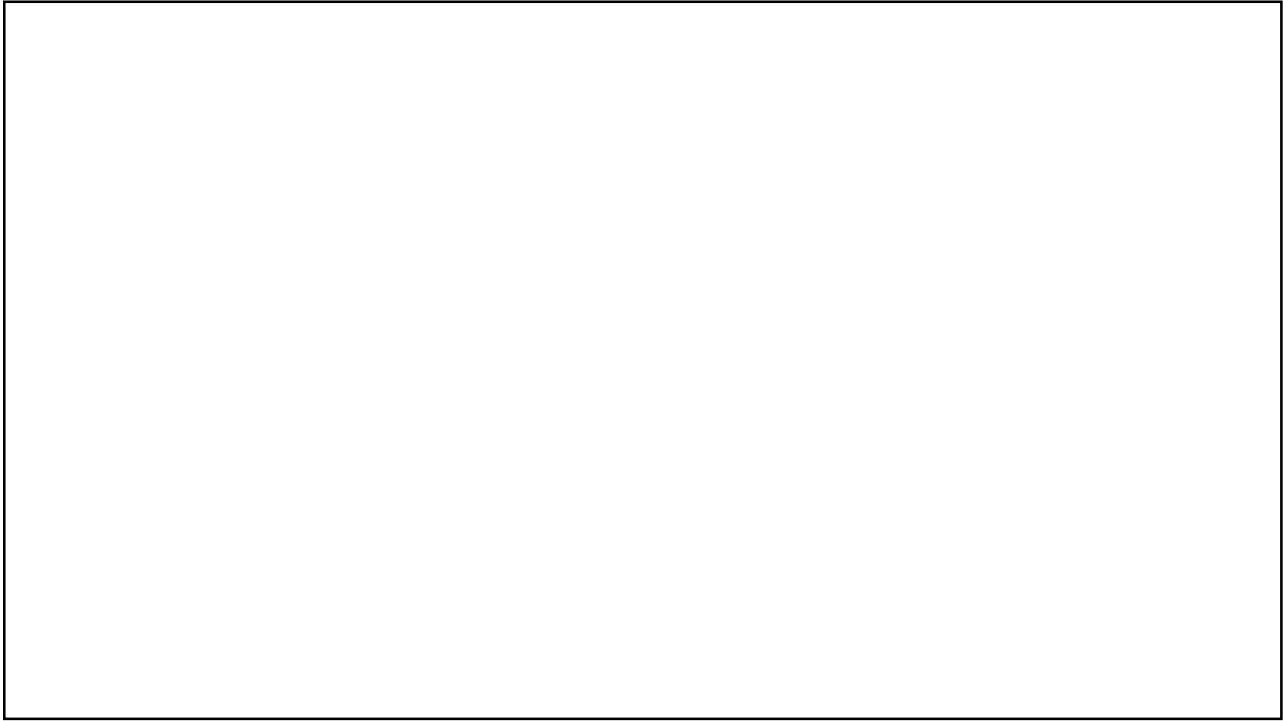
show nbc slides

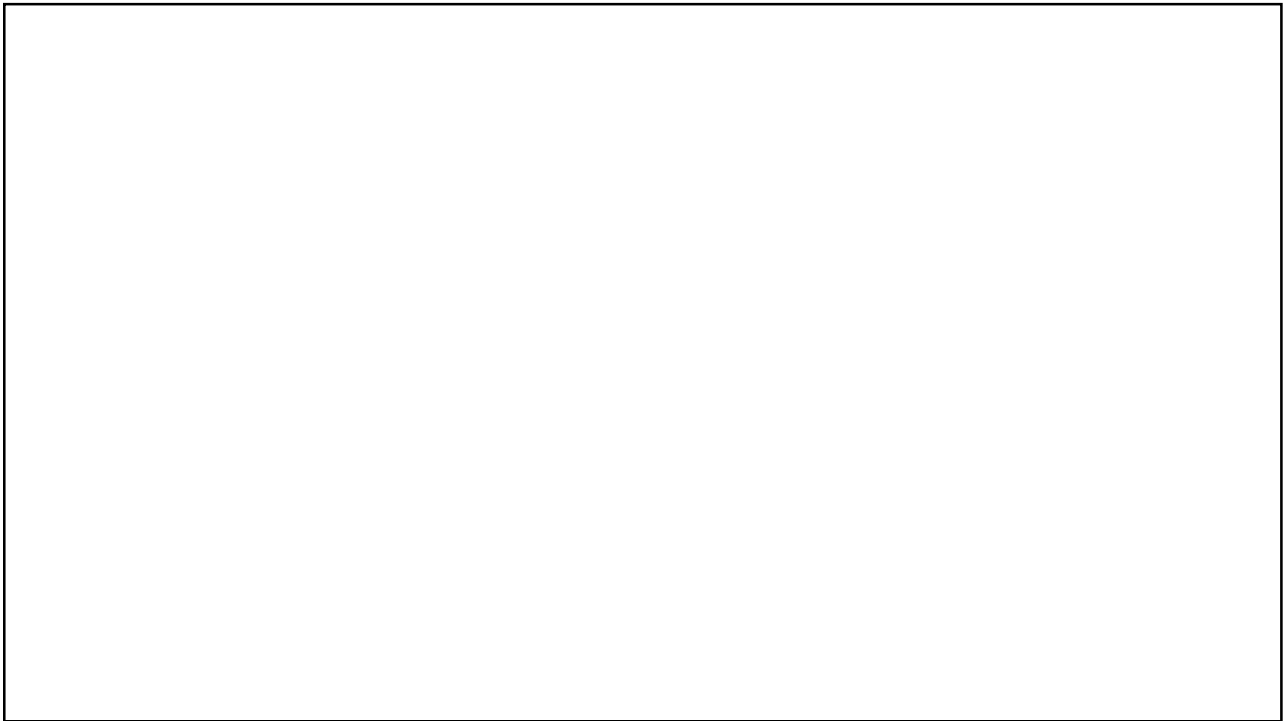
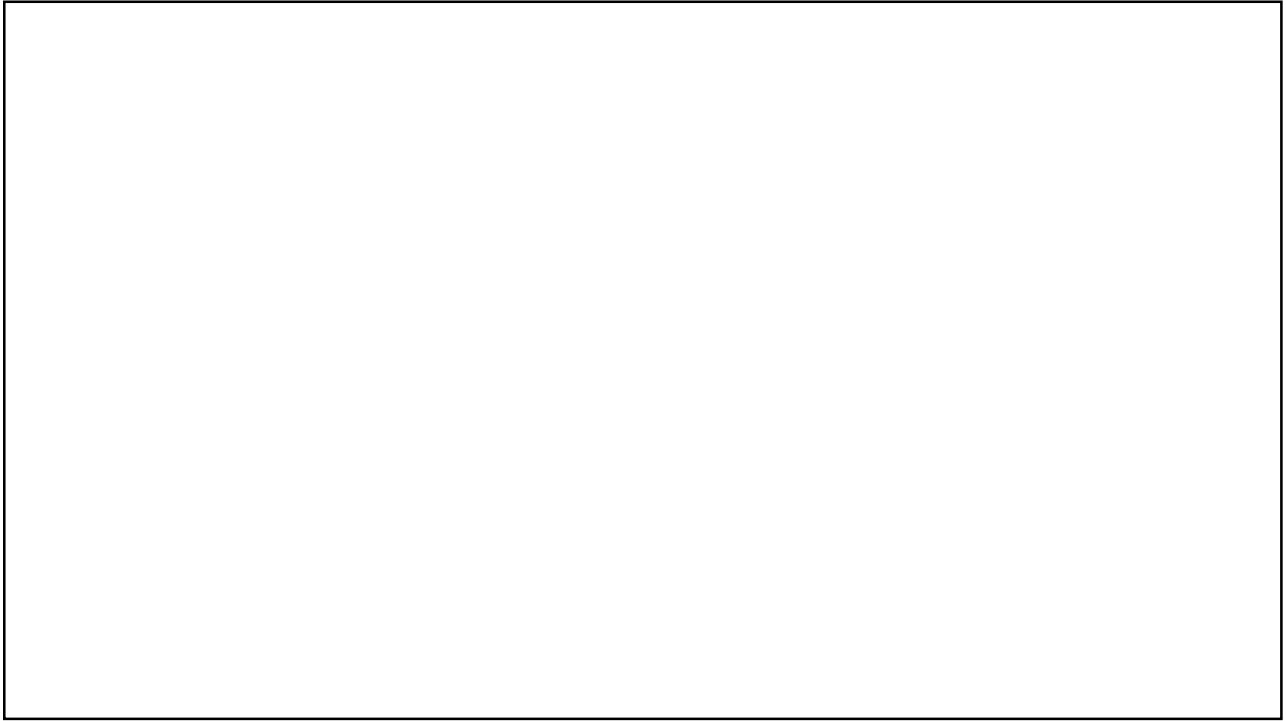
Heuristics vs creative innovation and collaboration

Changes in teachers

what teachers need in terms of support they need more time to get professional development such as neuroscience, more
time for working together on curriculum, share feedback about the students in each others classes if it's multiple subjects
or from the previous year what makes sense work for the student,

more pathways that are constructed with coordination such as project-based learning that some central group at the school
or committee organizers in terms of fitting to the curricular demands and the degree of differentiation opportunities

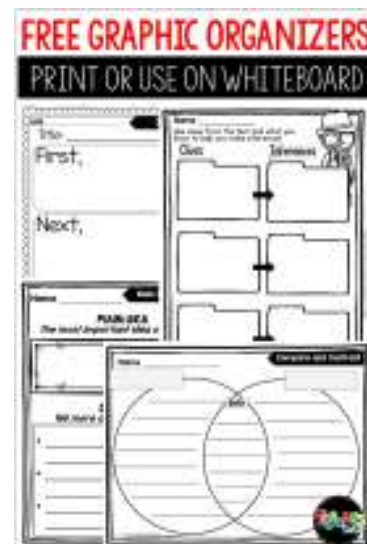




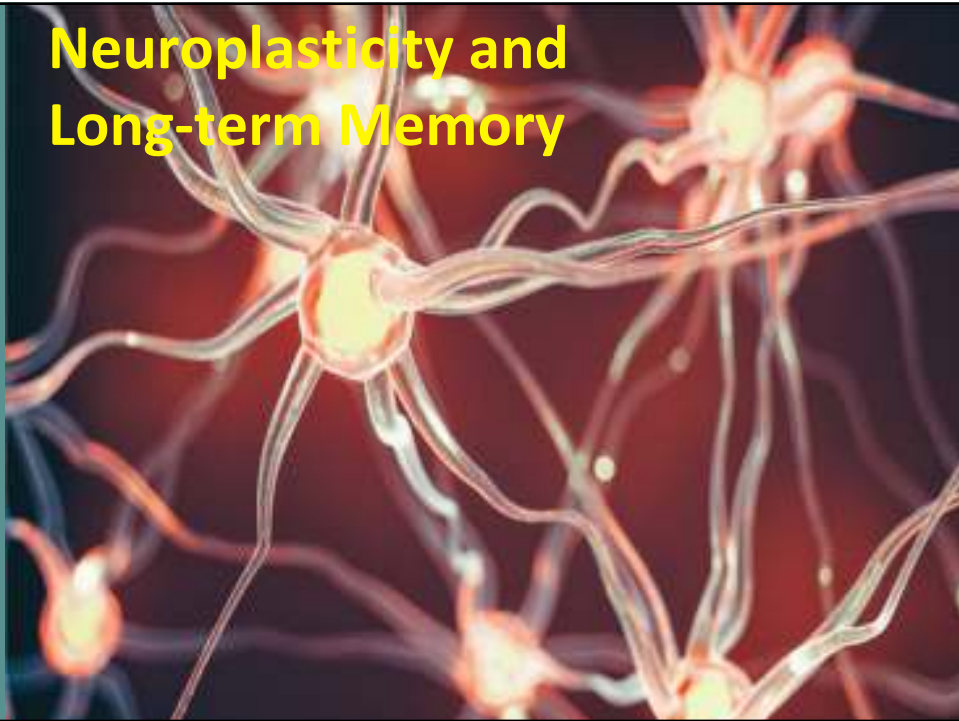
MEMORY

Graphic Organizers

- Activate prior knowledge
- Relate new to existing memory



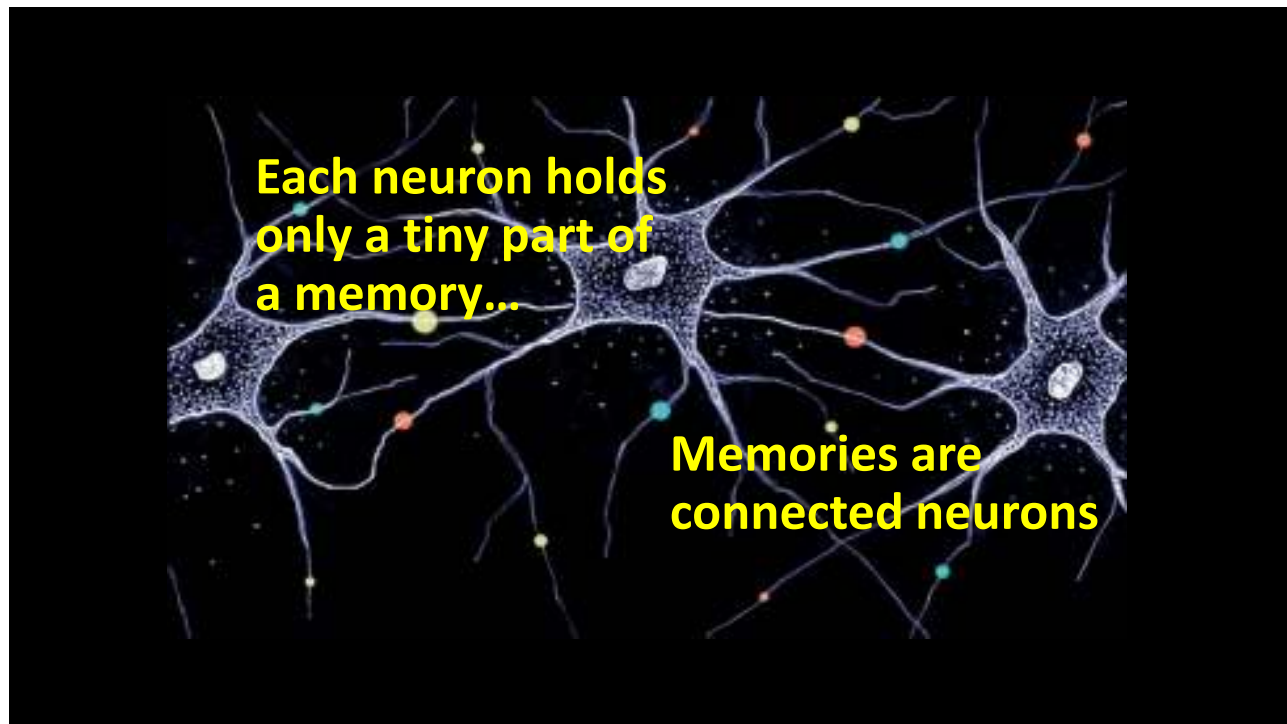
Neuroplasticity and Long-term Memory



Teach Students About
Neuroplasticity



The Infinite Potentials of
their Brains



Each time a memory is used it becomes stronger



Neuroplasticity: *Neurons that fire together, wire together*

Repeated activation =



Firing

More connections =



Wiring

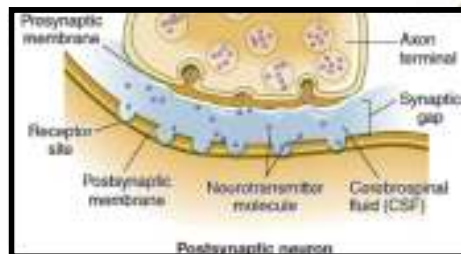
Neuroplasticity

Dendrites →

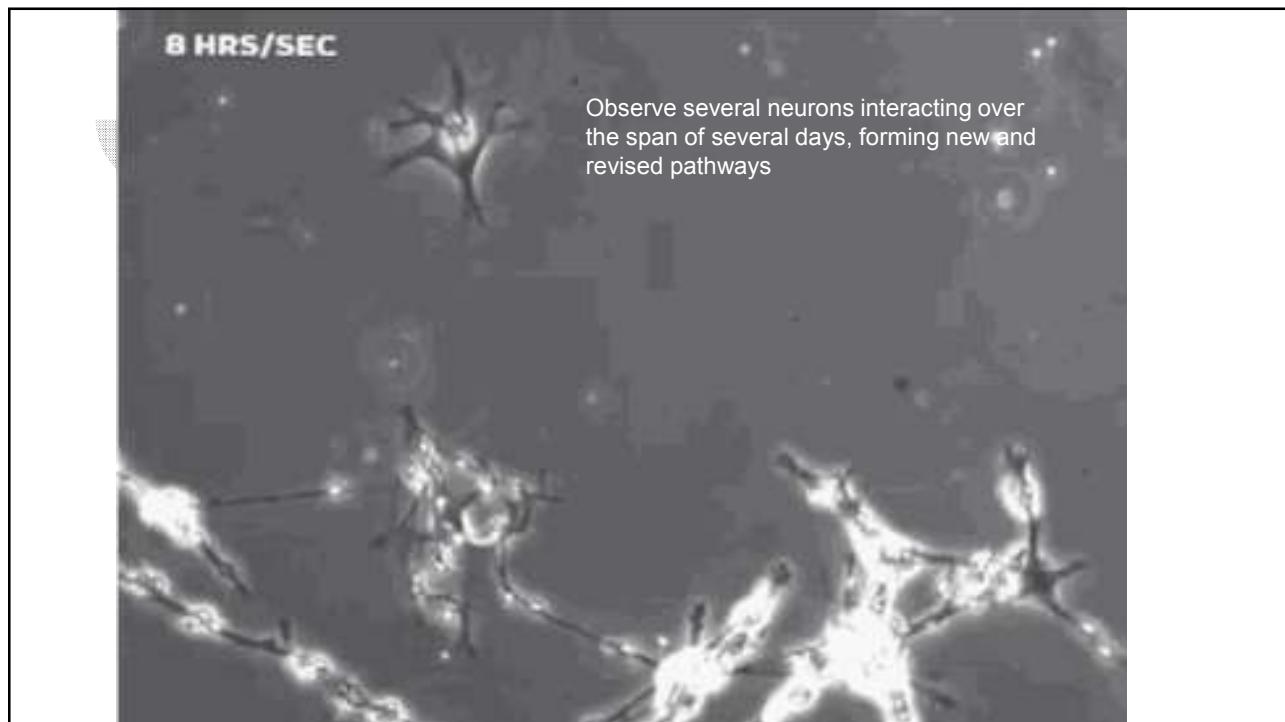
**More myelin =
Faster Communication**

**Neuroplastic Growth =
MORE connections**

Axon with myelin ←

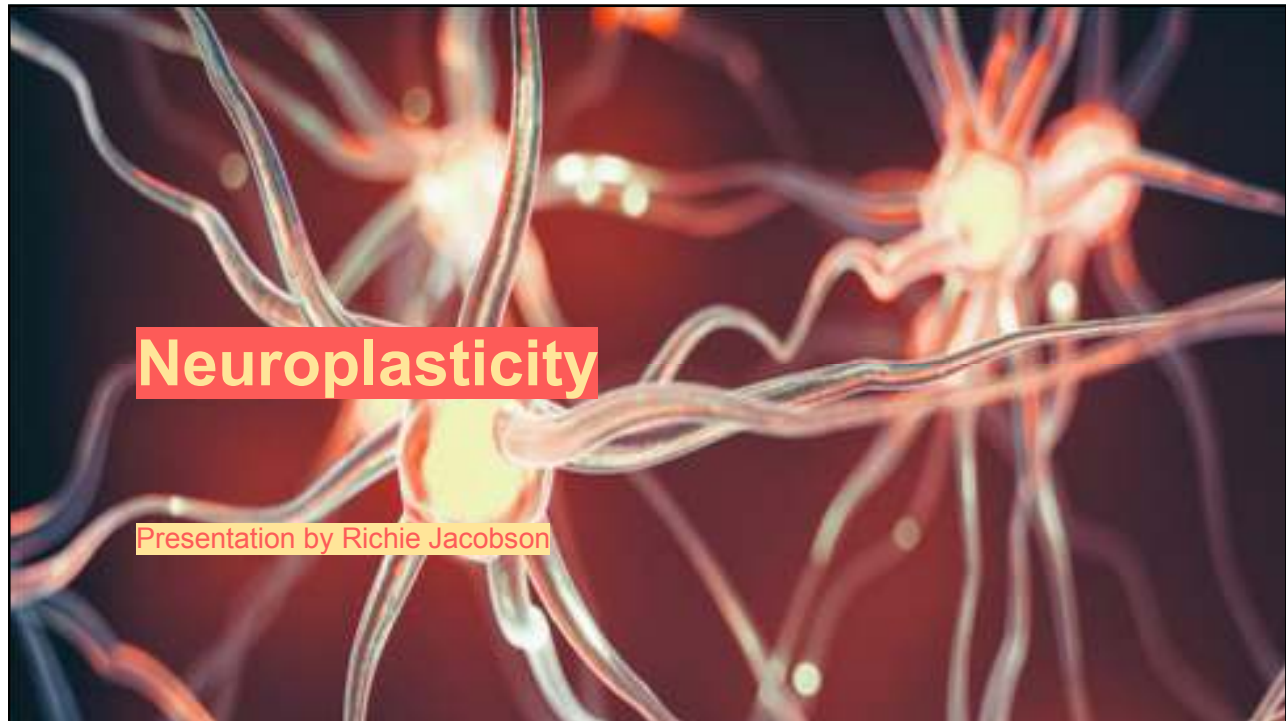


**Practice makes
PERMANENT**



More firing, more wiring





Ways to use the
neuroplasticity information
that follows

Teach students: *The
infinite potentials of
their brains*

Students teach parents

Understanding is
boosted by explaining
simply and clearly

*"If you can't explain it
simply, you don't
understand it"*



Teach Neuroplasticity: "neuroplasticity"

Understanding
neuroplasticity increased
effort and test scores



Details and reference in powerpoint pdf

- 100 seventh graders were given eight-weeks of instruction on how to use study time most effectively, organize information, and remember new material
- **Variable:** Half the students were also taught about neuroplasticity and how it applies to learning
- After the training, three times as many students in the "neuroplasticity" group increased effort and test scores

(Blackwell, et al 2007)



At a time they are highly responsive to
neuroplastic growth from use (activation)



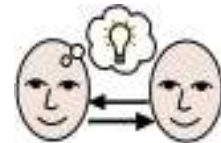
Ex Fun

- The Brain has parts that are important in successful goal achievement
-



Joseph Price:

Syn-naps: 4-minutes



Share: What I do or will do to reinforce understanding of neuroplasticity's power for the executive function networks

- **Summary**
 - Activation (use) promotes network strengthening (neuroplasticity)
 - Networks in PFC are highly responsive to activation during adolescent and teen years
 - Build up teens' PFC executive function circuits by activating them

One-minute timer to follow

Syn-naps – pair/share: one minute remains



What I do or will do to reinforce understanding of neuroplasticity's power for the executive function networks

Summary

- Activation (use) promotes network strengthening (neuroplasticity)
 - Networks in PFC are highly responsive to activation during adolescent and teen years
 - Build up teens' PFC executive function circuits by activating them

What neuroscience suggests about helping teens build stronger skillsets of *executive functions*



Day 5 Poll Questions: Activating Neuroplasticity and Growing their EF's



Which of the following are you **most excited** to work on with your learners?

1. Developing more focused **attention**
2. Practicing **emotional self-management**
3. **Getting organized**
4. **Prioritizing and planning ahead**
5. Using **judgment**
6. Engaging with **critical analysis**
7. Exercise **cognitive flexibility e.g. open-minded, creative problem solving**

How will you activate their EF neuroplasticity?

Thinking back to the executive function that you are most excited about working on with your learners, what is one new strategy you could use to build this skill? Take a moment to add to the Chat Box.

- Develop **attention**
- Practice **emotional self-management**
- **Organize**
- **Prioritize/plan ahead**
- Use **judgment**
- Engage with **critical analysis**
- Exercise **cognitive flexibility e.g. open-minded, creative problem solving**



Why does the cat resume meowing?

He doesn't want
anyone to know he's...

Bow-lingual



Q & A



Questions for you to ponder

- How will you guide students use the EF skills to strengthen their brain networks and capacities for organization, prioritizing, judgement, critical analysis throughout the curriculum?
- How could you do more to guide your students in the more attitudinal (like goal setting and follow through) and emotional executive functions so they build these self-management skills.

JUDGEMENT

From patterns to bias

Snap judgments

- Brain cannot process information as fast as it comes in
- Relies on templates: fast & strong memory links
- The brain may make inappropriate links

Confirmation bias

Brain holds on to reinforced beliefs or personal choices

Chevy vs. Ford



Judgment/Decision-making

- Self-checking strategies such as estimating in math, self-editing
- Debating; list pros and cons



Probability and judgment

If a coin lands on heads 100 times in a row, then what are the odds that the next flip will land on heads?

A: 50%. Past events don't dictate future probabilities.

Probability and Judgment

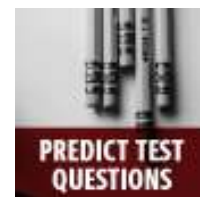
There are three doors. Behind two of the doors is a cardboard box, and behind the last is a brand-new car. You are told to pick a door. After you pick a door, the host who knows where the car is, opens one of the empty doors, then **offers you to switch doors**. Do you switch? Or do you keep your choice?

A: You switch. You have a 33% chance of landing on the door with the car behind it on your first guess. The other two doors have a 66% chance of containing the car. By switching from your first choice, you switch from having a 33% chance to a 66% chance of getting the car.

Estimation/Prediction

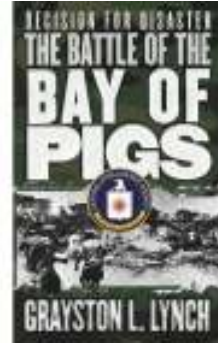


- Estimation is a form of judgment i.e. judge the number of beans in a jar or predict the information they believe is most important to review for tests
- Evaluate their judgments after the “answers are revealed”
- Share strategies that helped them make more successful judgments/predictions



Literary/Historical/Political Judgements

- Consider judgements made by literary characters, historical figures, politicians, or judges
- Would you have made the same decision or not? *Why?*
- What advice would you have given to them?



The Arts

Art INTERPRETATION to reveal pattern bias – jumping to single interpretation - “correct” answer



Teachable Moments for Judgment

Bullying: Encouraging standing up for themselves and for others



“That’s not fair” When students disagree with rules or laws:

- Disagree with compassion, tolerance, and a voice that will be heard
- Support their opinions with evidence
- Predict what the opposing responses would be and prepare to rebut these.

Switch roles and repeat (1-minute each exchange)

Person 1: Give your response to the prompt (*A strategy you use or could use to boost the executive function of judgment in students*). Leave about 15 seconds for your partner to give you feedback (repeat the gist).

Person 2: Give feedback to your partner (repeat the gist of what they said) in 15 seconds or less.

Switch rolls and repeat (another minute).



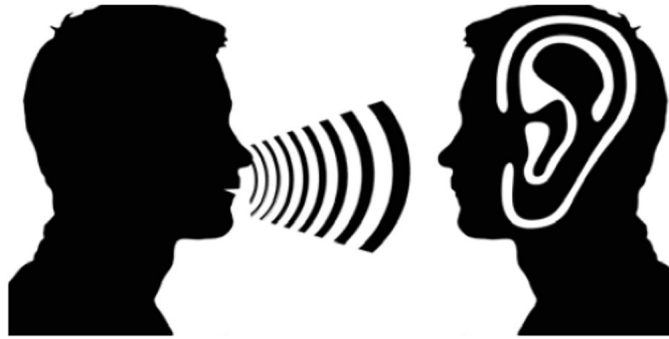
Samples of judgment building activities

- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Rules of Active Listening

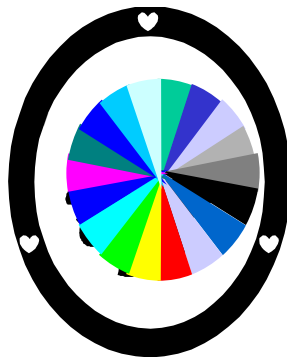
- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, “I think you are saying that....”

How did active listening feel?
 How did you do?
 Take Two-minutes and discuss with
 partner



How did it feel? How did you do?

How did active listening work out
 for you with a partner



Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that.."

One-minute remains



Thoughtful decisions
& considered choices

Start with your
Active Listening



Rules of Active Listening

- Focused attention (No multitasking)
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Parents with their children
Students in pairs

Syn-naps: Your active listening

Prompt: A strategy you use or could use to boost the executive function of judgment in students

With a partner, take turns (1-minute total)

Person 1: Give your response to the prompt (about a judgment strategy). Leave time (about 15 seconds in the minute) for your partner to give you feedback (repeat the gist).

Person 2: give feedback to your partner (repeat the gist of what they said) in 15 seconds or less.

Switch rolls and repeat (another minute).



One-minute timer to follow

Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Samples of judgment building activities

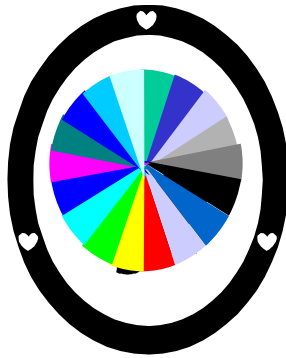
- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Your Active Listening: With a partner, take turns (1-minute each exchange)

Person 1: Give your response to the prompt (*A strategy you use or could use to boost the executive function of judgment in students*). Leave about 15 seconds for your partner to give you feedback (repeat the gist).

Person 2: Partner gives feedback (repeats the gist of what you said) in 15 seconds or less.

Switch rolls and repeat (another minute).



Samples of judgment building activities

- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Jump to Conclusions?



Critical analysis

Critical Analysis

Take a moment to consider: What do you find to be a limiting factor in your learners' analysis of information?

1. Identifying valid sources and recognizing bias
2. Interpreting graphs and data
3. Selecting the best information for their purpose
4. Knowing what the question or assignment is asking them to do?
5. Other

Confirmation bias

Brain holds on to reinforced beliefs or personal choices

Chevy vs. Ford



Judgment/Decision-making

- Self-checking strategies such as estimating in math, self-editing
- Debating; list pros and cons



Probability and judgment

If a coin lands on heads 100 times in a row, then what are the odds that the next flip will land on heads?

A: 50%. Past events don't dictate future probabilities.

Probability and Judgment

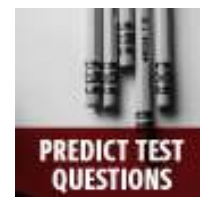
There are three doors. Behind two of the doors is a cardboard box, and behind the last is a brand-new car. You are told to pick a door. After you pick a door, the host who knows where the car is, opens one of the empty doors, then **offers you to switch doors**. Do you switch? Or do you keep your choice?

A: You switch. You have a 33% chance of landing on the door with the car behind it on your first guess. The other two doors have a 66% chance of containing the car. By switching from your first choice, you switch from having a 33% chance to a 66% chance of getting the car.

Estimation/Prediction

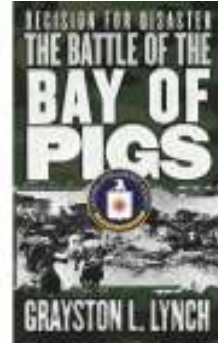


- Estimation is a form of judgment i.e. judge the number of beans in a jar or predict the information they believe is most important to review for tests
- Evaluate their judgments after the “answers are revealed”
- Share strategies that helped them make more successful judgments/predictions



Literary/Historical/Political Judgements

- Consider judgements made by literary characters, historical figures, politicians, or judges
- Would you have made the same decision or not? *Why?*
- What advice would you have given to them?



The Arts

Art INTERPRETATION to reveal pattern bias – jumping to single interpretation - “correct” answer



Teachable Moments for Judgment

Bullying: Encouraging standing up for themselves and for others



“That’s not fair” When students disagree with rules or laws:

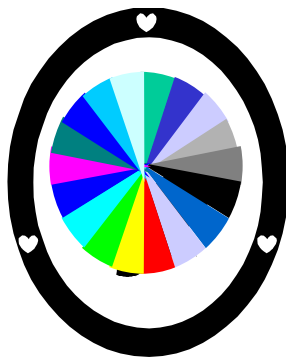
- Disagree with compassion, tolerance, and a voice that will be heard
- Support their opinions with evidence
- Predict what the opposing responses would be and prepare to rebut these.

Switch roles and repeat (1-minute each exchange)

Person 1: Give your response to the prompt (*A strategy you use or could use to boost the executive function of judgment in students*). Leave about 15 seconds for your partner to give you feedback (repeat the gist).

Person 2: Give feedback to your partner (repeat the gist of what they said) in 15 seconds or less.

Switch rolls and repeat (another minute).



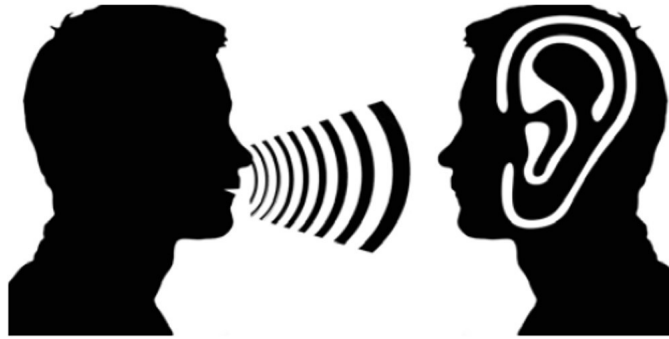
Samples of judgment building activities

- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Rules of Active Listening

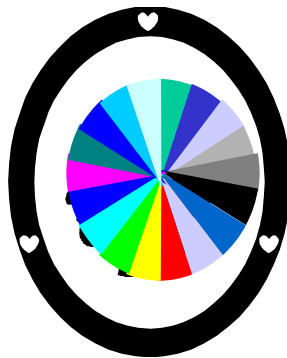
- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, “I think you are saying that...”

How did active listening feel?
 How did you do?
 Take Two-minutes and discuss with
 partner



How did it feel? How did you do?

How did active listening work out
 for you with a partner



Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that.."

One-minute remains



Thoughtful decisions
& considered choices

Start with your
Active Listening



Rules of Active Listening

- Focused attention (No multitasking)
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Parents with their children
Students in pairs

Syn-naps: Your active listening

Prompt: A strategy you use or could use to boost the executive function of judgment in students

With a partner, take turns (1-minute total)

Person 1: Give your response to the prompt (about a judgment strategy). Leave time (about 15 seconds in the minute) for your partner to give you feedback (repeat the gist).

Person 2: give feedback to your partner (repeat the gist of what they said) in 15 seconds or less.

Switch rolls and repeat (another minute).



One-minute timer to follow

Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Samples of judgment building activities

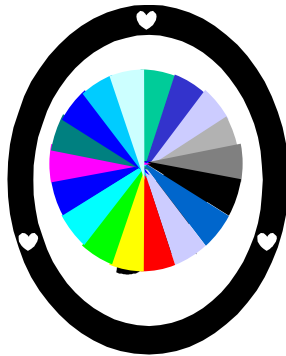
- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Your Active Listening: With a partner, take turns (1-minute each exchange)

Person 1: Give your response to the prompt (*A strategy you use or could use to boost the executive function of judgment in students*). Leave about 15 seconds for your partner to give you feedback (repeat the gist).

Person 2: Partner gives feedback (repeats the gist of what you said) in 15 seconds or less.

Switch rolls and repeat (another minute).



Samples of judgment building activities

- Invite their judgments regarding choices by book characters, historical figures, politicians
- Debate, contemplate, predict, estimate
- Build their awareness of media footprints
- Show examples of jumping to conclusions
- Tic-Tac-Toe

Rules of Active Listening

- No multitasking
- Neutral expression
- No interruptions or questions during their speaking
- Wait...then repeat gist, "I think you are saying that...."

Jump to Conclusions?



Critical analysis

Critical Analysis

Take a moment to consider: What do you find to be a limiting factor in your learners' analysis of information?

1. Identifying valid sources and recognizing bias
2. Interpreting graphs and data
3. Selecting the best information for their purpose
4. Knowing what the question or assignment is asking them to do?
5. Other

Critical Analysis

Take a moment to consider: What do you find to be a limiting factor in your learners' analysis of information?

1. Identifying valid sources and recognizing bias
2. Interpreting graphs and data
3. Selecting the best information for their purpose
4. Knowing what the question or assignment is asking them to do?
5. Other

Media Literacy Needed

- Latest *trends* from science to education and neuromyths
- On the internet one can always find information to support even the most outrageous lies or claims
- There is no clear filter to separate fact from fiction or opinion
- Teach students to navigate, assess, and evaluate sources
- Give them opportunities to assess information for bias (point of view), validity (fact or opinion), and commercial gain

Source Assessment



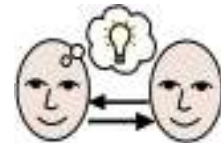
SUBRAHMANYAM, K. (2011) Kids and Credibility: An Empirical Examination of Youth, Digital Media Use, and Information Credibility Teachers College Record

Middle schoolers: 2/3 had had the experience or knew someone who had a bad experience because of false information online.

These experiences influenced their skepticism of Internet information.

However, they rated the Internet as the most believable source of information for schoolwork, news, entertainment, and commercial information.

Syn-naps: Stand and share 4-minutes



Share: How have you or could you promote critical analysis skills in learners?

Summary of a few

- Assess validity of advertisements
- Website analysis
- Correlation or causation? (Spurious Correlations)
- Primary source material and bias

Select one strategy to share out with whole group

One-minute timer to follow

Syn-naps – pair/share: one minute remains

Examples

- Planning long-term & self-monitoring
- Evaluating validity (and value) of information
- Making critical decisions thoughtfully
- Cognitive flexibility with critical thinking to navigate through conflicting information and polarizations
- Other: (i.e. delay immediate gratification)



One-minute timer ...what will your group share out?

Syn-naps – pair/share: one minute remains (remember to select one to share out with group)

Summary

- Assess validity of advertisements
- Spurious Correlations
- Website analysis
- Supported timelines
- Correlation or causation?
- Primary source material and bias



Project-based Learning & Authentic Performance Tasks

- Students apply what they learn as they learn it
- Learners construct their understanding



Jay McTighe: A free series of blogs on performance assessment <http://www.performancetask.com/course-details>

EXTRA...MEDS, COG FLEX,

COG FLEX

Inattentional Blindness

Attention restricted to the designated task causing one to fail to notice other things in plain sight

One's expectations of a single 'right' solution or interpretation



DeYoung, C. (2013). *Frontiers in Human Neuroscience*



Divergent thinking
task:
candle, box of
matches, thumb tack

Cognitive Flexibility

What has to be broken before you can use it?

An egg

What goes up but never comes back down?

Your age

What makes a loud noise when I am changing. I get lighter as I get bigger. What am I?

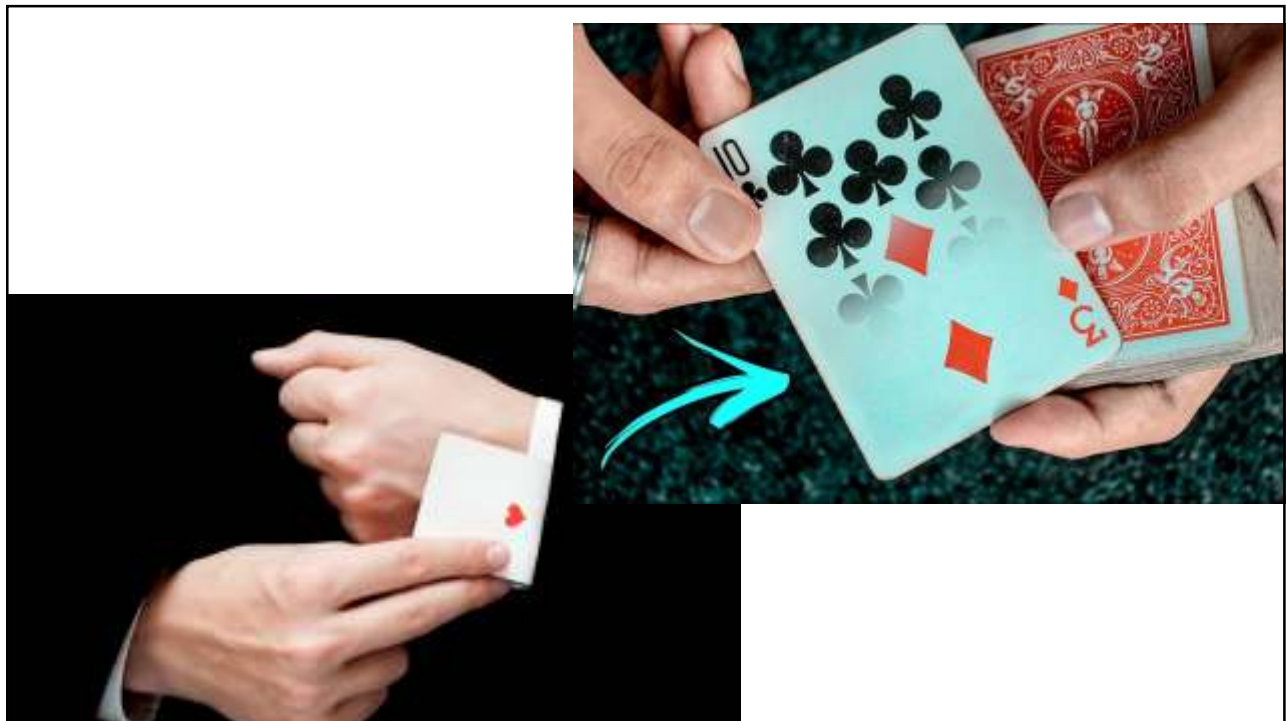


How many times can you subtract the number five from 25?

Once, because after you've subtracted five, it's no longer the number 25.

Laura has four daughters, each of her daughters has a brother; how many children does Laura have?

Five, each daughter has the same brother.



Which
one(s)
teach at
Williams?



And now we'll see two
examples of how previous
year's participants chose to
symbolize
the journey from sensory
information to wisdom



THANKS DIRK

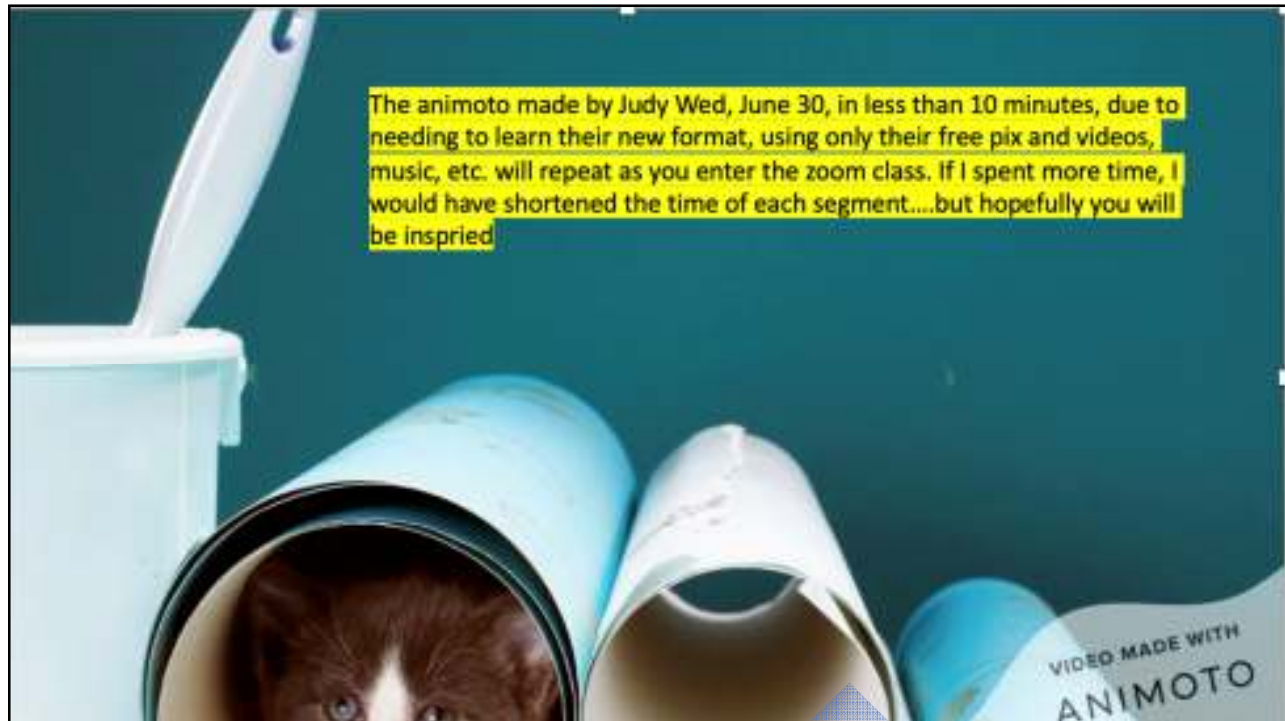
How the RAS and
amygdala influence
learning:

PFC Game

By Mike, Linda, and Beth



Divergent thinking
task:
candle, box of
matches, thumb tack



Questions?



Share out one of your strategies to share out with group

Cognitive Flexibility = potential to...

These responses from other educators *are in your powerpoint pdf.*



"We must help students break preconceived notions of self and others that are biased by prevalent influencers (i.e., Politics, media) and offer means of opening doors to the perspectives of others, allowing for opinions and alternative ideas to enter learning."

"Promote dropping the wall of fixed perspective – be open to other viewpoints/beliefs/likes and dislikes."

"Be receptive and open-minded to new experiences, unfamiliar customs, variations of opinions and interpretations, alternative points of view."

"Understand and value differences: everyone is unique and special in their own way"

"Assess changing data or new information from multiple perspectives."

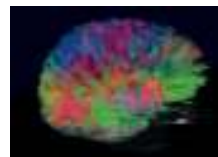


"Build their tolerance for complexity and flexibility in problem solving. To predict a variety of outcomes, adapt to change or new information, and explore their creativity."

Cognitive Flexibility: Multicentric activation benefits to the brain

Memory storage circuits
activated together through
novel connections, creative
applications/interpretations,
and innovations,
extend the brain's multicentric
cross-brains communication
connections

Diffusion Tensor Imaging



Uddin, et. at. Dynamic Reconfiguration of Structural and Functional Connectivity Across Core Neurocognitive Brain Networks with Development (2011) J Neuroscience: 31 (50)

Strategies for Building Cognitive Flexibility

- Games – “This is not a...”
- Variety of perspectives
- Alternative representations and variations
- Open-ended questions
- More wait time
- Avoid language that suggests a single answer

Games to Build Cognitive Flexibility

“This is not a paint brush!”

“It is a sweeper for cleaning desktop”

“It’s a tickle tool”

“It’s a cupcake-frosting applicator”



Change Game Rules for Cognitive Flexibility



Chess pieces with new movement designations

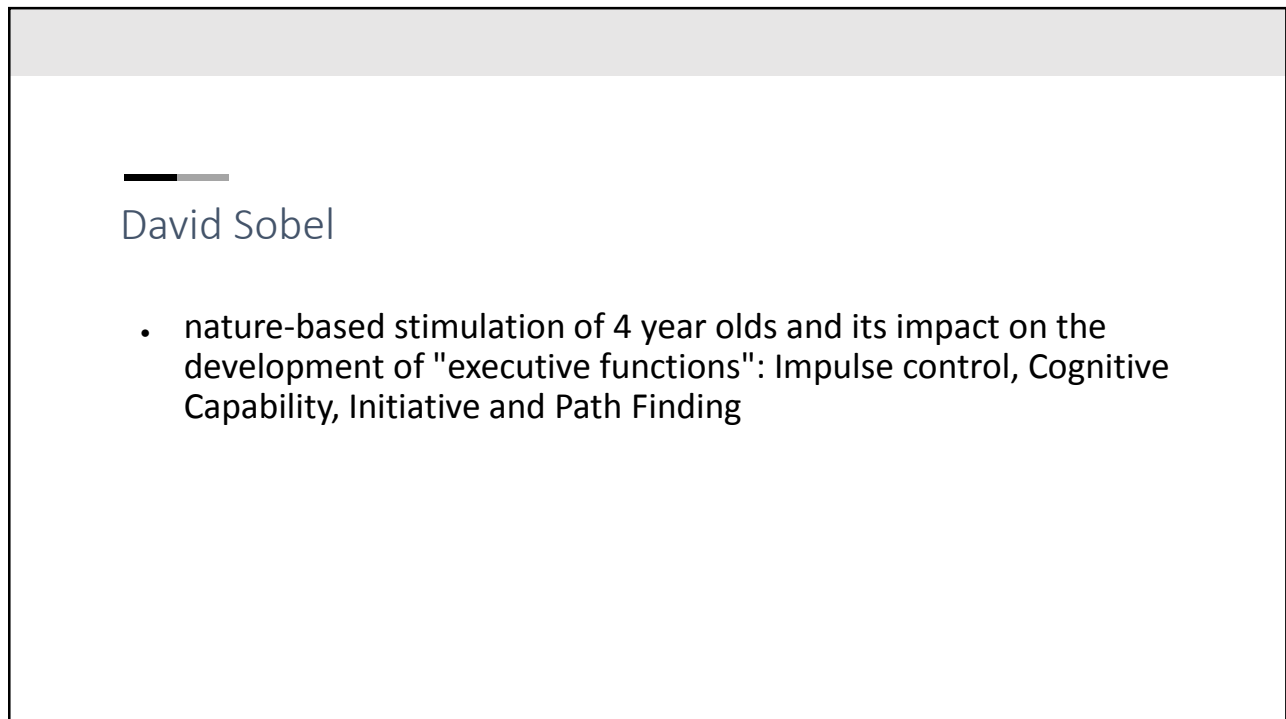


Create variations of
outcomes in literature,
art, science, or history



Prompts:

Pretend that you are
Pablo Picasso and paint a
picture in the style of an
impressionist like Monet.



David Sobel

- nature-based stimulation of 4 year olds and its impact on the development of "executive functions": Impulse control, Cognitive Capability, Initiative and Path Finding

