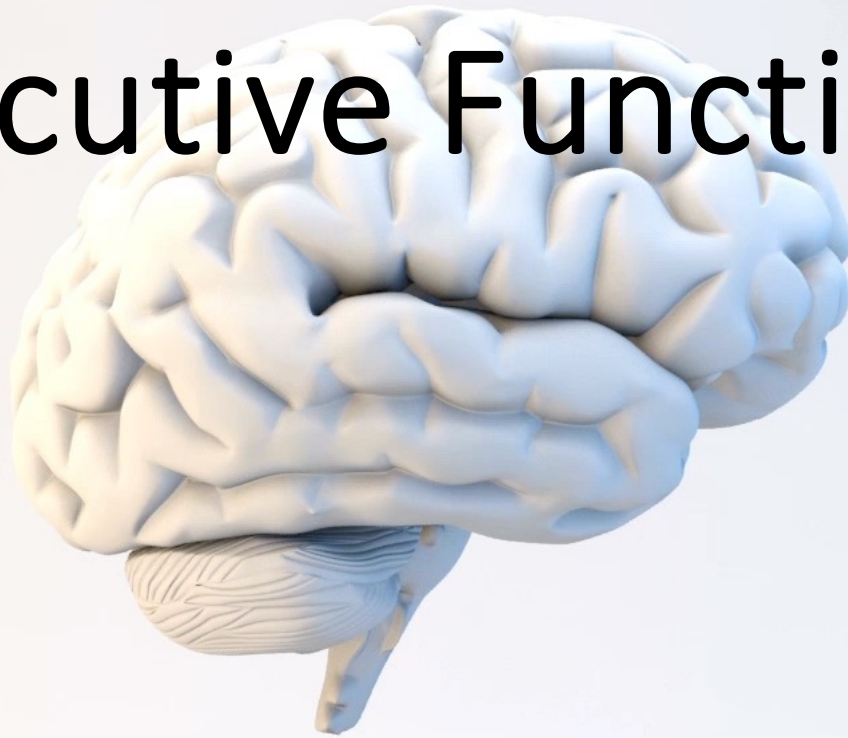



Executive Functions




Secondary Intervention

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Executive Functions Admin Committee

- Dr. Caitlin Colandrea, Director of Grants, Intervention and Student Services
 - Mr. Tim Dolan, Principal- Carl Sandburg Middle School
 - Mrs. Sally Fazio, Vice Principal- Old Bridge High School
 - Mr. Chris McCue, Principal- Carpenter Elementary School
 - Mr. Joe Marinzoli, Principal- Shepard Elementary School
- 
- A series of four yellow curved dashes in the bottom right corner, forming a partial arc.



How do you define executive
functioning?

What are Executive Functions?

- **SKILLS** that help us to decide what activities we will pay attention to and which ones we will choose to do.
- Allow us to organize our behavior over time and override immediate demands in favor of longer-term goals.
- Sustain our attention and persist to complete a task.
- Manage our emotions and monitor our thoughts to work efficiently and effectively.

Let's review each component in greater detail...

Skills Required to: Select & Achieve Goals and Problem-Solving

1. Planning – the ability to create a roadmap to reach a goal or to complete a task. It also involves being able to make decisions about what's important to focus on and what's not important.
2. Organization – The ability to design and maintain systems for keeping track of information or materials.
3. Time Management – The capacity to estimate how much time one has, how to allocate it, and how to stay within time limits and deadlines. It also involves a sense that time is important.

Skills Required to: Select & Achieve Goals and Problem-Solving

4. Working memory – The ability to hold information in mind while performing complex tasks. It incorporates the ability to draw on past learning or experiences to apply to the situation at hand or to project into the future.

5. Metacognition – The ability to stand back and take a birds-eye view of oneself in a situation. It is an ability to observe how you problem solve. It also includes self-monitoring and self-evaluative skills. You might ask yourself, “how am I doing” or “how did I do?”

Skills Required to: Guide Behavior & Achieve Goals

6. Response Inhibition – The capacity to think before you act. This ability to resist the urge to say or do something allows us the time to evaluate a situation and how our behavior might impact it.

7. Emotional Control (AKA – self-regulation or affect) – The ability to manage emotions in order to achieve goals, complete tasks, or control and direct behavior.

8. Sustained Attention – The capacity to attend to a situation or task in spite of distractibility, fatigue, or boredom.

Skills Required to: Guide Behavior & Achieve Goals

9. Task Initiation – The ability to begin a task without undue procrastination, in a timely manner.

10. Flexibility – The ability to revise plans in the face of obstacles, setbacks, new information, or mistakes. It involves adaptability to changing conditions.

11. Goal Directed-Persistence – The capacity or drive to follow through to the completion of a goal and not be put off by other demands or competing interests.

(Dawson & Guare, 2010)

What do weakness in executive skills look like in children?

- Doesn't bother to write down assignment
- Forgets directions
- Forgets to bring materials home
- Keeps putting off homework
- Runs out of steam before finishing work
- Chooses "fun stuff" over homework
- Passive study methods (or doesn't study)
- Forgets homework/forgets to pass it in
- Leaves long-term assignments until last minute
- Can't break down long-term assignments
- Sloppy work
- Messy notebooks
- Loses books, papers, notebooks
- Can't find things in backpack

(Dawson & Guare, 2010)

What do weakness in executive skills look like in children?

- Acts without thinking
- Interrupts others
- Overreacts to small problems
- Upset by changes in plans
- Overwhelmed by large assignments
- Talks or plays too loudly
- Resists change of routine
- Acts wild or out of control
- Doesn't notice impact of behavior on others
- Easily over stimulated and has trouble calming down
- Gets stuck on one topic or activity
- Gets overly upset about "little things"
- Talks out in class
- Can't come up with more than one way to solve a problem
- Low tolerance for frustration
- Freezes on tests

(Dawson & Guare, 2010)

Parents and teachers might notice

Organizational challenges: The student has difficulty organizing – whether a backpack, a desk, or multi-step directions for class assignments, the student may lose or forget to turn in homework

Behavior or emotional management challenges: the student is impulsive or easily frustrated, cannot resist online distractions, has difficulty settling down to do work and persisting with tasks

Time management challenges: the student leaves work until the last minute, causing panic and stress

Academic challenges: The student may lack persistence or often not start or complete even small assignments

Developmental Tasks Requiring EF Skills

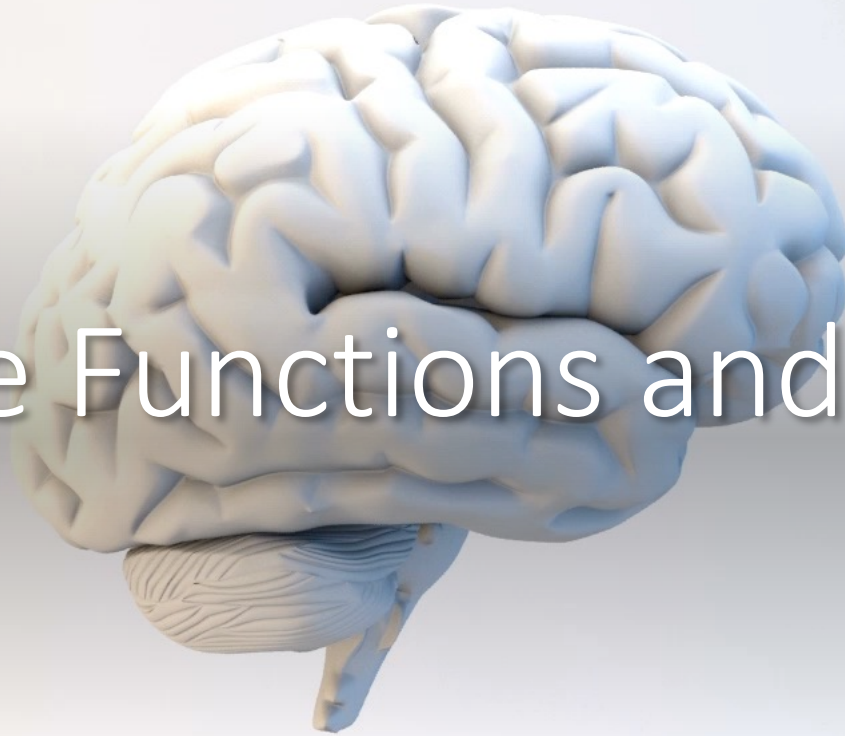
Grades 6-8

- Use a system for organizing schoolwork
- Follow a schedule
- Plan and carryout long-term projects
- Estimate how long a task will take to complete
- Inhibit rule breaking

Grade 9-12

- Manage schoolwork effectively- studying, completing assignments, following timelines, making adjustments to work performance in response to teacher feedback
- Establish long-term life goals
- Make appropriate use of leisure time while still maintaining responsibilities
- Inhibit reckless or dangerous behaviors

Executive Functions and The Brain



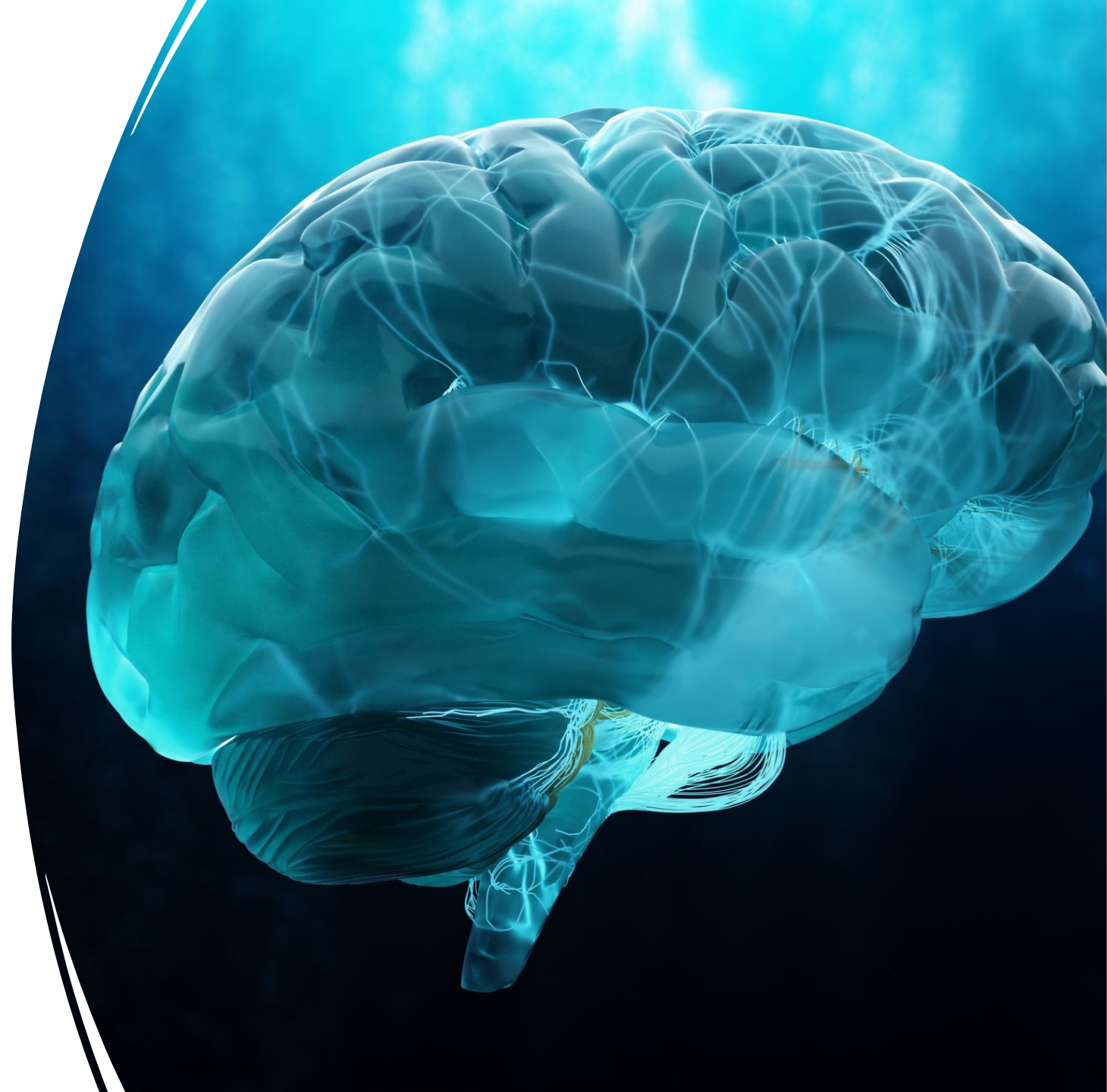
What do all students share in a particular grade-level?

A similar date of birth.

Our current education system is founded on the expectation that learning goals should be achieved by a certain age.

The brain does not pay attention to those expectations.

Consider: the pace of brain development varies among individuals

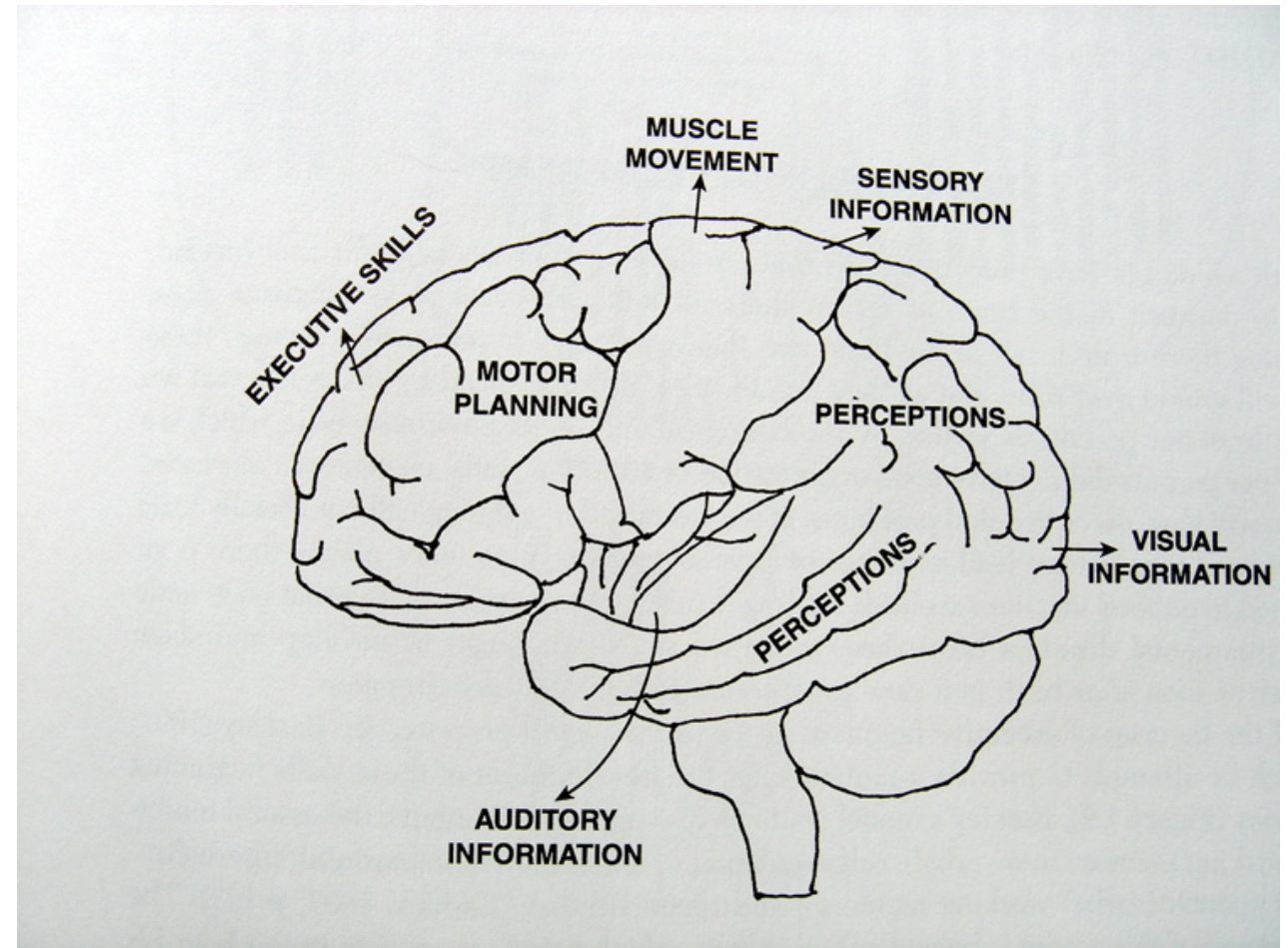


Development of Executive Skills

Executive skills begin to develop in early infancy and continue into adolescents and into early adulthood (Dawson & Guare, 2010).

Executive skills take a full 2 decades to develop (even longer in children who struggle with learning or attention).

In adults, they decline with age.

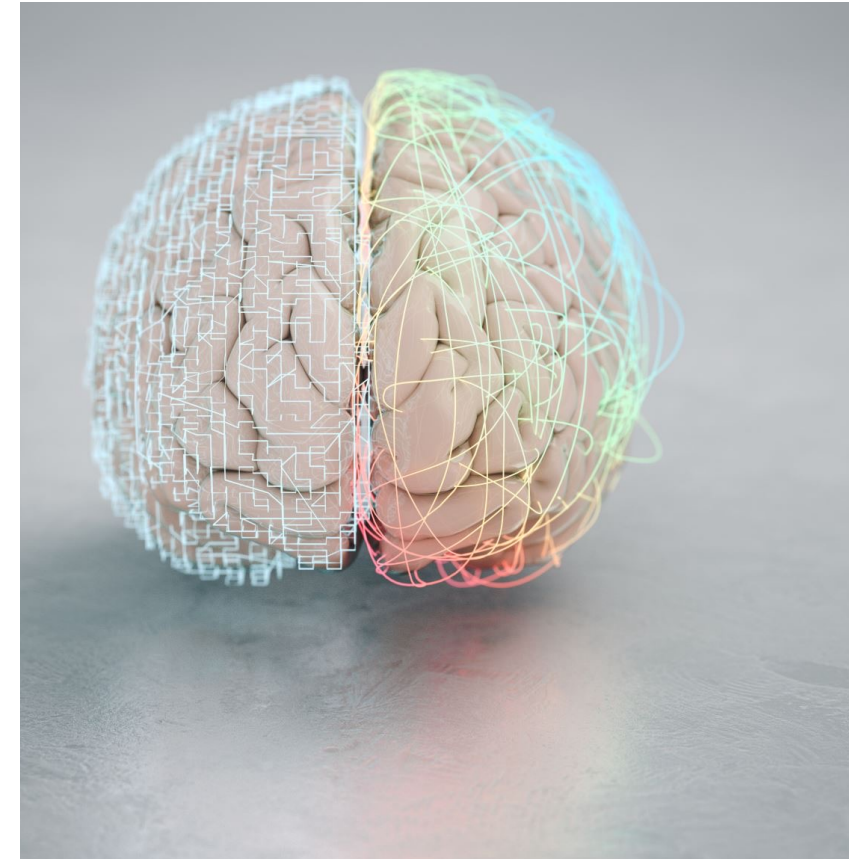


Brain development and sensitive periods

There are two major periods of “pruning” in the brain in which a major surge of synapses in the brain is followed by a consolidation of skills.

- From birth to age 3 and again just before adolescents (11-14) and pruning through age 25
- Most of this growth spurt in the brain during adolescents occurs in the frontal lobes
- Though the brain’s physical structures are fully developed by age 6, the connections among them take longer to form.

This process tells us that a child’s brain is primed for learning!



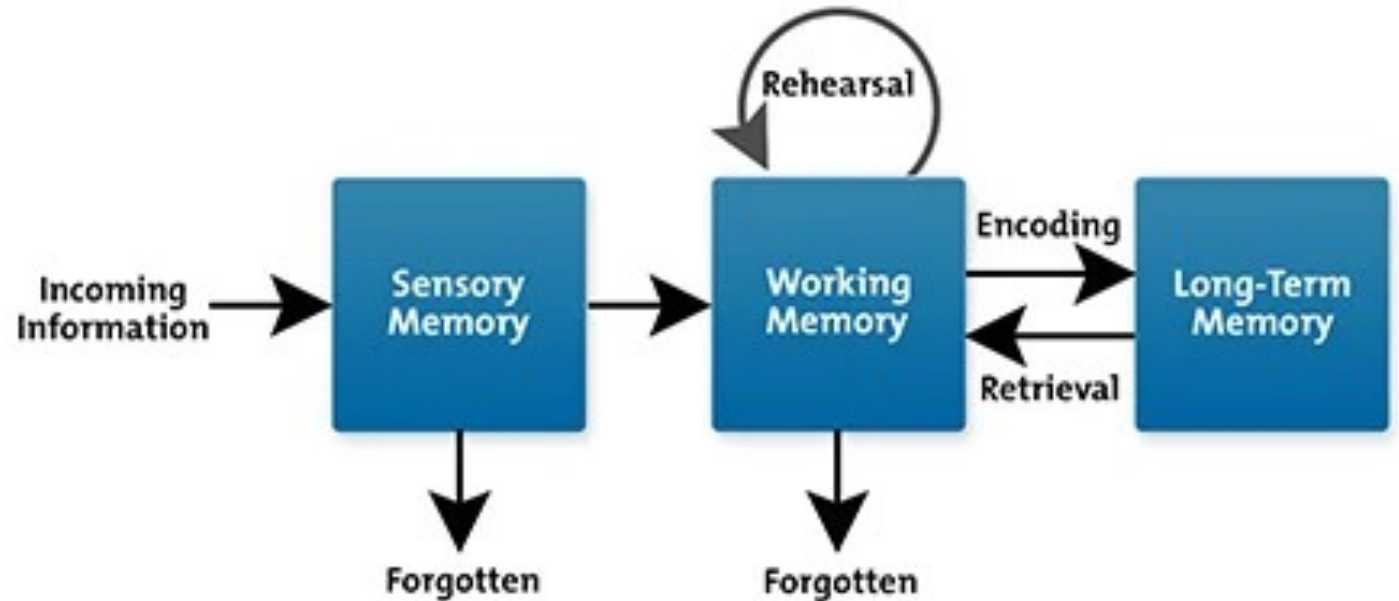
Explicit Instruction for Executive Skills

Planning, organization,
time management, task-
initiation, goal-directed
persistence



The Learning Process: Working and Long-Term Memory

- Working Memory: temporary storage to hold information up to 30 seconds
- Students primarily use their Working Memory until they can encode the information to long-term memory by developing a meaningful connection OR through repetition.
- To be retained, new information must be linked to existing information.



AVERAGE CONCENTRATION SPAN BY AGE

Age x 2 to 5 minutes = Average Concentration Span



| AGE | AVERAGE CONCENTRATION SPAN |
|-----|----------------------------|
| 4 | 8 – 20 MINUTES |
| 5 | 10 – 25 MINUTES |
| 6 | 12 – 30 MINUTES |
| 7 | 14 – 35 MINUTES |
| 8 | 16 – 40 MINUTES |
| 9 | 18 – 45 MINUTES |
| 10 | 20 – 50 MINUTES |
| 11 | 22 – 55 MINUTES |
| 12 | 24 – 60 MINUTES |

Attention Span

Sufficient attention is needed for working memory to focus on the task at hand or new content being presented.

Long-Term Memory and Learning



Memories are susceptible to change and misinformation



The way to make long-term memory more reliable is to incorporate new information gradually and repeat in timed-intervals

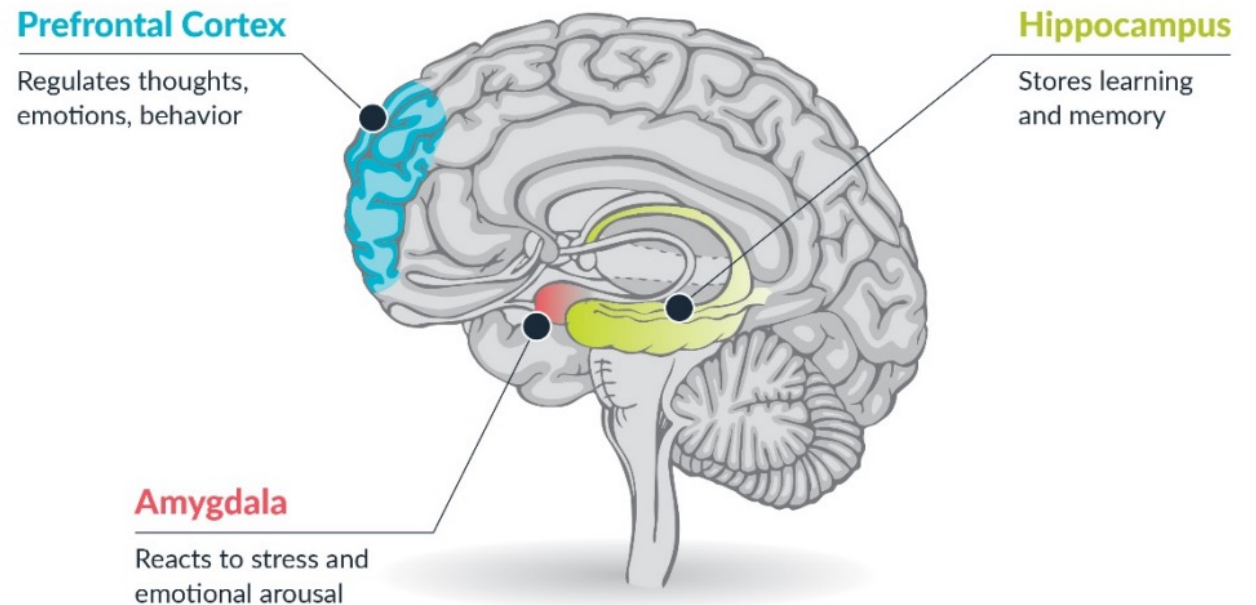


Chronic stress or anxiety can create damage to the cells of the hippocampus creating problems with the ability to learn and remember

Memory, Learning Process and Meaning

The **hippocampus** is where short-term memories are turned into long-term memories, then stored elsewhere in the brain.

The **amygdala** helps determine what memories to store, and whether we have a strong or weak emotional response to the event.



Emotion Regulation:

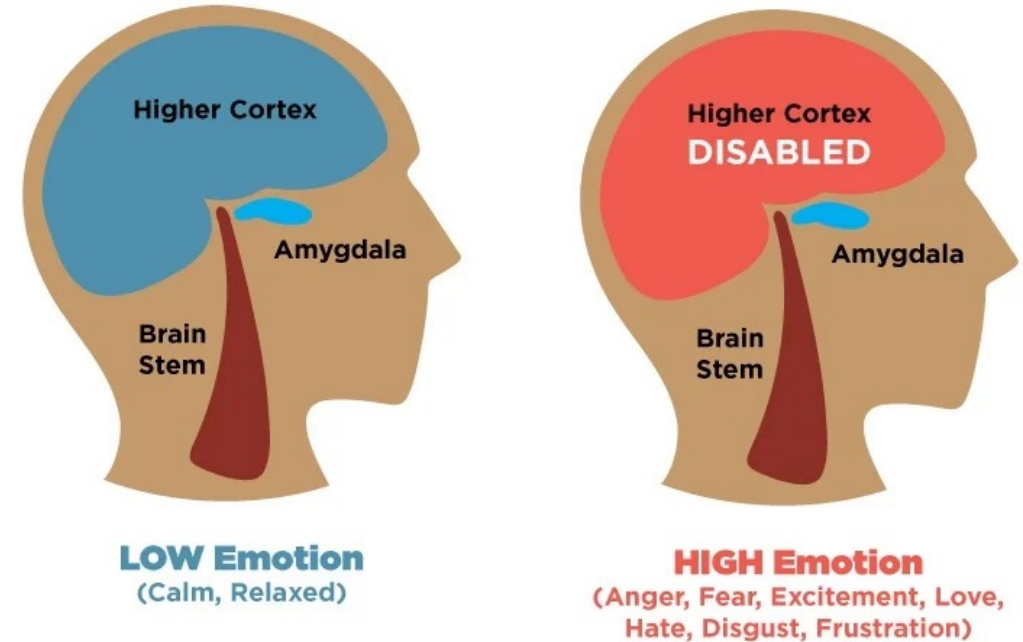
Learning is an emotional experience for students

Struggling students experience stress and anxiety from tests and school in general

Stress and anxiety can cause the brain's higher order thinking processing center to shut down, making retention of learning very low.

The brain, instead focuses on reducing the cause of the anxiety and learning objectives become a low-priority.

Students may remember the situation, that's it.



Keys to Motivation

- **Dedication:** avoidant students do not always make the connection between their efforts and outcomes
- **Confidence:** Lower achieving students often over-emphasize their limitations believing they are worse than they really are until they give up
- **Interest-** (sustained attention)
- Individuals demonstrate greater motivation when the incentive will help them to avoid the loss of something as compared to gaining something



What can impact the development of executive functioning skills in students?

Any major type of trauma to the brain

Genes inherited from parents

Environmental toxins

Emotional trauma

Any type of child abuse

Disadvantaged economic circumstances


Chronic stress

Low educational attainment

Executive Functioning Skills and ELA




Working Memory and ELA

- Children comprehend the meaning of text by remembering what they have already read and updating their understanding of the story as they continue to read.
 - Helps a child to keep the topic or goal of a paper in mind while writing, versus going off on a tangent.
 - Helps in remembering spelling and grammar rules.
- 



Inhibition and ELA

- Is needed when encountering words with multiple meanings by choosing the correct meaning in the context of the story and ignoring its other meanings.
 - Is needed during the brainstorming/planning process of writing. This is going to help children inhibit ideas they have already covered, allowing them to think of new ideas.
- 

Executive Functioning Skills and Math

Working Memory and Math

Information should be chunked followed by sufficient practice in order to lead to long-term memory storage.

Emphasize the process over computational skills.

Both the **quantity and quality** of response opportunities can impact the rate of improvement.



Math Reinforcement and Meaning

- An important factor when building mathematical proficiency is the extent to which students have the opportunity to apply newly learned concepts/skills and the extent to which they can apply them in meaningful ways.
- **Application to real-life: the brain is hardwired to attend to information with emotional content first.**

Motivation

Research indicates that students who have experienced success with math in the past will persevere even if they can only respond correctly about 75 percent of the time.

In contrast, students who do not have a history of success need instruction broken down into smaller steps/increments **so they can experience success 90-95 percent of the time in order to remain engaged.**

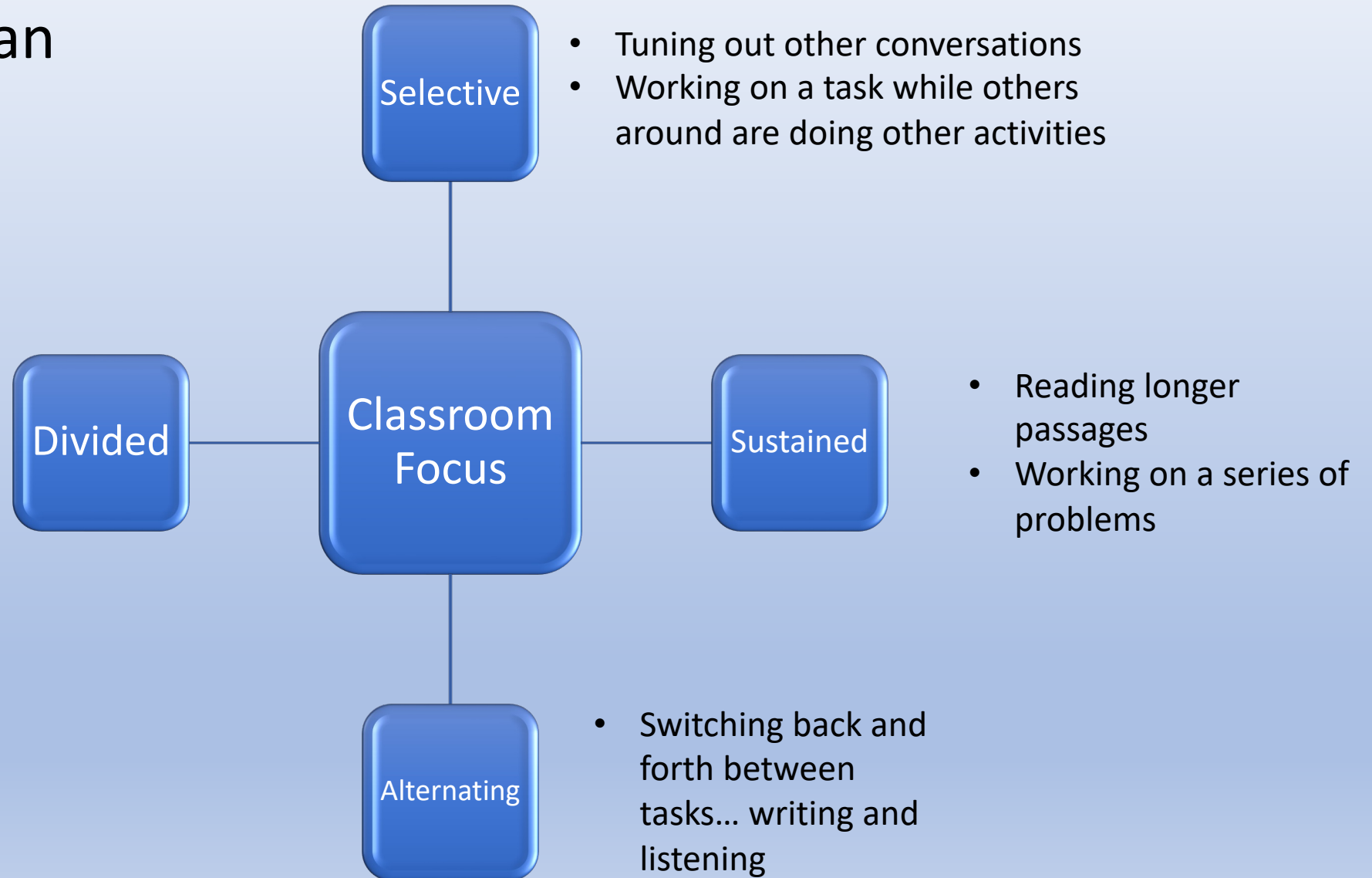
Think Aloud Process for Metacognition

- Model thinking aloud for students.
 - Re-read the problem
 - Paraphrase the problem
 - Create a plan to solve the problem
 - Predict/estimate the answer
 - Compute the answer
 - Check the answer
- Have students think aloud while solving a problem.

Strategies for Home

To get better at school we can plan and practice at home

- Attending to 2 or more stimuli at the same time... Writing and holding a conversation





Habits to build...

- Planning and organizing for school (Calendar)
- Pushing through boredom
- Being Goal Oriented



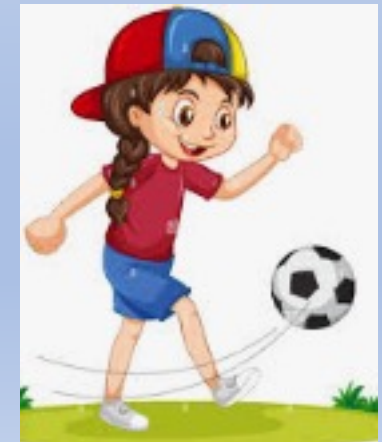


- Management of time
 - Distracted body
 - Distracted Mind
 - Disorganization



- Completion of tasks at home
 - Tracking
 - Visualize data
 - Plan and record rewards and tasks completed

| CHORES | | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|--------|---------------|---------|-----------|----------|--------|----------|--------|
| Little | Read | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Little | Set Table | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Little | Load Dishes | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Little | Sweep | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Owen | Read | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Owen | Feed Dog | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Owen | Unload Dishes | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Owen | Clear Table | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Connor | Wash Table | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Connor | Pick Up Toys | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |



STARVE
YOUR DISTRACTION
FEED
YOUR FOCUS

- Homework or taskwork Ladder
 - Create the rungs



- Emotional regulation at home
 - Recognize emotional escalation
 - Take a break when heated

- In the World

- How to build or foster mental flexibility
 - The exercise of perspectives
 - The multiverse game-- Multiple possible outcomes
 - Change the ending of a plan

“No parent
can child-proof
the world.
A parent’s job is
to world-proof
the child.”

-Doug Flanders, MD



Personal behavior



Emotional regulation



- S ---(stop talking & moving)
- T ---(Think about what you are doing)
- O ---(Observe the environment)
- P ---(Proceed)

Understanding of emotions comes first

- Task Initiation and Task Completion



- Life Calendar of Important events



Games or
activities to
help with
these skills:

Simon Says Freeze tag Reading Together

Board Games (some examples)

Stratego



Chess



Sorry



Checkers



Monopoly

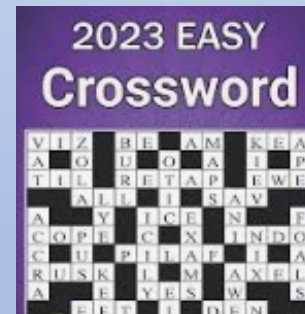


Independent tasks:

Directed building



Crosswords



Puzzles



Rubiks Cube



Video Games?

Yes! Certain videogames build these skills!

Takeaways

- Better attention always equals better learning
- Emotions get our attention
- Meaning before details
- The brain needs a break to connect the dots



Questions?