

**EXECUTIVE FUNCTIONING:
THEORY INTO APPLICATION
SEVEN STRATEGIES TO TEACH
EXECUTIVE FUNCTIONING SKILLS:
PART 2**

**Washington State Association of School Psychologists
Laurie Harrison, Ph.D.
Snohomish School District**

VARIABLES THAT IMPACT STUDENT LEARNING

- Evolution
- Gender Differences
- Developmental Abilities
- Adverse Childhood Experiences (ACES)
(Epigenetics)
- Ethnicity
- Cultural Linguistic abilities

- Brains vary as much as a finger print, both in structure and in how we use them.

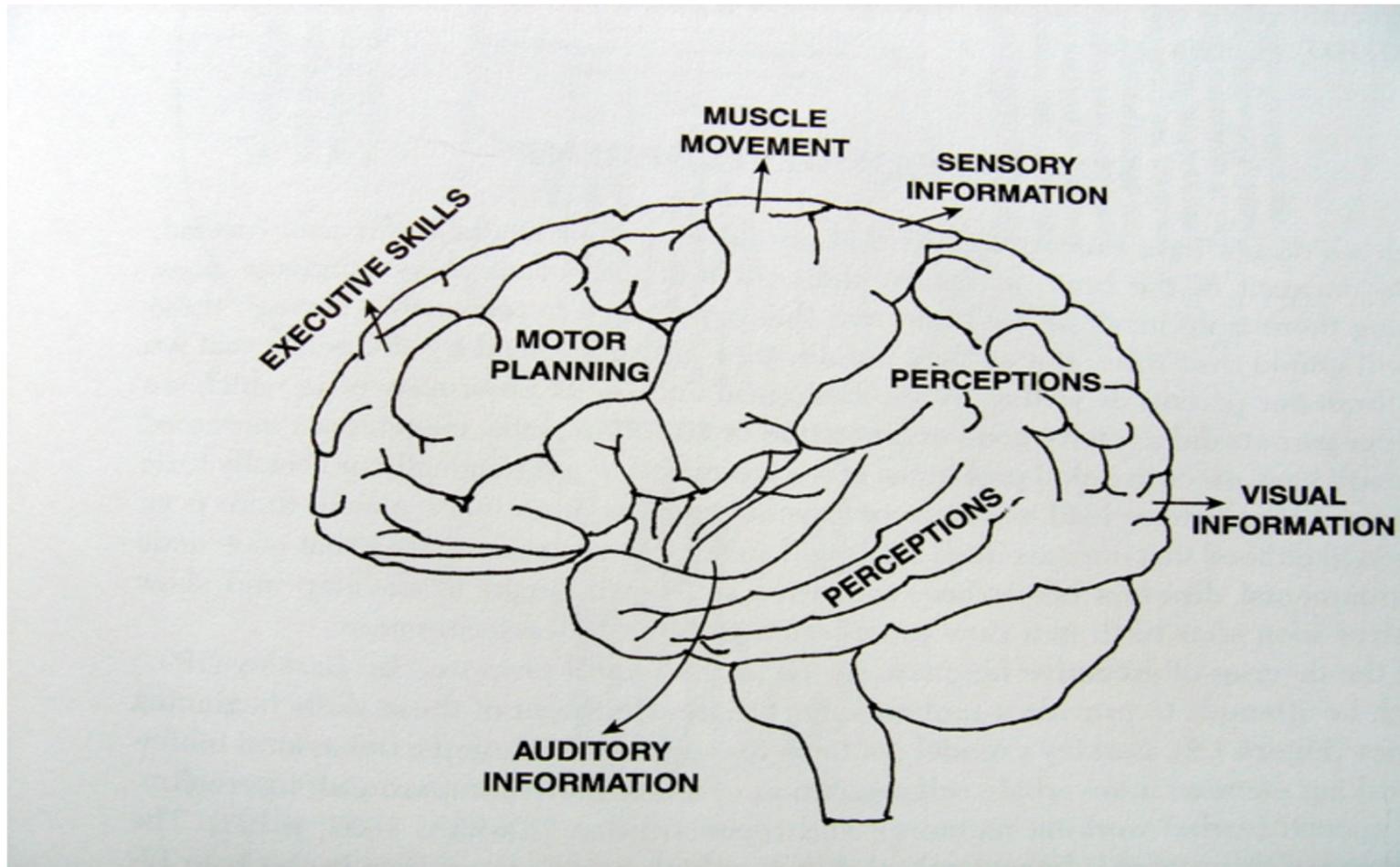


EVOLUTION

- Over time human beings developed the ability to engage in cooperation, most moving out of the Hunters and Gathers phase to building immense civilizations.
- We developed and reinforced our ability to:
 - Verbally communicate
 - Engage in higher level reasoning skills
- The stronger our abilities in thinking and communication, the better we did.
- Males and Females brains evolved differently, complimenting each other and strengthening our ability to survive and evolve.



Where in the brain are executive skills located?
In the frontal lobes (just behind the forehead)



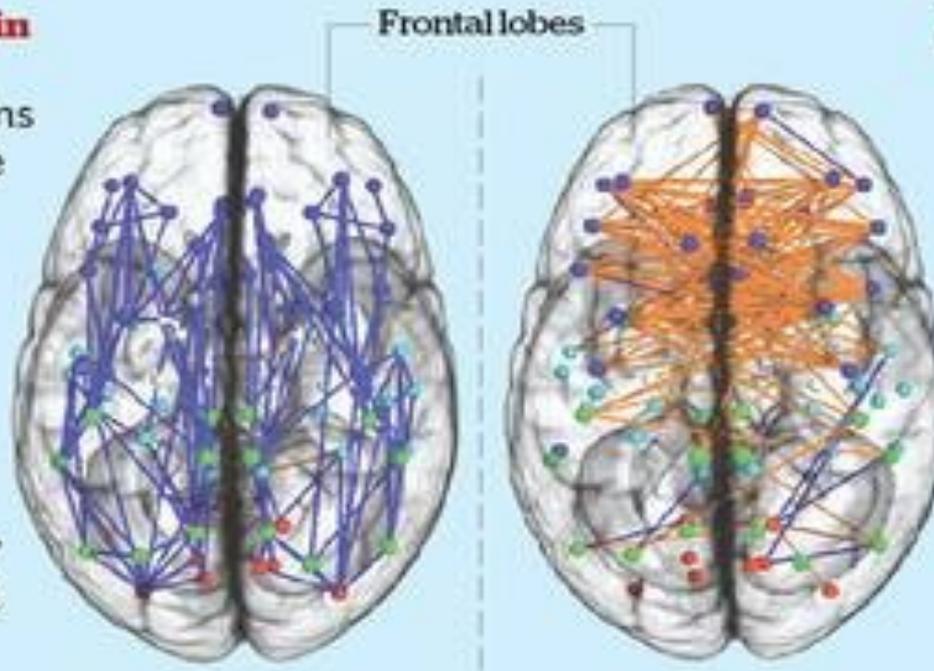
VARIABLES THAT IMPACT STUDENT SUCCESS: GENDER DIFFERENCES

The male and female brain

A new way of showing the connectivity of the brain – called “connectome” maps – reveals significant differences between men and women

Typical male brain (top view)

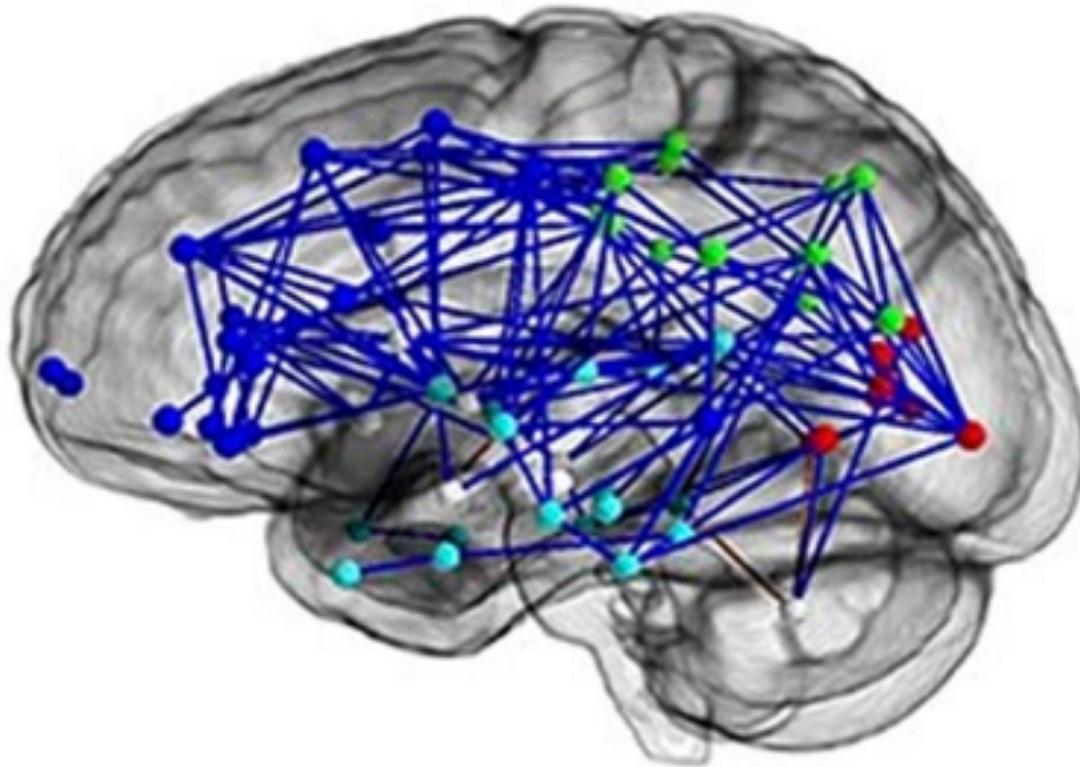
Most connections run between the front and back parts of the same brain hemisphere, which could account for the better spatial skills and motor (muscle) control in men



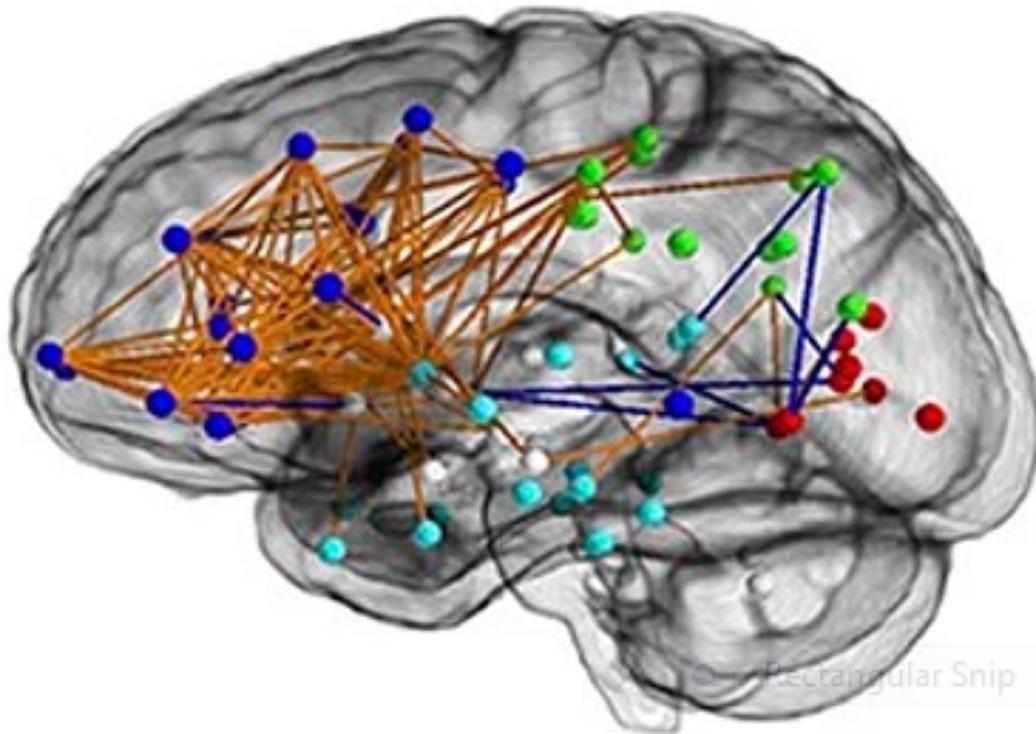
Typical female brain (top view)

Many more neural connections go from side to side across the left and right hemispheres of the brain. Scientists say this could account for women's better verbal skills and intuitive abilities

MEN'S BRAINS APPARENTLY WIRED MORE FOR PERCEPTION AND COORDINATED ACTIONS



FEMALE BRAINS ARE WIRED FOR SOCIAL SKILLS, MEMORY, AND BETTER EQUIPPED TO MULTI-TASK.

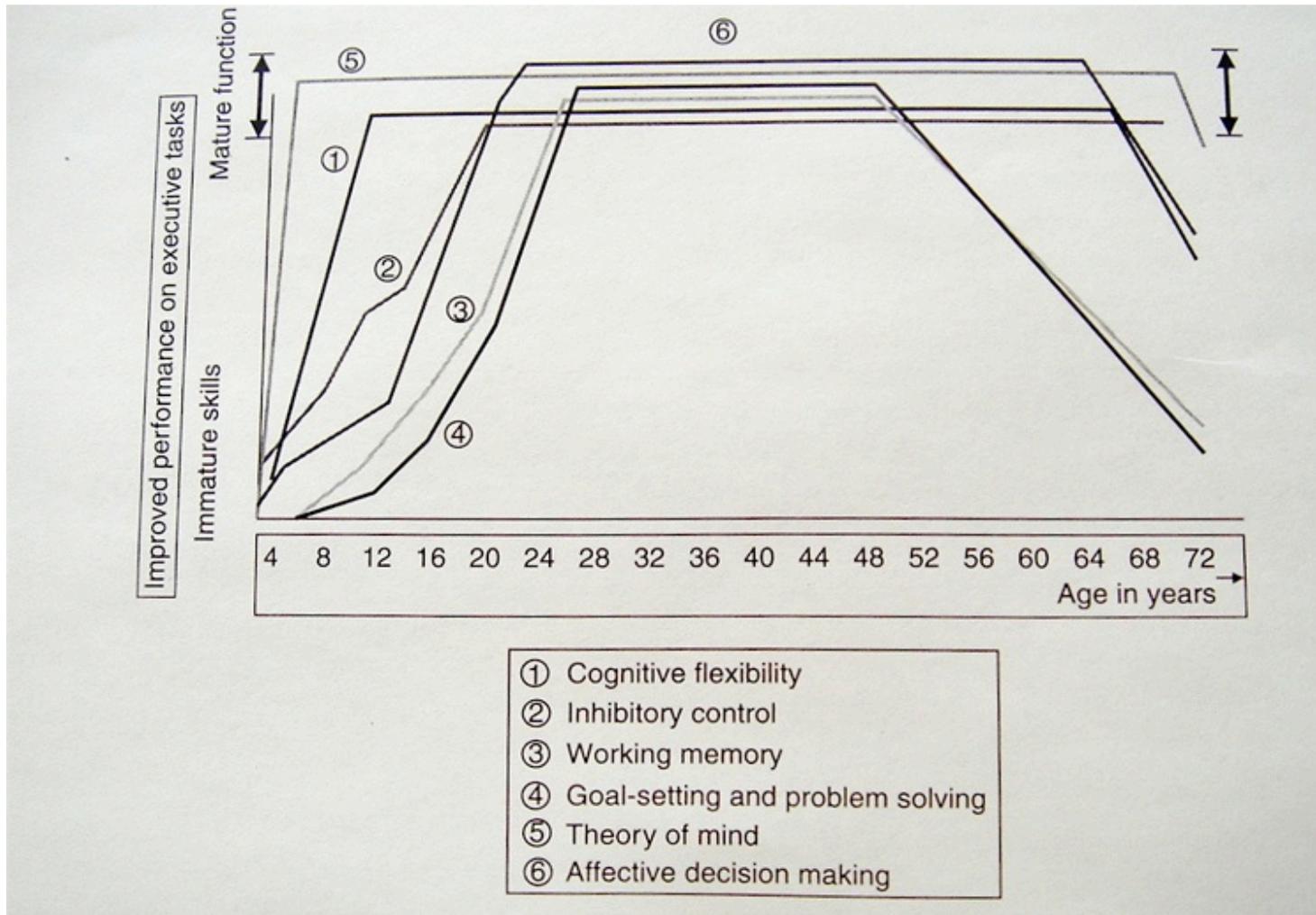


VARIABLES THAT IMPACT STUDENT SUCCESS: DEVELOPMENTAL EXPECTATIONS

[http://www.nytimes.com/interactive/2008/09/15/health/
20080915-brain-development.html](http://www.nytimes.com/interactive/2008/09/15/health/20080915-brain-development.html)



FRONTAL LOBES TAKE TIME TO DEVELOP...



VARIABLES THAT IMPACT STUDENT SUCCESS: POVERTY

- Poverty: Lack of Resources, Intense Stress, vulnerability
 - One of the things that deprived childhood causes is problems with prefrontal cortex function, so somebody who has had an unstable home life is more likely to have trouble with planning and organizing behavior and with inhibiting impulses than somebody who has had a stable life.





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EXECUTIVE FUNCTION

WHEN WE FACE NEW CHALLENGES OR RESOLVE TO PURSUE A GOAL, WE NEED THE FOLLOWING:

- **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.
- **Sustained Attention:** The capacity to maintain attention to a situation or task in spite of distractibility, fatigue, or boredom.
- **Emotional Control:** The ability to manage emotions in order to achieve goals, complete tasks, or control and direct behavior.



EXECUTIVE FUNCTION

WHEN WE FACE NEW CHALLENGES OR RESOLVE TO PURSUE GOAL, WE NEED THE FOLLOWING:

- **Task Initiation**: The ability to begin projects without undue procrastination, in an efficient or timely fashion.
- **Flexibility**: The ability to revise plans in the face of obstacles, setbacks, new information or mistakes. It relates to an adaptability to changing conditions.
- **Goal-directed persistence**: The capacity to have a goal, follow through to the completion of the goal and not be put off or distracted by competing interests.



*EXECUTIVE FUNCTIONS: THESE HELP US TO
CREATE A PICTURE OF A GOAL, A PATH TO THAT
GOAL AND RESOURCES WE NEED ALONG THE WAY.*

- **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.
- **Organization**: The ability to create and maintain systems to keep track of information or materials.
- **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.



EXECUTIVE FUNCTIONS

THESE HELP US TO CREATE A PICTURE OF A GOAL, A PATH TO THAT GOAL AND RESOURCES WE NEED ALONG THE WAY.

- **Working Memory**: The ability to hold information in memory while performing complex tasks. It incorporates the ability to draw on past learning or experience to apply to the situation at hand or to project into the future.
- **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 (e.g., asking yourself, “How am I doing? or How did I do?”).



EXECUTIVE FUNCTIONING CHALLENGES: ACADEMICS

- 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 or chores
- Passive study methods (or doesn't study)
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- Forgets homework/forgets to pass it in
- Leaves long-term assignments or chores until last minute
- Can't break down long-term assignments
- Sloppy work
- Messy notebooks
- Loses or misplaces things (books, papers, notebooks, mittens, keys, cell phones, etc.)
- Can't find things in backpack



EXECUTIVE FUNCTIONING CHALLENGES: BEHAVIORS

- 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
- Doesn't notice impact of behavior on others
- Don't see their behavior as part of the issue
- Easily overstimulated and has trouble calming down
- Gets stuck on one topic or activity
- Gets overly upset about "little things"
- Out of control more than peers
- Can't come up with more than one way to solve a problem
- Low tolerance for frustration
- Acts wild or out of control
-



7 CORE STRATEGIES: STRATEGY 1

- 1. Provide Children with Executive Function Weakness the “Surrogate Prefrontal Lobe” support they need to survive.
 - Insisting or expecting that children with EF weaknesses perform at the same levels of independence as their peers will generally backfire.
 - Children need adults to task analyze, sequence steps, scaffold learning.



7 CORE STRATEGIES: STRATEGY 2

- 2. Teach New Skills and Content Systematically & Explicitly.
 - Teachers can minimize confusion when students are confronted with new information or skills by teaching it in Highly Explicit, Step-By-Step ways that clearly link the unfamiliar to the familiar.
 - Clear and Repeated Modeling followed by Extended Opportunities for students to practice the skills with frequent and direct teacher feedback.
 - Kinesthetic learning opportunities such as role playing.



7 CORE STRATEGIES: STRATEGY 3

- 3. Teach Strategies and Explicitly Demonstrate the Manner in Which They Should be Applied in Real-Life Contexts.
 - Students with Executive Functioning weaknesses are more often defeated by the HOW of learning and production process rather than the WHAT.
 - Lacking the ability to arrive at effective learning and production strategies on their own, they tend to benefit from explicit teaching strategies that can be applied across a range of academic situations. For instance, systematic note taking, studying for tests, organizing/sequencing thoughts for writing assignment.



7 CORE STRATEGIES: STRATEGY 4

- 4. Minimize Demands on Working Memory(Limit Simultaneous Processing Load)
 - Students are expected to follow directions, while simultaneously “holding onto” the steps of task requires understanding what is needed from their memories, then retrieving the memories and applying them to the task at hand.
 - Students with working memory deficits are especially vulnerable to in the areas of Reading Comprehension, Math Reasoning, and Written Language



7 CORE STRATEGIES: STRATEGY 5

- 5. Provide Many Opportunities for Guided, Extended Practice
 - While practice may not actually make perfect, it does build fluency. When students are able to use skills with fluency and automatically recall facts and other elements of content, the load on the prefrontal cortex drops considerably.
 - Some research that teachers' assumption about the amount of time needed to grasp new skills are contributing factors to the lack of practice available to the students.



7 CORE STRATEGIES: STRATEGY 6

- 6. Keep things as Predictable and Consistent as Possible.
 - At the beginning of the year educators across the grade levels should be teaching behavioral expectations with organizational routines to be used over the school year.
 - This decreases the stress levels for students, and will engage them in the process of learning.



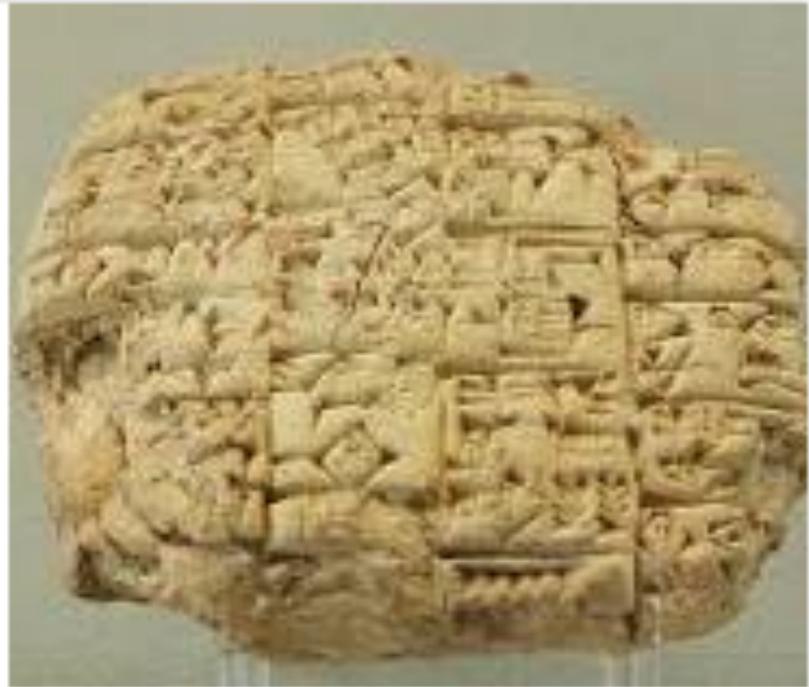
7 CORE STRATEGIES: STRATEGY 7

- 7. Anticipate the Aspects of Tasks and Situations Students Might Find Threatening or Frustrating, and Model Strategies to Manage These Challenges when they Occur.
 - Your ability to engage the executive skills necessary for learning are dependent upon the amount of fear and frustration you are experiencing at the moment.
 - Explicitly show students the parts of task that might be frustrating and then model ways to manage the difficulty. By doing this, teachers both normalize the negative emotions students might feel in a given academic context.



EARLIEST WRITTEN LANGUAGES

- The Sumerian **language** is one of the earliest known **written languages**. The "proto-literate" period of Sumerian **writing** spans c. 3,300 to 3,000 BC. In this period, records are purely logographic, with no linguistic or phonological content. The **oldest** document of the proto-literate period is the Kish tablet.



READING AND WRITING CO-EVOLVED OVER TIME.

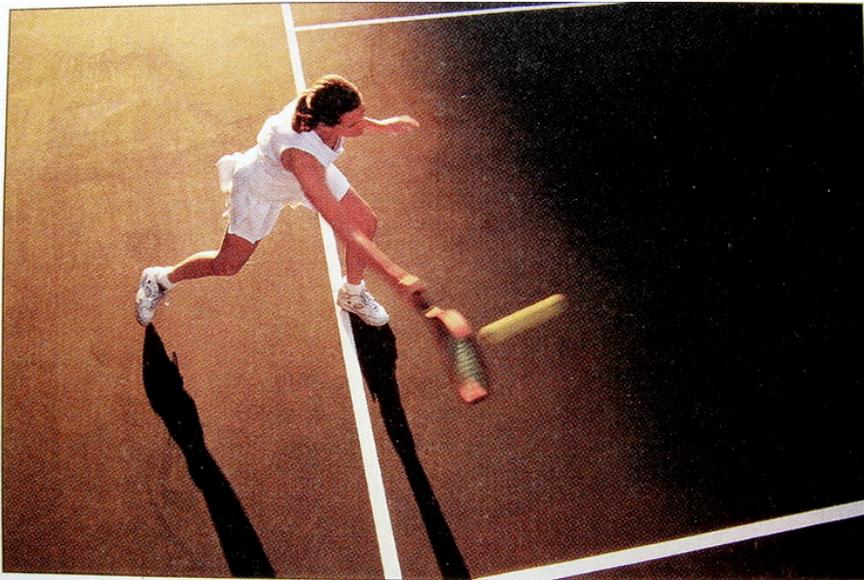
○ Written language is an agreement that squiggly little lines were ascribed meaning.

- Guan / Mandarin (官话 [官話] guānhuà)
- Wu (吴语 [吳語] ng¹nyiu²)
- Yue (粤语 [粵語] yuhtyúh)
- Min (闽语 [閩語] bân-gú / mìn-ngū)

أنا سعيد جداً في عملي الجديد. عندما بدأت العمل في "الجيم" لم أكن أحب العمل
لأنني كنت أقف وراء المكتب وأشهد الشباب والبنات يتدربون. كنت أحب بالغير
والممل. فأنا أحب الرياضة.



All skills, including executive skills,
improve with practice...



Technique rules: Repetition builds better brain circuitry.

The more you practice,
the better the skill.
Practice also makes
the task less effortful.



TEACHING READING TO CHILDREN WITH EXECUTIVE FUNCTIONING CHALLENGES

- <http://readingmatterstomaine.org/reading-and-the-brain/>



WORD READING SKILLS

Decoding:

1. Fluent letter-recognition
2. Letter-Sound Correspondence
3. Phonemic Awareness

Words are composed of component phoneme and morpheme parts

4. Vocabulary
5. Syntax
6. Orthographic processing skills.



EXECUTIVE DYSFUNCTION ON THE ACQUISITION OF WORD READING SKILLS

- Poor language development
- Poor rote-memorization skills (Memory)
- Self-Regulatory weakness
 - Unable to sustain attention thus resulting in incomplete or erratic knowledge of phonics. Although language processing elements are intact.
 - Lack the ability to focus sufficiently on the letter-sound association and hold this information in order to read the words.
- Unable to inhibit responses when processing visual information and rapid automatic naming: guessing the word based on the 1st letter, reading 'goal' for 'goat'.



EXECUTIVE DYSFUNCTION ON THE ACQUISITION OF WORD READING SKILLS

○ Poor Working Memory

- When asked to decode a multi-syllabic word, forgets one of the parts when putting it together.
- Resulting in poorly blended or incompletely decoding words.



FLUENCY: TO READ ALOUD WITH SUFFICIENT SPEED, ACCURACY AND EXPRESSION

- Essential element of the reading process that links decoding to comprehension.
 - Fluent readers automatically decode allowing them to focus on the content of what they are reading.
 - Fluent Readers can engage in purposeful attention, impulse control and self-monitoring.
 - Fluent Readers, can read with expression.



FLUENCY

- Children whose oral reading tends to be inaccurate and slow, focus on decoding the words, not understanding the content.
- Combined with a poor Working Memory, children simply move forward slowly decoding the words, not understanding they should be reading for meaning and content.
- Children are unable to shift from decoding word by word and appeared “glued to the page”.



FLUENCY

- Common Oral reading error patterns
 - Numerous omissions or parts of words (most often suffixes and small words, i.e., the, is, a, at)
 - Disregard punctuation
 - Struggle with keeping track of where they are on a page.
 - Unable to read with expression.
 - Guess at the word
 - Leave out parts of the word
 - Change the meaning of what they have read.



READING COMPREHENSION: DERIVING MEANING FROM THE TEXT.

- The process of simultaneously extracting and constructing meaning through integration and involvement (reading to learn and understand).
- It is estimated that approximately 10% of all students possess adequate reading decoding skills yet struggle significantly with reading comprehension.
 - May be due to poor receptive language, environmental factors, and quality of instruction.
- Construction of meaning from text is primarily dependent upon the quality of students self-directed cognitive abilities.



INFLUENCE OF SPECIFIC EXECUTIVE SKILLS ON READING COMPREHENSION

- **Planning Skills:** The ability to read with a specific question or purpose in mind when seeking specific Information. Strategy a reader uses to process information.
- **Organizational Skills:** The way a reader puts together text in a cohesive manner. When distracted can return to the text and resume where he/she left off.
- **Working Memory:** Temporarily suspend previously read information in the mind while simultaneously linking to new information being read.



INFLUENCE OF SPECIFIC EXECUTIVE SKILLS ON READING COMPREHENSION

- Cognitive Flexibility: Shifting patterns of thought processes to the organizational parameters of the text being read, and not continuing to focus on material.
- Verbal Fluency: Speed of processing linguistic information at the word level to facilitate passage comprehension at the text level.
- Concept Formation: Depth of understanding the text.
- Response Inhibition: Refrain from jumping ahead and missing salient aspects of the passage.
- Sustained Attention: The ability to focus on a text for prolonged periods of time and resist distractions.



EXECUTIVE DYSFUNCTION

Children may approach reading the same way they watch television. Their eyes are open, they are looking at the text, and are looking at the words. Waiting for meaning and understanding to jump off the page. If something doesn't make sense, they simply go on.

1. Passive learners
2. Do not draw upon prior information
3. Do not assess if what they are reading makes sense and reread passage.
4. Do not remember what they just read, and it's correlation to what section they are currently reading.



STRATEGIES TO IMPROVE READING

- Early literacy instruction emphasis a systematic phonics instruction.
 - Consistently returning to specific skills until mastered as evidenced by day to day retention.
 - Inclusion of a kinesthetic aspect to the phonics model makes it even more explicit, and increase retention.
 - Associate with a phoneme sound such as 'S' is the Sammy Snake.
 - Have children act out or associate a certain movement with a certain sounds. Such as making the S sound, with their arms out slithering like a snake.



STRATEGIES TO IMPROVE READING

- Teach Decoding using a word family approach to help students identify the visual patterns.
- Teach structural elements that occur frequently in words for instance, prefixes, suffixes and root words. For instance ‘mal’ means bad, or adding ‘s’ at the end means plural.
 - Decreases guessing and distractibility.
- The key to building Fluency is Guided Oral Reading Practice.
 - Frequent opportunities to read aloud to an adult who is following along with the text and monitoring/ correcting the accuracy of the child’s reading.



STRATEGIES TO IMPROVE BEFORE READING

- Preview Unfamiliar Books and Text Passages
 - At all grade levels/engaging all the students.
 - Discuss the overall reading, look at the headings, the sequence of information.
 - Discuss the Main Idea
 - Discuss Main Characters.
 - Review Key Vocabulary words
 - Could act out and give examples
 - Discuss what questions the child should be able to answer once the reading is completed.



STRATEGIES TO IMPROVE BEFORE READING

- Explicitly Cue Students before they Read
 - Remind the students of errors they may make
 - “ Now remember John, today I really want you to focus on reading through each whole word completely before moving on to the next.”
 - Develop a check in sheet with the student on common errors and tape to desk, so the student reviews just prior to reading.
- Remind them to Use Fingers and other Place Markers
 - So when interrupted/distracted student does not have to figure out where he/she was at in the text.
 - Using a 3 by 5 notecard, above the line to reduce the maladaptive habit of rereading the same line, and sustain focus on the subsequent line.



STRATEGIES TO IMPROVE READING: BEFORE READING

1. Teach and Model the importance of thought gathering.

For instance, if reading about Volcanoes, ask students to think about/make a list of what they already know about Volcanoes.

Inserting relevant prior knowledge from long-term memory into working memory allows for a more focused, task-related state of mind.

2. Teach students to develop a plan for comprehension. First review what they know, then what they want to learn, what they did learn and what they may still want to know.



DURING READING

- Teach students that reading is an active process, the more effort they put in, the more information they will get out of reading.
 - Model reading and thinking out loud about what you are reading.
- Stress the importance of visualization
 - Pause frequently to visualize what they have just read, and verbalize quietly to themselves about what they have imagined.
- Teach self- monitoring
 - Does this make sense, what can the student do when it does not.



DURING READING

- Train students to code their thoughts about a text, either by making a notation such as a ? by something confusing, * by what is important, 😊 when something is interesting.
- Or takes notes such as on page 2, I don't know what 'ignorant' means.



AFTER READING

- Teach the Art of Summarization
 - Summarizing the essential elements
 - May require more explicit instruction with regard to the how of creating useful summaries before they can do it on their own.
 - Post Reading Walk
 - Focus on the essential elements
 - Ask student's to restate in their own words
 - Use Structured Reading Response logs
 - For younger students, it may be drawing a picture
 - Use Dramatic Role Play
 - The literal demonstration of important scenes or interactions makes it more real for all students regardless the grade.



WRITING PROCESS

- Isn't writing the simply an extension of speaking, both involve expressive language?
- The simultaneous processing demands and phases that must be fluently shifted among is what makes writing such a cognitive burden

The overall process of writing includes:

- Prewriting
- Writing
- Revising
- Editing
- Publishing



INEFFECTIVE WRITING

Wing it and Hope for the Best.

Children in the primary grades do not plan before they write.

They jump into the process of writing as a Knowledge Telling approach.

Each sentences is predicated on the sentence before it.

When they have nothing else to say, they are done.



WRITING REQUIREMENTS

- Students need to simultaneously process
 - Task Demands (Directions)
 - Audience expectations
 - Goals and purpose
 - Ideas
 - Sequence of Ideas
 - Spelling Rules
 - Grammar Rules
 - Punctuation Rules
 - Capitalization Rules
 - Syntax Rules
 - Vocabulary.....



EXECUTIVE FUNCTION CHALLENGES IN WRITING

- Working Memory Capacity determines whether or not a student can stick to his/her established goal, and implement the plan in achieving that goal.
 - Students with working memory weaknesses lack the cognitive workspace to focus on the higher-ordered elements of text generation while simultaneously attending to lower-order mechanical elements.
 - Generally something is sacrificed:
 - “John it has been 20 minutes but you have only written one sentence.”
 - “Megan, what you’ve said here is nice, but it is full of spelling, punctuation and capitalization errors.”



EXECUTIVE FUNCTION CHALLENGES IN WRITING

- Weak Impulse control (inability to inhibit)
 - Rushing through the writing leading to numerous errors, poorly sequenced thoughts, and text that wanders far afield from what the assignment directed.
- Sustained Attention Deficits
 - Numerous stray thoughts, omitted words, and sentence that link poorly together.
- When working memory deficits are paired with attention deficits, you will see processing delays and word retrieval challenges.



PREWRITING: THE ESSENTIAL INTERVENTION STAGE OF STUDENTS WITH EXECUTIVE DYSFUNCTION.

- Due to challenges with goal-setting, planning, working memory, and self-monitoring limitations, these students have great difficulty structuring their writing on the “fly” during the drafting phase, and therefore must organize their thoughts in advance.
- Research has shown when students with learning disabilities are explicitly taught prewriting planning strategies, the quality and length of their writing improves considerably.



PREWRITING STRATEGIES

- Build systemic prewriting processes into the curricula so that all students are required to use them on a regular basis.
- Explicitly demonstrate how the use of systematic prewriting activities makes writing easier.
 - Show the students how the time and effort devoted to prewriting are likely to save them time and effort while they write.
 - Use a Think Aloud technique that also demonstrates what to do if they make a mistake.
 - Once a student has been concretely shown and modeled the writing struggles that can occur in the absence of planning their willingness to use structured planning will increase.



PREWRITING STRATEGIES

- Stress the idea that “thought gathering” (i.e., prewriting thought organization and planning) is simply a standard part of writing.
 - Best way to overcome the “Hope for the best and Wing it” approach.
 - First I think, Then I write”



PLANNING AND ORGANIZATIONAL STRATEGIES

- Helpful to start off with Low-Tech strategies
 - Take a topic
 - Have all students write on a sticky note a thought they have about the subject.
 - Have them put it into a basket
 - Discuss with class, the how the process should be organized via areas.
 - Take sticky notes out and place on white board under specific areas.
 - Sequence the sticky notes under the area.
 - Teacher role models how to put sticky notes into an organized sentences.



PLANNING & ORGANIZATION STRATEGIES

○ Use of Graphic Organizers

- FYI: organizers that focus on the essential information but do not allow for sequencing of information may be confusing to children. They may have the essential elements such as in a web, but not understand how they should flow together in an organized format.
- Should incorporate an obvious sequential, step-by-step flow, such as linear graphic organizer.



PLANNING & ORGANIZATION STRATEGIES

- Stop and List (STOP: Stop and Think Of a Purpose)
 - Expressly designed to build goal-setting, planning and organization.
 - Requires student to develop an overarching goal for writing and then systematically brainstorm, select, and sequence ideas before engaging in drafting phase
 - Three core steps to this approach
 - First develop a goal for what the student wants to create.
 - Once students have established their writing goals
 - Then list ideas: Students simply brainstorm as many ideas as they can think of related to the writing prompt.
 - Select from several brainstormed ideas those that will be included in the assignment.



PARAGRAPH WRITING STRATEGIES

- Students require explicit instruction in paragraph construction, and then guided extended practice in the systematic development and sequencing of paragraphs.
- Two methodologies
 - Step Up to Writing
 - Modified Sandwich Graphic Organizer



STEP UP TO WRITING

Using the traffic light metaphor the Step Up to Writing model of teaching paragraph construction stresses the importance of a logical flow from topic sentence, main ideas (with supporting details/examples) and concluding sentence.

Using a green marker on the Smart Board the teacher demonstrates that a paragraph starts with a topic sentence that introduces the general statement of a paragraph. A yellow marker is then used to reflect the need to slow down and write an idea, reason, or fact. The teacher next uses a red marker to reflect the more definite stop that occurs in a paragraph, to provide an example of the idea, reason or fact. The green marker is used again for the concluding sentence to remind student it must be related to the topic sentence.



SYSTEMATIC EDITING STRATEGIES

○ COPS

- Capitalization – Have I capitalized the first words of sentences and proper nouns.
- Overall appears – How neat and organized is my writing
- Punctuation – Do I have periods at the end of all sentences, and have I inserted commas, semi-colons, and apostrophes where necessary?
- Spelling – Do all my words look like they are spelled correctly? Use spell checker or dictionary to check on the ones I am not sure I have spelled correctly.



WRITING ACCOMMODATIONS FOR STUDENTS WITH EXECUTIVE FUNCTIONING CHALLENGES

- Dictation (Scribing)
- Sentence Starters
- Modified Assignments
- Dividing Larger Assignments into Smaller Chunks
- Extended time for Assignment Completion
- Keyboard access



IMPROVING MATH PERFORMANCE OF STUDENTS WITH EXECUTIVE FUNCTION WEAKNESS

- Math Instruction is Highly Explicit, Direct & Strategic
 - MATH concepts taught in a highly concrete manner



IMPROVING MATH PERFORMANCE OF STUDENTS WITH EXECUTIVE FUNCTION WEAKNESS

- 1. Minimize the Number of Algorithms Taught
 - Scaffold the Strategy Selection Process Until Students Become Confident in Self-Directing Their Own Strategic Problem Solving.
 - Numerous strategies increases confusion and stress.
 - The brain becomes overloaded in attempting to figure out which strategy to use.
 - Focus on specifically selecting 1 – 2 of the most strategies.



IMPROVING MATH PERFORMANCE OF STUDENTS WITH EXECUTIVE FUNCTION WEAKNESS

- Minimize Demands on Working Memory by Building Math Fact Retrieval Fluency
 - Explicitly Embed Strategic Algorithms into Worksheet Materials.
 - Working memory deficits will overload the brain with students needing to rediscover basic facts.
 - Increases capacity for students to solve the higher order elements when math facts and steps for solving algorithms are visually available on teacher-constructed worksheets.



IMPROVING MATH PERFORMANCE OF STUDENTS WITH EXECUTIVE FUNCTION WEAKNESS

- Children with EF weakness need to be encouraged to approach the solving of math problems in a careful, methodical manner.



STRATEGIES TO BUILD MATH FACT FLUENCY

- Strategy 1: Build Number Sense by Working with Number Lines
- Strategy 2: Less is More – Teach only a few facts at a time
- Strategy 3: Use FASTT Math
- Strategy 4: Teach rules, patterns, and number families



STRATEGIES TO BUILD ALGORITHM LEARNING AND RECALL MNEMONICS

- MiDAS: The Golden Rule for the order in which mathematical operations must be applied.
 - Multiplication
 - Division
 - Addition
 - Subtraction



STRATEGIES TO BUILD ALGORITHM LEARNING AND RECALL MNEMONICS

- Does McDonald's Sell Burgers Done Rare?: The steps of the standard long division algorithm.
 - Divide
 - Multiply
 - Subtract,
 - Bring Down
 - Repeat as necessary



VISUAL CUEING

- All visual cueing strategies provide a relatively clear indication of the steps that need to be followed for accurate problem solving.
 - Templates using boxes and arrows, incorporating colors can be made using PowerPoint, Publishing, and PageMaker



STRATEGIES TO IMPROVE THE SOLVING OF WORD PROBLEMS

- Search the Word Problem (STAR)
 - Search the word problem for operation terms.
 - Translate the words into a simple picture and then pick a strategy to solve the problem
 - Answer the problem by executing the strategy
 - Review the solution
- Translate the Words into a Simple Picture and Then Pick a Strategy
- Answer the Problem by Executing the Strategy
- Review the solution



SELF-MONITORING (CHECKING) STRATEGIES

- Strategy 1. Error Analysis
- Strategy 2. Top Three Hits
- Strategy 3. Pounce



ERROR ANALYSIS

- Teach children with executive deficits to become aware of the types of errors that they as individuals are prone to make, and to systematically check their work for these specific errors.



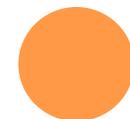
TOP THREE HITS

- Once students have been helped to recognize the math mistakes they most commonly make with regard to specific types of problems, these errors are listed on a “top three hits” card. The card is meant to be pulled out whenever the student works on a given type of math problem, hopefully acting as both a reminder to avoid the errors while working and cue to systematically check for the top three mistake types before handing in math tests and assignments.



POUNCE: SYSTEMATIC SELF-CHECKING OF MATH PERFORMANCE. THIS STRATEGY ENCOURAGES STUDENTS TO VISUALIZE A CAT POUNCING ON A MATH PROBLEM TO CHECK IT.

- **P**: Change to a different color **pen** or **pencil** to change your mindset from that of a student (test taker) to teacher (test checker)
- **O**: Check **operations**
- **U**: **Underline** the question (in a word problem) or directions. Did you answer the question? Did you follow directions?
- **N**: Check the **numbers**. Did you copy them down correctly? In the right order?
- **C**: Check your **calculations**. Check for the type of calculation errors you tend to make.
- **E**: Does your answer agree with your **estimate**? Does your answer make sense?



ORGANIZATION, STUDY SKILLS, AND TIME MANAGEMENT

- Organizing is what you do before you do something, so that when you do it, it is not all mixed up. Christopher Robin in Winnie-The Pooh (Milne, 1926)



WORKSPACE AND MATERIALS ORGANIZATION

- Dedicate a Homework Space
 - Student should be required to always do homework in this designated space
 - Keep all academic supplies in their designated space
- Encourage Parents to Supervise
 - A parent needs to directly supervise a child's retrieval and return of needed materials in Homework Space.
- Use Checklists and Inspections
 - Use of a daily school-to-home checklist
 - Parents should review every day



DAILY HOMEWORK

- Executive Functioning Impacts
 - Forgotten or partially recalled assignment directions
 - Poor prioritization of homework tasks and time
 - Weak task persistence
 - Fatigue



HOMEWORK STRATEGIES

- Less is More
 - Teachers need to be highly selective in framing homework assignments.
 - Teachers can emphasize reading and note-review tasks over narrative writing and the self-directed organization of numerous details.
- Establish Consistent Schedules and Routines
 - Brains become accustomed to the mustering and spending of cognitive energy during these times.



HOMEWORK STRATEGIES

- Use Highly Structured and Signed Assignment Books
 - Builds a student's organization, time management, memory and work completion skills.
 - Their use has to be highly structured and supervised daily.
 - These work best if required from all students.
 - Teacher must be explicit as to what should be written down. Or they should check for accuracy and completeness
 - The simpler the more likely student will comply



TIME MANAGEMENT & PROJECT PLANNING

- Executive Functioning weaknesses are compounded by large projects.
 - Limited Temporal Sense: Difficulty sensing with accuracy the passing of time and/or predicting the amount of time different tasks require.
 - Important for interventions targeting longer-term assignments to address time-management difficulties as well as planning struggles.



TIME MANAGEMENT & PROJECT PLANNING: STRATEGIES

- Limit or Carefully Structure Topic Choices
 - Students can be bogged down simply selecting a topic
- Turn Potential Mountains into a Series of Molehills
- Be Specific about Project Steps and Deadlines
- Provide Lots of Individualized Project Coaching
- Complete a Structured Project Planning Form.
 - Meant to be completed at the beginning of a long-term project.



NOTE-TAKING

- Learning effective note-taking is essential for secondary students and college students.
- Requires a substantial amount of:
 - Teacher-directed instruction
 - Explicit Modeling
 - Use of structured note-taking templates
- Note-taking skills support:
 - Accurate storage of information
 - Improves ability to remember
 - Teaches students how to summarize and organize the information and their thinking
 - Distinguish important versus unimportant details



NOTE-TAKING STRATEGIES

○ Explicit Modeling

- Teacher uses overhead projector or document camera to model structural expectations
- After a discussion, the teacher needs to summarize the essential learning points, while explaining the reasons for the phrases and keywords in the notes
- Directs the students every several minutes as to what to copy down.
- Teacher monitors what the students has written down, and provides additional individual support.



NOTE-TAKING STRATEGIES

○ Use of Note-Taking Templates

- The best make plain the most effective means to organize information, but also structure such that key information is recorded in a format that will ease its recall during tests and assignments.

○ Two Formats

- Two- and three-column templates: Structured around a question-and-answer framework. Students associate essential information with question that elicit it.
- Graphic Organizers: Require students to construct visual maps that represent the manner in which main ideas relate to other ideas and supporting information.



STUDY SKILLS

- Test preparation challenges for students
 - Forgetting to remember to study
 - Leaving insufficient time for studying
 - Feeling overwhelmed by the demands of studying
- Interventions need to provide scaffolds in the form of highly structured test preparation routines and strategies.
 - Teachers and parents need to address the when and how elements of studying that are clearly defined.



STUDY SKILL STRATEGIES

- Establish Study Schedules and Routines
- Show Students Exactly What to Study and How to Study It.
- Coaching
 - Structured goal setting
 - Set up a daily plan
 - Review the prior days plan, and make adjustments if needed
 - Help students to problem-solve current or potential problems



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