Understanding the Brain's Roadblocks: Practical Strategies for Learning Success
Part 2

WDE SPED
SPECIAL EDUCATION

❖ **Explanation of Cognitive Index Scores**
- ■ **Breif Review of G's**
- ■ Working Memory Index
- ■ Visual Processing Index
- ■ Processing Speed Index
- ➤ Educational Implications

❖ **Practical Applications -**
- ➤ Instructional Strategies/ SDI examples
- ➤ Identification of Accommodations
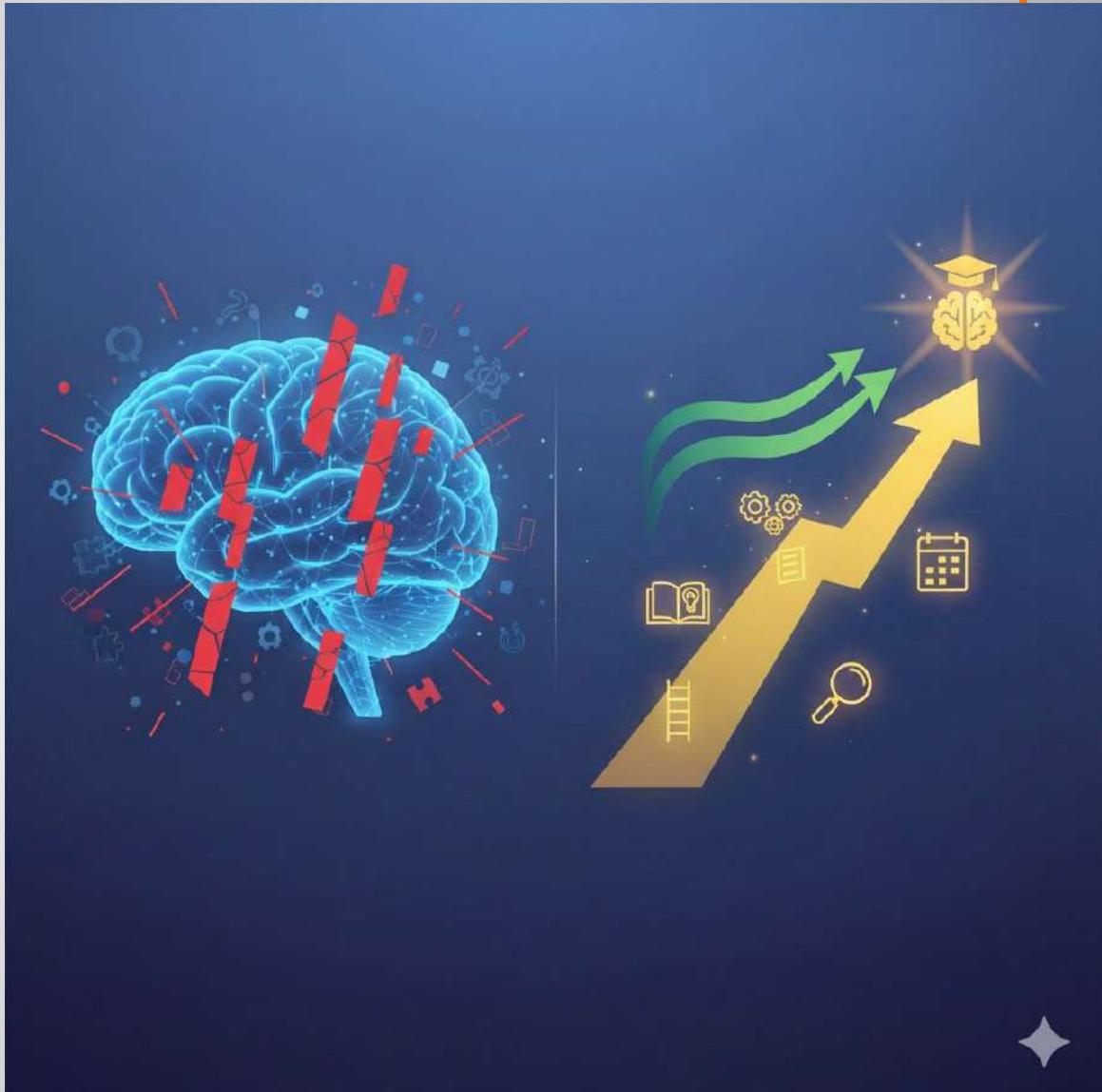
COGNITIVE ABILITIES

The Thinking Process Revealed

The "Why" Behind This Training

Understanding cognitive processes *empowers* special education teachers to move beyond simply implementing a prescribed plan to becoming **truly skilled and responsive educators** who can tailor learning experiences to *unlock* each student's unique potential.

The Invisible Curriculum

The "WHY" Behind Understanding Student Cognition

Identifies Strengths and Weaknesses

Informs Instructional Strategies

Helps Identify Differentiated Instruction Needs

Understand Learning Styles

Develop Targeted Interventions

Cognitive Indexes

Full Scale IQ (FSIQ)

Visual Processing (Gv)

Verbal Comprehension (Gc)

Fluid Reasoning (Gf)

Working Memory (Gsm)

Processing Speed (Gs)

What is "g"? (General Intelligence) and Classroom Implications

What is "g"?

Think of "g" as "overall mental horsepower" or "brain efficiency."

- Learning new things
- Reasoning and problem-solving
- Adapting to new situations

Underlying common ability for thinking & learning.

Why is "g" Important for Teachers?

Explains General Learning Pace:

- **Predictive Power:**
  - Overall academic achievement
  - Success in higher education
  - Job performance
- **Informs Broad Differentiation:**
  - Handling cognitive complexity
  - Grasping abstract ideas
  - Pacing of instruction

"g" and Classroom Implications

For Students with Higher "g":

↑ Opportunities for deeper dives, critical thinking, independent projects.
↑ Accelerated learning pathways.
↑ Less direct instruction needed.

For Students with Lower "g":

↓ Concrete examples and hands-on activities.
↓ Step-by-step instructions and task breakdown.
↓ More repetition and scaffolded learning.
↓ Focus on mastery of foundational skills.

Cognitive Standard Scores

WJ-IV COG
Average Range: 90-109
Low Average: 80-89

Gf/Gc Composite
Comprehension/Knowledge (Gc)
Fluid Reasoning (Gf)
Long-term Retrieval (Glr)
Visual Processing (Gv)
Auditory Processing (Ga)
Cognitive Processing Speed (Gs)
Short Term Working Memory
(Gwm)

K-ABC-II
Average Range: 85-115

CHC Model:
Fluid-Crystallized Index
(FSIQ)
Crystallized Ability (Gc)
Fluid Reasoning (Gf)
Long-term Retrieval (Glr)
Visual Processing (Gv)
Short-Term Memory (Gsm)

Luria Model:
Sequential Processing
Simultaneous Processing
Learning Ability
Planning Ability
Mental Processing Index

WISC-V
Average Range: 90-110

FSIQ
Verbal Comprehension Index
(Gc)
Visual Spatial Index (Gv)
Fluid Reasoning Index (Gf)
Working Memory Index (Gsm)
Processing Speed Index (Gs)

Ancillary Scores include:
Quantitative Reasoning Index
Auditory Working Memory
Index
Nonverbal Index
General Ability Index
Cognitive Proficiency Index

Key Takeaway for Teachers

Understanding "g" helps us appreciate the diverse ways students learn and the cognitive demands of different tasks.
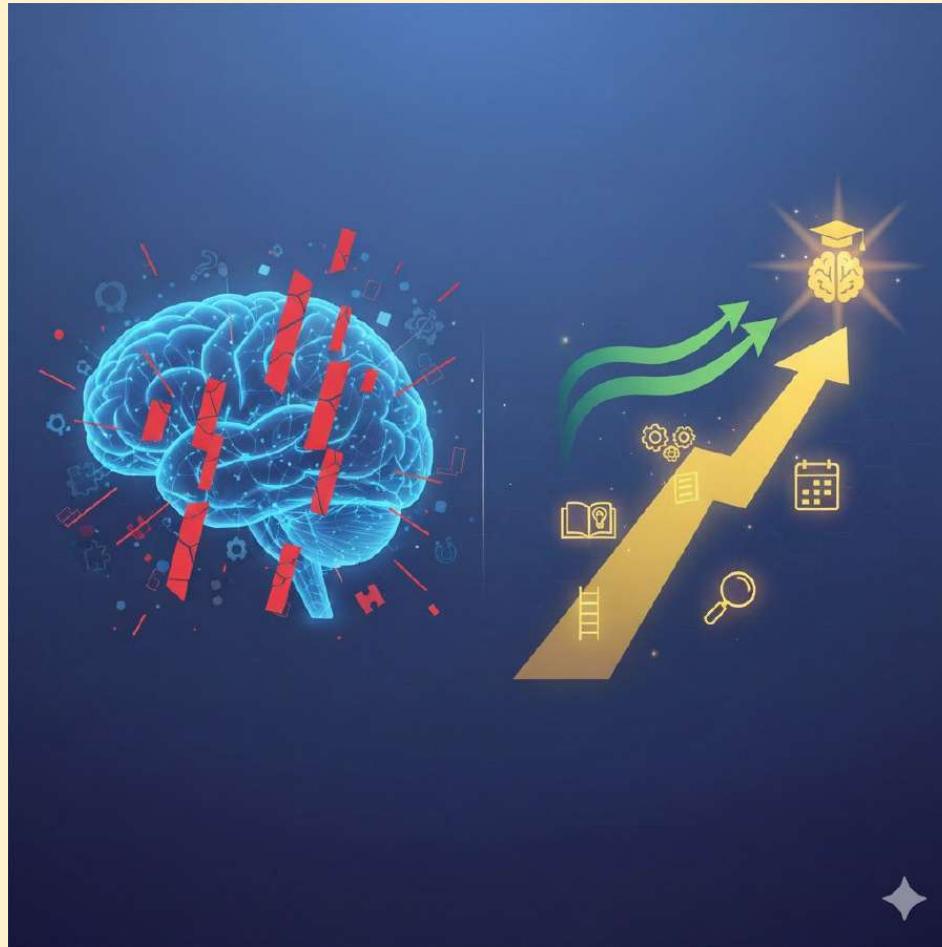
It's a powerful lens, but **just one part** of the rich and complex picture of each student.

Use this knowledge to:

● Tailor your teaching strategies effectively.

● Provide appropriate challenges and supports.

● Foster growth and success in ALL students.

Working Memory (Gsm)

Reading Comprehension
Task: After reading a 4-paragraph story, students must infer the main idea

- Holding key details from earlier parts of the text
- Making connections across paragraphs
- Suppressing irrelevant information while focusing on the question

- Retaining the other person's point
- Formulating and holding your response while waiting your turn
- Integrating supporting information on the fly

Oral Language / Discussions
Task: Respond to a peer's argument with a counterpoint and support it with facts

WORKING MEMORY

Writing
Task: Write a persuasive paragraph using a topic sentence, three supporting details, and a conclusion

- Organizing ideas before and during writing
- Remembering the structure while generating content
- Keeping the argument cohesive across sentences

Science
Task: Mix chemicals in a specific order, observe reactions, and write results

- Holding the sequence of steps in mind
- Tracking changes and results
- Linking observations to hypotheses or explanations

🔊 Auditory Working Memory
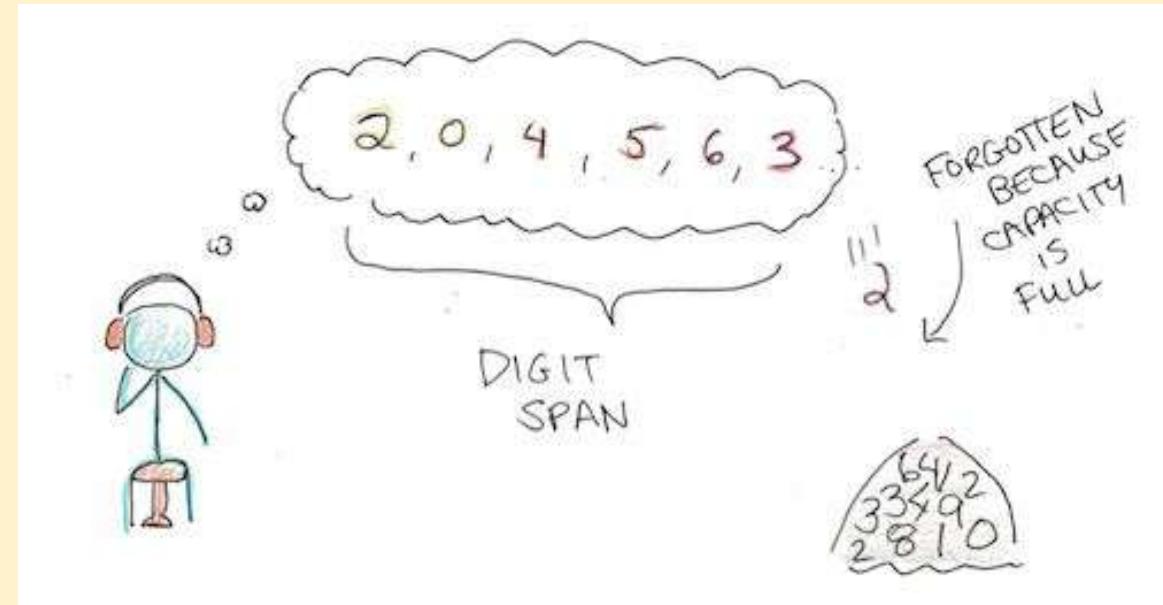
Definition

The ability to take in, hold, and mentally manipulate information that is heard.

Examples in the Classroom

- Recalling multi-step oral directions
- Remembering a spoken phone number
- Mentally solving a math problem read aloud
- Following along during oral reading or lectures

When Challenged

- Student may ask for directions to be repeated
- Struggles with note-taking or following conversations
- Has difficulty remembering oral instructions or word problems

👁 Visual Working Memory

Definition:

The ability to hold and work with visual information—such as images, shapes, written text, or spatial layouts—in the mind.

Examples in the Classroom:

- Copying from the board accurately
- Visualizing a map or diagram while answering a question
- Holding a mental image of a math equation to solve it
- Remembering the position of objects in a science experiment
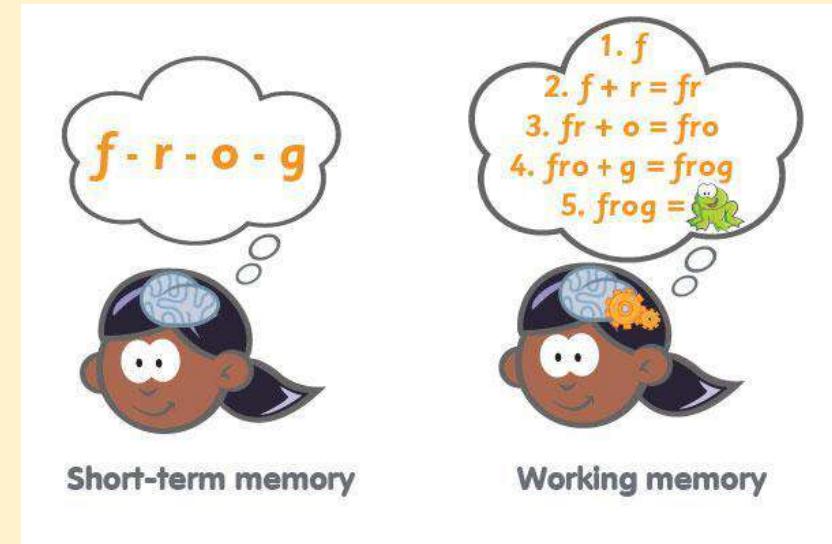
When Challenged:

- Student may lose place when reading or writing
- Struggles to complete tasks that require copying or visual recall
- Difficulty remembering visual patterns, graphs, or charts

f - r - o - g

Short-term memory

1. f
2. $f + r = fr$
3. $fr + o = fro$
4. $fro + g = frog$
5. $frog =$ 🐸

Working memory

⚖️ Key Differences

Feature	Auditory Working Memory	Visual Working Memory
Input Type	Information heard	Information seen
Common Activities	Following oral directions, spelling aloud, verbal reasoning	Reading, map work, math alignment, copying
Primary Challenge	Retaining and processing spoken information	Retaining and manipulating visual layouts or details
Instructional Clues	"Can you repeat that?" or looks confused during lectures	Skips words, loses place, copies inaccurately

Look Fors" - Identifying Working Memory Deficits Translates to PLAAFP / Educational Impa

Difficulty Following Multi-Step Instructions - Needs repeated instructions or breaks tasks into smaller parts.

Frequent Forgetting of Instructions - Forgets key details or needs constant reminders.

Problems with Sequential Tasks - Struggles to complete tasks requiring a specific sequence of steps.

Verbal Reporting of Memory Problems - Self-reports difficulty remembering or feeling overwhelmed by tasks.

Difficulty with Recall in Social Situations - Struggles to recall details during conversations or social exchanges..

Inconsistent Performance on Mental Manipulation Tasks - Difficulty solving math problems or applying learned information.

Difficulty with Complex Reading or Listening Tasks - Struggles with comprehension or recalling details from readings or discussions.

Problems with Sequential Tasks - Struggles to complete tasks requiring a specific sequence of steps.

Inconsistent Performance on Mental Manipulation Tasks - Difficulty solving math problems or applying learned information.

Struggles with Organization and Task Management - Difficulty with keeping track of assignments, deadlines, or project steps.

Slow Processing Speed - Takes longer to complete tasks or react to information.

The Golden Thread: Connecting Observation, PLAAFP, Goals, and Accommodations

Difficulty Following Multi-Step Instructions -

Needs repeated instructions or breaks tasks into smaller parts.

Present Levels of Academic Achievement and Functional Performance:

Classroom observations and teacher reports indicate that [Student] demonstrates difficulty following multi-step verbal and written directions. When tasks involve more than one step, [Student] frequently begins incorrectly, omits steps, or requires repeated prompts to continue.

These difficulties are not due to a lack of understanding of the content; when directions are presented one step at a time or supported with visual cues, [Student] is able to complete tasks accurately. However, when required to hold multiple pieces of information in working memory, [Student] struggles to retain and apply all task components simultaneously.

This working memory deficit impacts [Student]'s ability to independently initiate and complete classroom tasks across content areas, resulting in incomplete work and reduced efficiency. These data indicate a need for **Specially Designed Instruction** to support working memory through explicit instruction and structured supports that reduce cognitive load and improve access to instruction.

The Golden Thread: Connecting Observation, PLAAFP, Goals, and Accommodations

GOAL: By the end of the IEP cycle, when given a task involving 3 to 4 sequential steps and a visual checklist, [Student] will independently complete all steps in the correct order with no more than one adult prompt in **4 out of 5 trials across two consecutive weeks**, as measured by a teacher-completed task analysis checklist.

Presentation Accommodations

- Directions **broken into smaller, manageable steps**
- **Visual supports** provided to accompany verbal directions
- Written directions available for reference during tasks

Timing / Task Initiation

- **Pause time** before task initiation to review directions
- Check for understanding **before** work begins

Response / Organization

- Access to **step-by-step checklists** or task cards
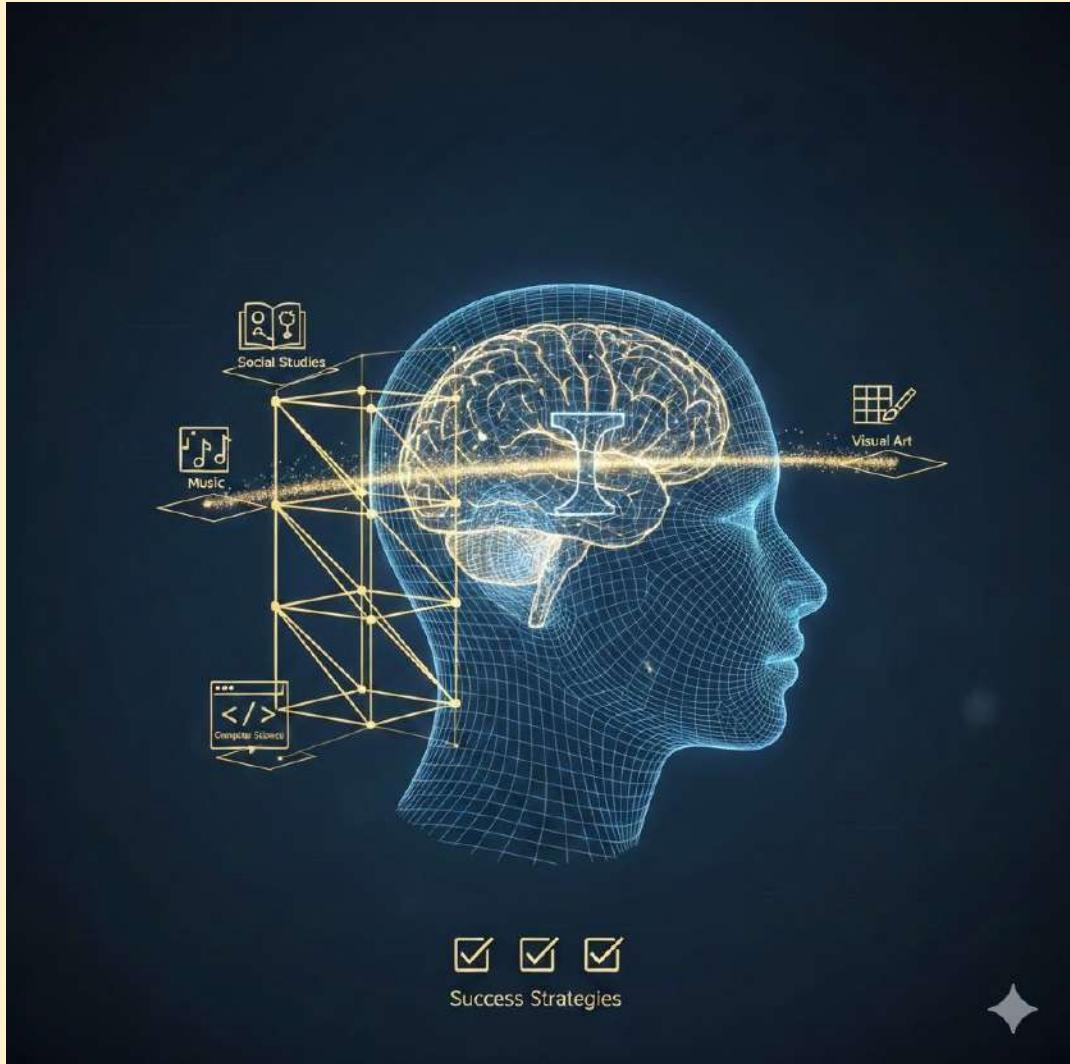- Permission to **highlight, underline, or mark completed steps**

Instructional Environment

- Reduced extraneous verbal information during instruction
- Teacher cues to redirect attention to the **current step only**

# Instructional Strategies

The Scaffolding Secret - Success Strategies for Low Working Memory

Direct Instruction in "Chunking" Strategies

Instead of just giving smaller tasks, you explicitly teach the student **how to categorize information** to reduce the number of "items" in their mental RAM.

- **The Strategy:** Teach the student to group 10 spelling words into three categories (e.g., words with "th," words with "ch," and "the outliers").
- **The Goal:** The student learns to hold 3 "chunks" in memory rather than 10 individual items.
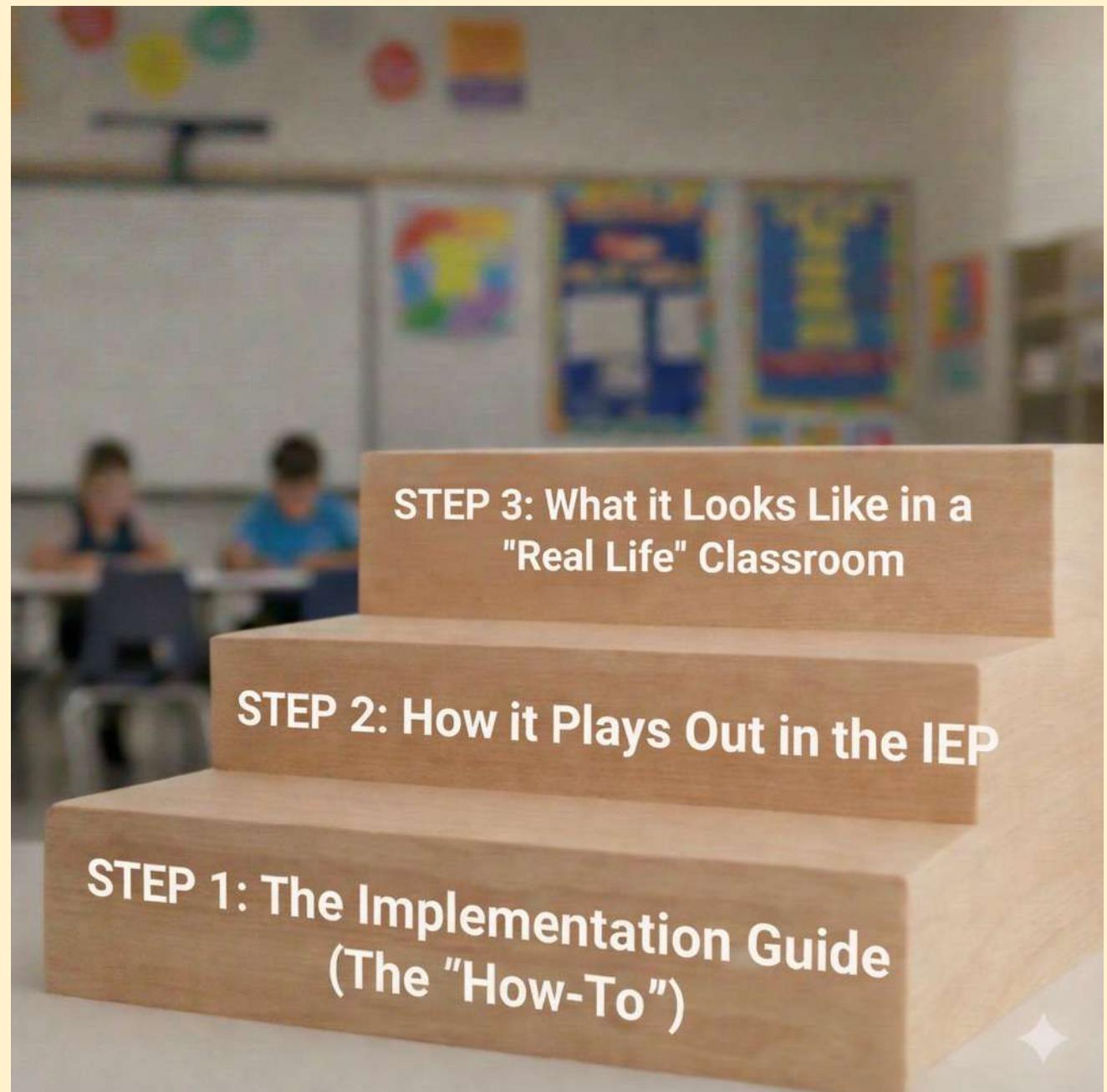
Part 1: The Implementation Guide (The "How-To")

Implementation follows a **"Gradual Release" (I Do, We Do, You Do)** model.

Part 2: How it Plays Out in the IEP

When writing this into an IEP, you must distinguish between the **Goal** (what they will do) and the **SDI** (how you will teach it).

Part 3: What it looks like in a "Real Life" Classroom

To help the student generalize the skill beyond spelling, teach them to "Chunk" their day:

- **Social Studies:** Instead of 10 facts about an explorer, chunk them into: *The Ship, The Route, The Discovery.*
- **Computer Science:** Instead of 10 lines of code, chunk them into: *The Setup, The Loop, The Print.*
- **Art:** Instead of a long list of clean-up tasks, chunk them into: *Water tools, Dry tools, Table surface.*

Verbal Rehearsal (The "Loop" Strategy)

The Concept: Teaching the student to use their "inner voice" to keep information active in their working memory before it fades.

Part 1: Implementation Guide (The "How-To")

1. **Explicit Modeling (I Do):** Think out loud. *"I need to go to the cupboard, get the blue paint, and bring a sponge. Blue paint, sponge. Blue paint, sponge."* Show them that you keep repeating it until the task is started.
2. **Guided Practice (We Do):** Give a 2-step direction. Have the student whisper it back to you (the "Echo") before they move. Increase to 3 steps as they improve.
3. **Independent Practice (You Do):** The student is given a task and prompted: *"What is your loop?"* They state their internal rehearsal strategy before starting.

Part 2: The IEP Language

- **The Goal:** *"When given a 3-step verbal direction, [Student] will independently use a verbal rehearsal strategy (repeating the steps) to complete the task with 80% accuracy across 5 trials."*
- **The SDI:** Explicit instruction in 'Echoing' techniques, subvocal rehearsal (whispering to self), and self-talk pacing.

Visual Mapping (The "External Brain")

The Science: Why Visuals Overcome Memory Gaps

- **Dual Coding:** When a student hears a word and sees a map simultaneously, the brain encodes the information in two different places. If the "auditory" memory fades, the "visual" map remains as a backup.
- **Reduced Cognitive Load:** A list of 10 facts requires the student to remember the order and the content. A map shows the relationships spatially, so the student doesn't have to "list" them in their head.

Strategy 1: The "Anchor" Map (For New Content)

- **The Problem:** Students lose the "big picture" as soon as a teacher starts diving into specific details.
- **The Map:** Create a **Central Node** map before the lesson begins.
  - **The Center:** The main topic (e.g., "The Water Cycle").
  - **The Spokes:** 3–4 main categories (Evaporation, Condensation, Precipitation).
- **Implementation:** As the teacher talks, the student simply checks off which "spoke" is currently being discussed. This acts as a GPS for the lecture.
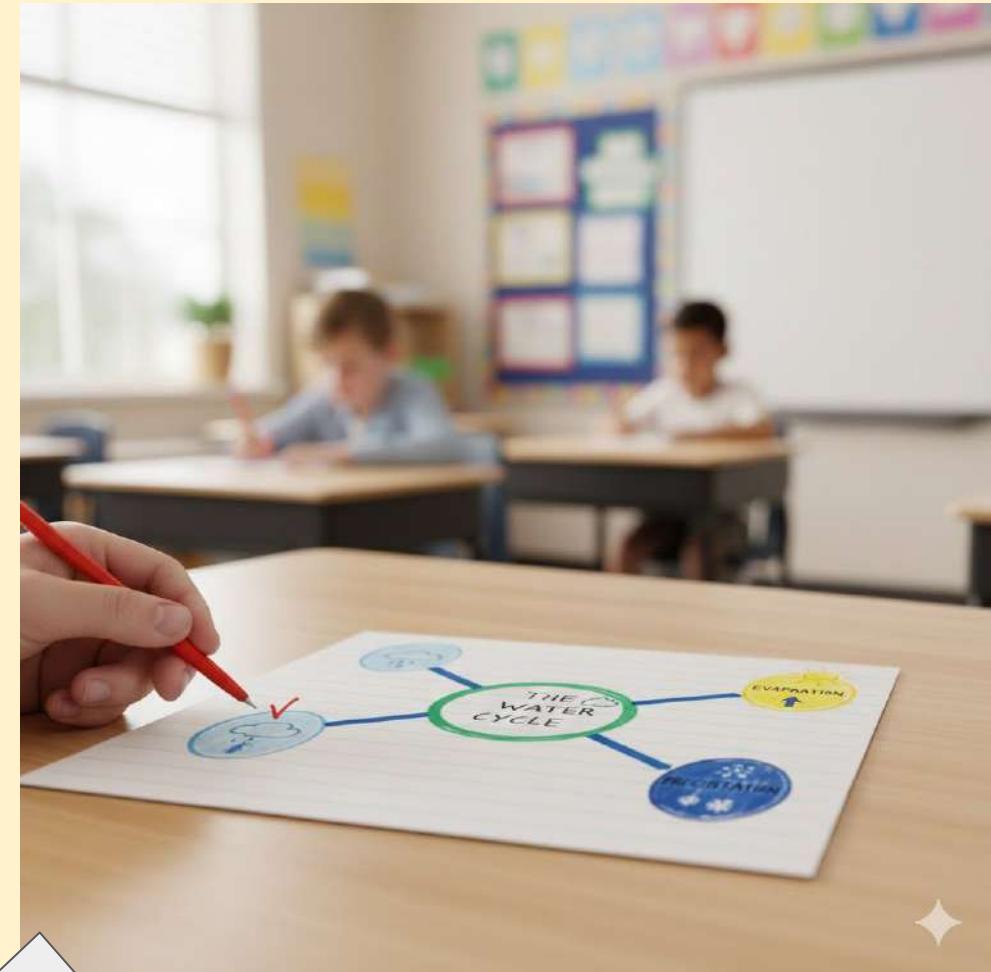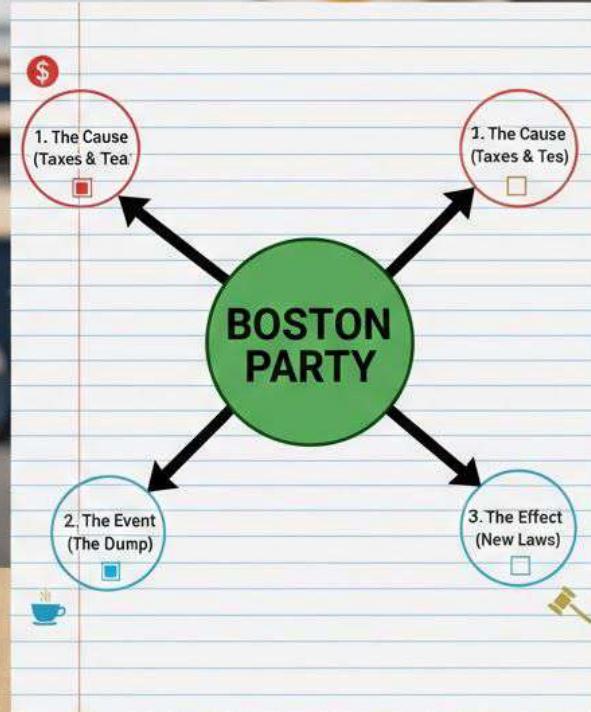
Mind Map vs. Central Node Map: The Boston Tea Party

Messy Mind Map (Overload)

Structured Central Node Map (Focus)

"Spoke" Rules for Teachers

To keep the "Node" effective, teachers should follow the **Rule of 5**:

1. **Never have more than 5 spokes.** (3 is ideal). More than five spokes creates "visual noise" that causes the student to lose the center.
2. **Clockwise Flow:** Always teach the student to read the spokes starting at "12 o'clock" and moving clockwise. This creates a predictable "scanning pattern" for the eyes.
3. **High Contrast:** The Central Node should be the largest, boldest shape on the page.

The 3-Step Mapping Rule

1. **Keep it "Low-Text":** Use symbols, icons, or single words. If a map is too wordy, it creates a new working memory deficit (reading fatigue).

2. **Color-Coding is Mandatory:** Assign a specific color to each category of information. For example, in a history map: Dates are always Blue, People are always Red, and Events are always Green.

3. **Co-Construction:** Don't just give the student a finished map. Have them draw the lines or add the icons. The physical act of "mapping" helps move the information into long-term storage.

This is where the SDI comes in!
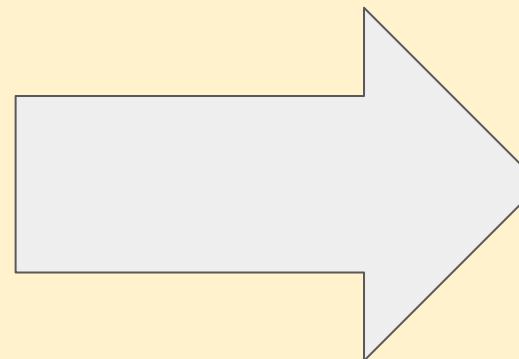
To help a student transition from relying on a teacher to becoming an independent "mapper," they need a repeatable routine. After you have taught students the strategy, this checklist and Map Reflection Card is designed to be taped to the inside of a textbook or a binder as a permanent scaffold.

The "Process" Map (For Multi-Step Tasks)

- **The Problem:** In subjects like Math or Science, the "order of operations" is usually the first thing a student forgets.
- **The Map:** Use a **Flow Map** with specific icons for each action.
  - **Step 1:** Circle the signs.
  - **Step 2:** Underline the keywords.
  - **Step 3:** Solve the left side.
- **Implementation:** The student places a physical marker (like a transparent counter) on the step they are currently working on. This prevents the "Where was I?" moment after a distraction.
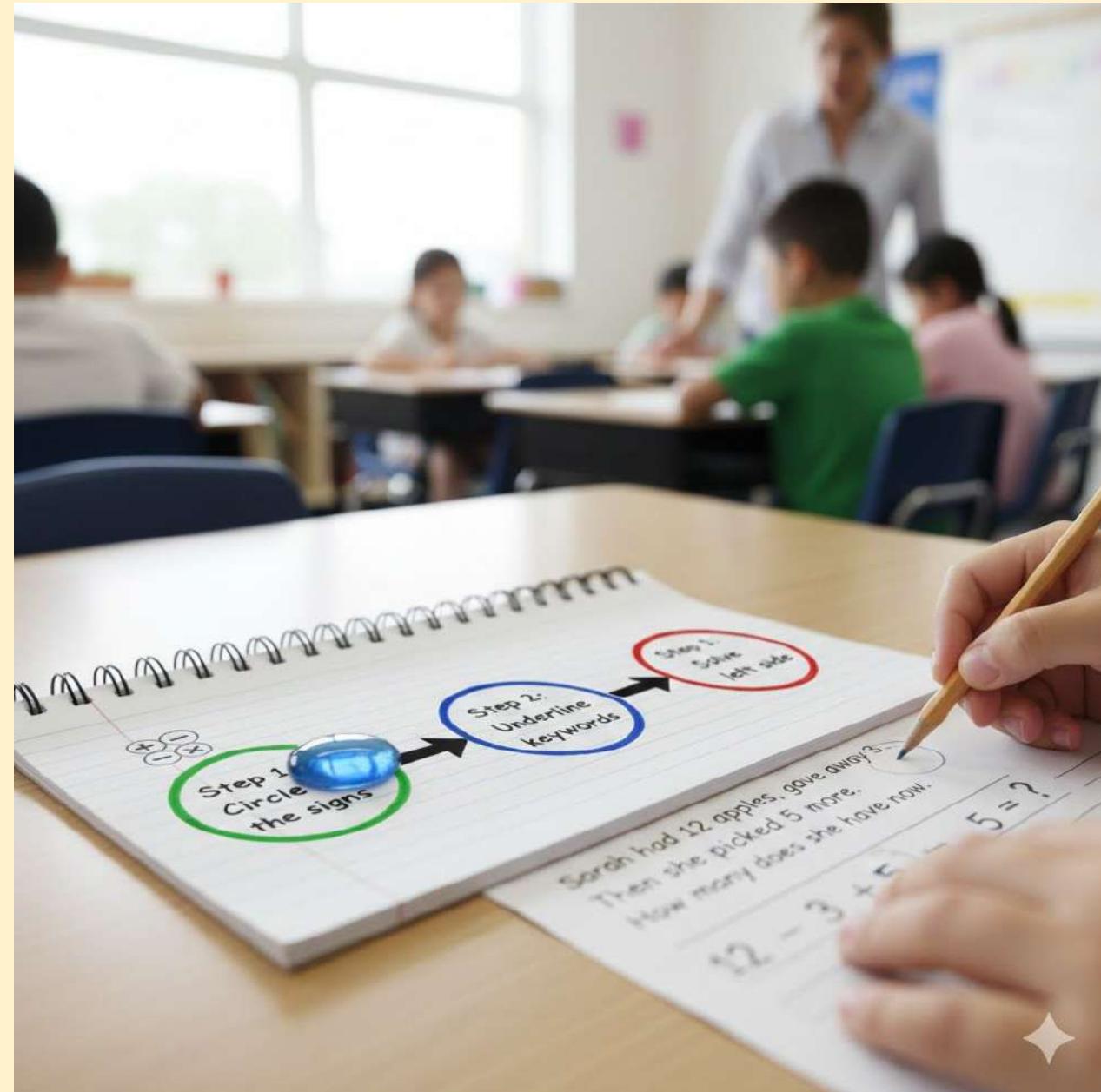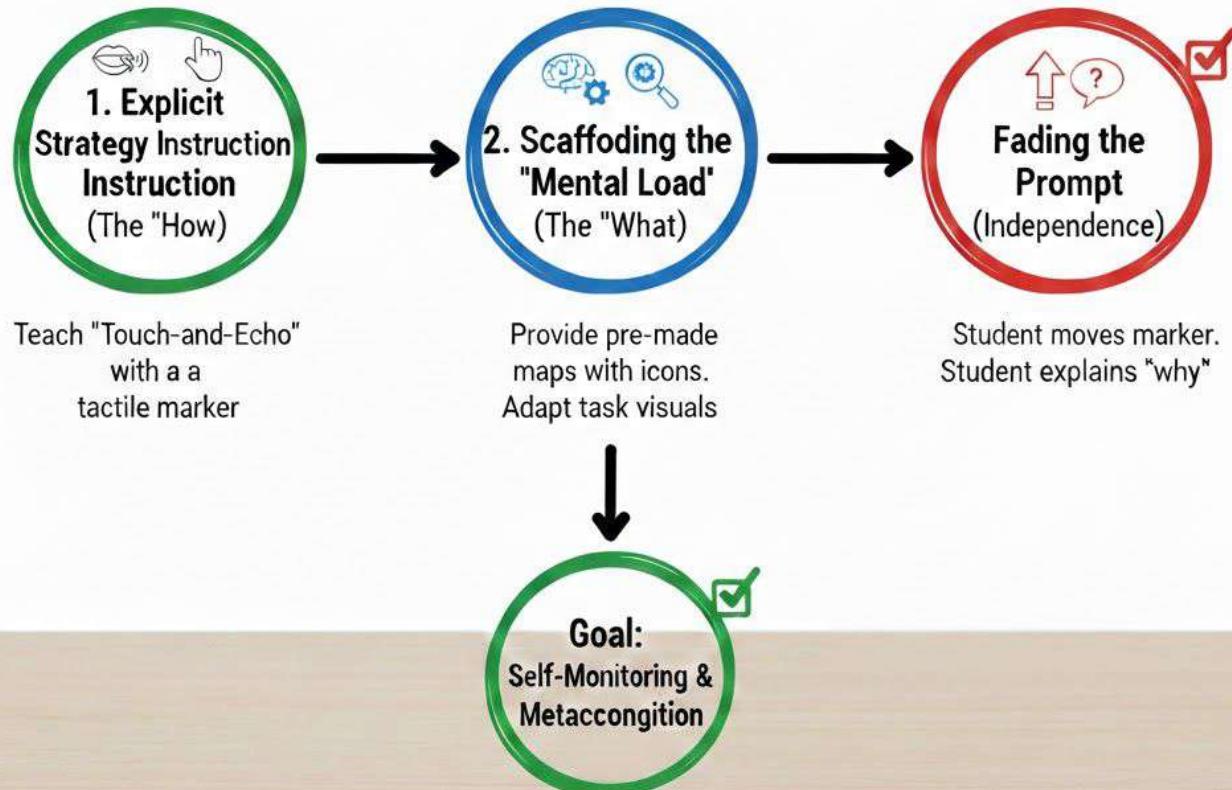
The SDI Translation: "The 3 Pillars"
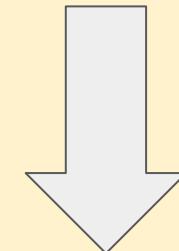
Key SDI Features
1. Physical Anchoring
2. Visual-Spatial Learning
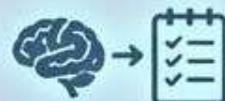3. Gradual Release

HANDOUT
SDI: The 3 Pillars

Universal Strategies to Support Working Memory

SUMMARY: Supporting the Cognitive "Engine"

Externalize the Information:
Don't make the brain "hold" what a piece of paper can. Use checklists, cheat sheets, and visual anchors to free up mental RAM for high-level thinking.

Prioritize "Chunking":
Break complex tasks—whether a line of code, a musical phrase, or a historical era—into small, manageable "bites" to prevent system overload.

Bridge the Visual Gap:
Use grids, color-coding, and graphic organizers to provide a 'map' for the eyes, reducing the effort needed for visual search and spatial processing.

Respect the 'Processing Pause':
Build in time for the brain to catch up. A 5-second pause can be the difference between a 'system crash' and a 'lightbulb moment.'

Visual Spatial Processing (Gv)

OVERLOOKED LEARNING CHALLENGES

WSBT 22

Visual Spatial (Gv)

- ➤ Visual processing is the ability to think about visual patterns and visual stimuli
  - ○ generate, perceive, analyze, synthesize, manipulate

- ➤ Inaccurate processing of shapes of letters and numbers

  Key Distinction: A student with a visual processing deficit may have 20/20 vision but still "see" a jumble of letters on a page. The IEP must treat the deficit as a **functional barrier to information**, not a physical eye problem.

- ➤ Visual processing deficits are correlated to:
  - ○ Basic Reading Skills / Reading Fluency
    - ■ Difficulty finding and retaining important information
    - ■ Reading with speed / precision
    - ■ Blending letters into words visually
    - ■ Perceiving individual letters or words accurately
  - ○ Math Calculation / Math Reasoning
    - ■ Understanding of size
    - ■ Fractions and part/whole relationships
    - ■ Perceiving individual numbers accurately
  - ○ Writing
    - ■ Staying within the margins or on the lines
    - ■ Copying from the board or books
    - ■ Writing neatly and quickly
    - ■ Difficulty with spacing

Application Across Other Content Areas

Fine Arts/PE

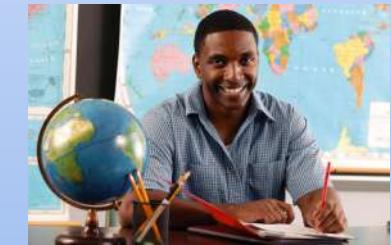Drawing from models, choreography, spatial positioning -Have trouble mirroring actions, copying visual patterns, or organizing space on paper or the field

Social Studies

Reading maps, timelines, and historical images - Confusion about spatial relationships or visual timelines

Science

Interpreting diagrams, charts, and visual experiments - Struggles to follow procedures or make sense of visuals

Visual Spatial
Impact on Key IEP Components 🎯

A visual processing deficit significantly impacts how a student accesses information, necessitating a highly specialized approach to the IEP. Unlike a vision impairment (acuity), this is a brain-based challenge in interpreting what is seen

- **Present Levels of Performance (PLAAFP):** The PLAAFP must detail the **impact** of the disability on the student's involvement and progress in the general education curriculum. For example:
  - **Reading:** "Student loses their place frequently, skips lines, or confuses letters like 'b' and 'd', leading to a reading fluency rate of 40 WPM compared to a grade-level peer average of 90 WPM."
  - **Math:** "Student struggles to align numbers in columns for multi-digit addition, leading to calculation errors despite understanding the mathematical concept."
  - **Writing:** "Due to visual-motor integration issues, the student's handwriting is illegible when writing on standard ruled paper, and they require 3x the time of peers to copy notes from the board."
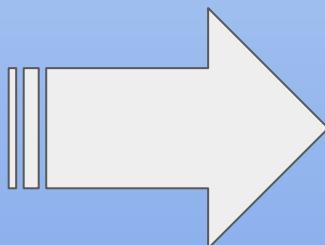
- **Measurable Annual Goals -** Goals for students with visual processing deficits often focus on **compensatory strategies** or **remediation** of the specific sub-type (e.g., visual memory or figure-ground):
  - **Visual-Motor Goal:** "When given a graphic organizer, the student will organize and record 3 key details from a text with 80% accuracy over 5 consecutive trials."
  - **Self-Advocacy Goal:** "The student will independently request a 'line guide' or 'reading window' during independent reading tasks in 4 out of 5 opportunities."
  - **Math Goal:** "The student will correctly align and solve 2-digit multiplication problems using graph paper or vertical guides with 90% accuracy."

Visual Spatial 🎯 Impact on Key IEP Components 🎯

Special Education and Related Services: A visual processing deficit often triggers the need for specific experts:

Occupational Therapy (OT): To work on visual-motor integration and handwriting.
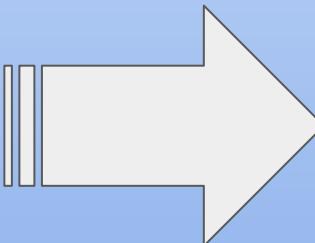
Supplementary Aids, Services, and Accommodations:

This is often the most robust section for visual processing. The goal is to **reduce visual "noise"** and cognitive load:

- **Environment:** Preferential seating (direct line of sight to the board), reduced wall clutter, and slanted work surfaces.
- **Materials:** Increased "white space" on worksheets (fewer problems per page), high-contrast materials, and the use of a ruler or finger-guide to track text.
- **Testing:** Extended time (due to slower processing speed), oral testing options, or allowing the student to mark answers directly in a test booklet rather than on a separate bubble sheet (which requires high visual-spatial shifting).

Instructional Strategies

Understanding the Challenges of Visual Spatial Deficits

Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Visual Processing (Gv) Deficit

| Classroom Instruction	Instructional Materials	Environmental	Strategies
Provide oral explanations for visual concepts	Video clips	Color-coded information	Orthographic strategies for decoding (word length, shape, etc.)
Review spatial concepts using hands on activities (use of models i.e. to show the moon's orbital path)	highlight margins during writing tasks	Preferential seating - easy access to visual material (i.e. smartboard, manipulatives)	Highlight or color code important info. Use aids to support visual tracking
Provide verbal label for visual representation (i.e. explain color coding in graphs)	Graph paper to assist with number alignment on math assignments	Note taking buddy, readers/scribes when needed	Pair visual with verbal
Provide auditory cues to supplement visual info.	Books on tape	Alternative lighting (natural light)	

🗣️ Methodology: Adapting *How* You Teach

To provide effective Specially Designed Instruction (SDI) for visual processing, the teacher must change **how** the lesson is taught to bypass the student's visual "roadblocks." Because visual processing is an umbrella term, the instruction should target the specific sub-type of the deficit.
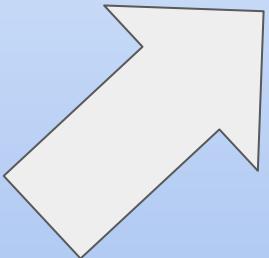
SDI for Visual-Spatial & Figure-Ground Deficits

These students struggle to find specific information on a crowded page or understand where objects are in relation to one another.

- **Instructional Highlighting:** The teacher provides text where key vocabulary or main ideas are pre-highlighted in a specific color, reducing the student's need to visually "scan" and "filter" through dense paragraphs.
- **The "Window" Method:** Using a physical tracking tool or a "reading window" (a card with a slot cut out) to isolate a single line of text or one math problem at a time, physically blocking out distracting visual stimuli.
- **Grid-Based Math:** Providing large-square graph paper for all math assignments. The teacher explicitly instructs the student on how to use the grid lines to align place value (ones, tens, hundreds), preventing "spatial drift" during calculation.

🗣️ Methodology: Adapting *How* You Teach

SDI for Visual Discrimination & Sequencing

These students struggle to see the difference between similar symbols (b/d, +/x) or keep a sequence of symbols in the correct order.

- **Multi-sensory Mapping:** Using "Sandpaper Letters" or "Air Writing" to teach letter and number formation. By using the sense of touch and movement (kinesthetic), the brain builds a "muscle memory" of the shape that doesn't rely solely on visual recognition.
- **Color-Coded Sequencing:** The teacher uses a consistent color-code for multi-step processes. For example, in a long division problem, the "Divide" step is always Green, "Multiply" is Red, and "Subtract" is Blue.
- **Verbalizing the Visual:** The teacher explicitly describes the "topography" of a symbol or letter (e.g., "The letter 'b' has a tall stick on the left and a belly on the right").

🗣️ **Methodology: Adapting *How* You Teach**

SDI for Visual Memory Deficits

These students struggle to remember what they have seen, which impacts sight-word recognition and copying information.

- **Visual-Auditory Pairing:** Every time a new visual concept (like a map or a diagram) is introduced, the teacher provides a corresponding audio recording or a detailed verbal description to be stored in the student's stronger auditory memory.
- **Reference Aids:** Providing a "Desk Tool" (a small card taped to the desk) that contains the alphabet, common sight words, or math formulas. This removes the "memory retrieval" burden, allowing the student to focus on the higher-level task.
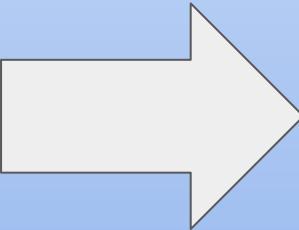
To provide Specially Designed Instruction (SDI) for a student with **visual-spatial deficits**, the teacher must shift from "showing" to "structured doing." These students struggle to understand the relationship between objects, symbols, or letters on a page, often feeling "lost" in the white space.

Step-by-Step Example of SDI for Visual Processing
- Solving a Multi-Step Math Equation -
The "Spatial Anchoring Method"

Step 1: Environmental Modification (The Prep)

The teacher does not provide standard wide-ruled paper. Instead, the teacher provides **large-square graph paper** or a **vertical alignment template**.

- **The "Why":** This provides a physical "box" for every digit, removing the student's need to mentally calculate where the number should sit.

Step 2: Color-Coding for Directionality

The teacher instructs the student to use two different colored highlighters to define the "paths" of the calculation.

- **The Action:** Highlight the "Ones" column in yellow and the "Tens" column in blue.
- **The "Why":** Students with visual-spatial deficits struggle to "track" vertically. Color creates a visual "lane" that the brain can follow more easily than a black-and-white grid.

Step 3: Verbalizing the Spatial Movement

As the teacher models the problem, they use **explicit spatial language** rather than just saying "put the 3 here."

- **Teacher Script:** "We start in the bottom-right yellow box. We move straight up to the top-right yellow box. Now, we move diagonally to the top-left blue box."
- **The "Why":** It converts a visual-spatial task into a **verbal-sequential task**, utilizing the student's likely stronger verbal channels (Gc).

Step 4: The "Placeholder" Anchor

The teacher explicitly teaches the student to place a **physical "X" or a sticker** in the "Ones" place when moving to the second line of multiplication.

- **The Action:** "Before we multiply the Tens, we must mark' the ones place with a big red X so our numbers don't slide over."
- **The "Why":** Students with spatial deficits often forget to shift over one space because they don't perceive the "empty" space as a functional requirement.

Step 5: Self-Correction Checklist (Tactile)

The teacher provides a small "Post-it" checklist on the corner of the desk with three spatial checks:

1. **Aligned?** (Are my numbers inside the boxes?)
2. **Direction?** (Did I move from right to left?)
3. **Anchored?** (Is my 'X' in the second row?)
- **The "Why":** This builds metacognition, teaching the student to manually check the spatial layout that their eyes might have missed.

When the Page Does the Remembering

Visual-Spatial Supports for Multi-Step Math Accuracy

Instruction is **intentionally** designed to support **visual-spatial processing**, not just math computation

Environmental modification (graph paper) lets the page handle alignment, not the student's brain

Color-coding creates clear **directional** "lanes," helping students track vertically

Explicit spatial language turns a visual task into a verbal, sequential process

Placeholder "X" gives a concrete **anchor** for shifting place value

Self-correction checklist builds **metacognition** for checking spatial accuracy

All together, these steps reduce visual overload and allow students to focus on the math, not on where numbers should go

[Student] demonstrates difficulty in the area of **math calculation**, particularly when tasks require multi-step problem solving and accurate use of place value. Classroom work samples and teacher observations indicate that errors often occur due to **misalignment of numbers, difficulty tracking columns, and inconsistent spacing,** rather than a lack of understanding of math concepts or procedures.

Visual–spatial processing challenges impact [Student]'s ability to organize written math work, maintain consistent placement of digits, and shift appropriately between place values during multi-step calculations. These difficulties frequently result in incorrect answers, skipped steps, or loss of place, even when [Student] can verbally explain the mathematical reasoning.

Without structured visual supports, [Student] expends significant cognitive effort managing the spatial layout of math tasks, which interferes with accuracy and task completion. When provided with graph paper, color-coded place-value supports, explicit spatial modeling, and step-by-step visual anchoring, [Student] demonstrates improved organization and increased accuracy in math calculations.

These needs indicate that [Student] requires **Specially Designed Instruction** to address math calculation skills **in conjunction with visual–spatial processing** supports to ensure access to grade-level math instruction and accurate demonstration of mathematical understanding.

Annual Goal

By the end of the IEP cycle, given **multi-step math calculation problems** and **structured visual–spatial supports** (e.g., graph paper or spatial templates, color-coded place-value cues, and a step-by-step process map), [Student] will accurately complete multi-step math calculations by maintaining correct alignment, place value, and sequencing with **at least 80% accuracy across 4 out of 5 opportunities**, as measured by classroom work samples, curriculum-based assessments, and teacher data collection.

Accommodations

Presentation / Response Accommodations

- Use of **graph paper or spatially structured templates** for math calculations
- **Color-coded place-value cues** to support vertical and horizontal tracking
- **Consistent layout** for math assignments and assessments
- Reduced visual clutter on math worksheets when possible

Instructional Supports (Used During Instruction & Assessment)

- Access to **step-by-step visual reference sheets** for multi-step calculations
- Teacher use of **explicit spatial language** during modeling (e.g., "move to the next column")
- Allowing work to be completed using **aligned formats** rather than standard lined paper

Environmental / Organizational

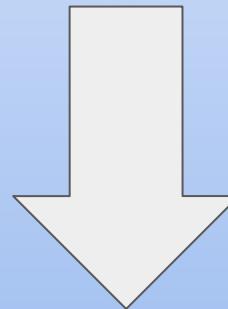- Workspace arranged to minimize visual distraction
- Materials aligned consistently (same paper type, same format)

🗣️ Methodology: Adapting *How* You Teach Organizing A Written Paragraph - The "Spatial Blueprint" for Writing

⬇️

Goal: To teach the student to organize a 5-sentence paragraph with correct indentation and logical flow without the text "clustering" or drifting off the page.

5-Step Explicit Instruction Process

Step 1 - The "Visual Skeleton" (Template)

The teacher provides a "Blueprint" rather than a blank sheet of paper. This is a page divided into five distinct, high-contrast colored boxes.

- **The Action:** Box 1 is Green (Topic), Boxes 2–4 are Yellow (Details), Box 5 is Red (Conclusion).
- **The "Why":** It provides a **fixed physical boundary** for each thought. The student doesn't have to worry about "where the sentence goes" because the box defines the space.

Step 2 - The "Indentation Anchor"

To teach the spatial concept of an indent, the teacher provides a **tactile marker** (like a small "Go" arrow sticker) placed exactly one inch from the left margin in the first box.

- **The Action:** "Place your pencil on the arrow before you write your first word."
- **The "Why":** Visual-spatial deficits make it hard to estimate "one inch." A physical anchor turns a spatial estimate into a concrete starting point.

Step 3 - Directional "Bumper Lines"

The teacher uses **Bold Green** for the left margin and **Bold Red** for the right margin on the student's paper.

- **The Action:** The teacher instructs: "Green means Go (start writing), Red means Stop (time for a new line)."
- **The "Why":** This mimics a "lane" for writing. It prevents the "waterfall effect" where the student's lines gradually slant downward or run off the edge of the paper.

5-Step Explicit Instruction Process

The teacher explicitly teaches the student to use a physical tool (like a popsicle stick or a "spacer" tool) between every word.

- **The Action:** Write a word $\rightarrow$ Place the stick $\rightarrow$ Write the next word.
- **The "Why":** Students with spatial deficits often struggle with **inter-word spacing**, leading to a "string" of letters that they cannot later decode or read back.

The teacher provides a **colored transparency overlay** (like a blue strip). Once the paragraph is finished, the student slides the blue strip down the page to "mask" everything except the line they are currently reading.

- **The Action:** "Use the blue slider to check that every box has at least one period."
- **The "Why":** This helps the student focus their visual attention and prevents "visual crowding," where the eyes jump between lines and skip errors.
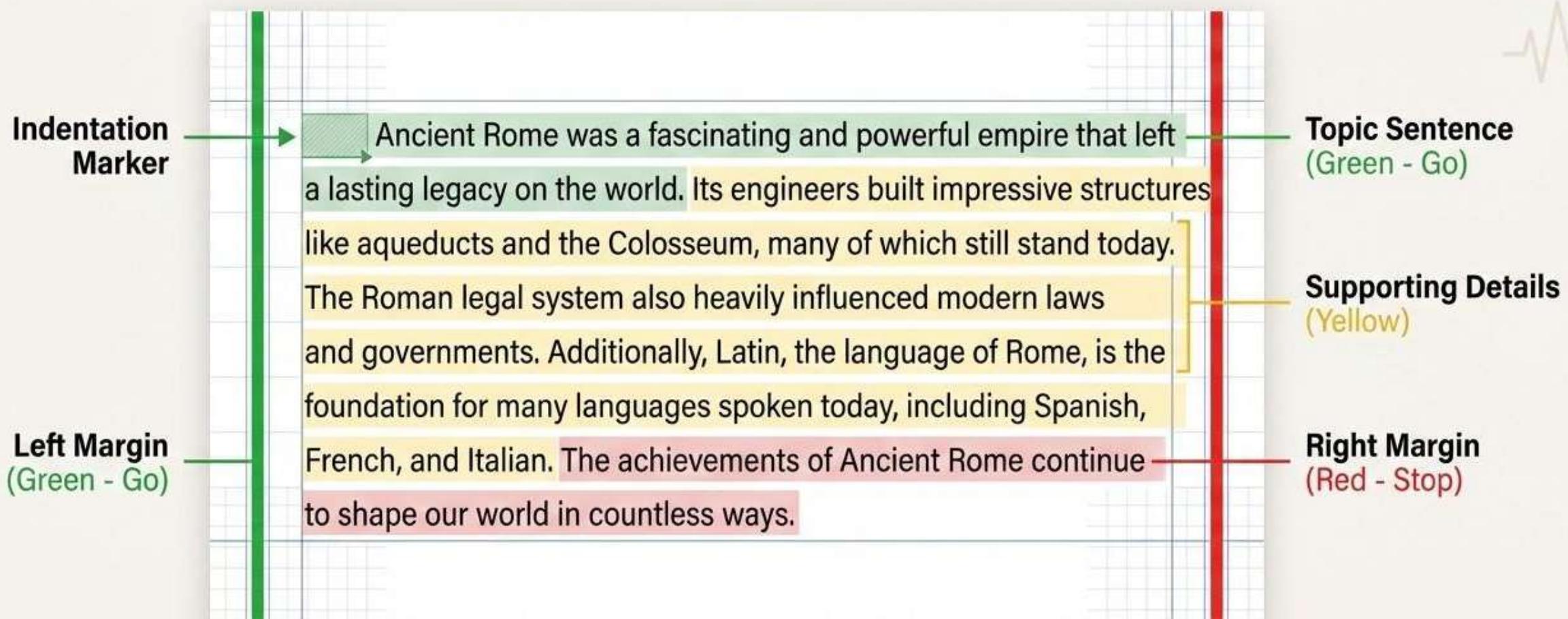
Organizing A Written Paragraph – The "Spatial Blueprint" for Writing

Goal: To teach the student to organize a 5-sentence paragraph with correct indentation and logical flow without the text "clustering" or drifting off the page.

Indentation Marker

Left Margin
(Green - Go)

Ancient Rome was a fascinating and powerful empire that left a lasting legacy on the world. Its engineers built impressive structures like aqueducts and the Colosseum, many of which still stand today. The Roman legal system also heavily influenced modern laws and governments. Additionally, Latin, the language of Rome, is the foundation for many languages spoken today, including Spanish, French, and Italian. The achievements of Ancient Rome continue to shape our world in countless ways.

Topic Sentence
(Green - Go)

Supporting Details
(Yellow)

Right Margin
(Red - Stop)

🗣️ **Methodology: Adapting *How* You Teach Navigating Science Diagrams or Maps**

Step 3 – The "Isolation Technique" (The Missing Step!)

Reducing Visual Crowding to Improve Focus

Without the 'Isolation Technique':

Teacher Action: Show the whole diagram at once, with many labels.
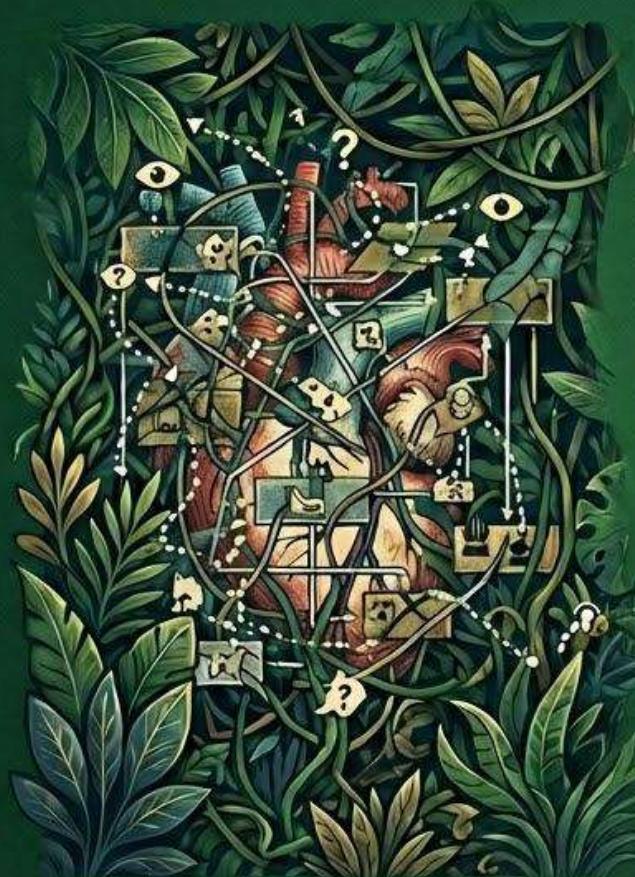
With the 'Isolation Technique':

Teacher Action: Use L-shaped masking cards to cover most of the diagram.
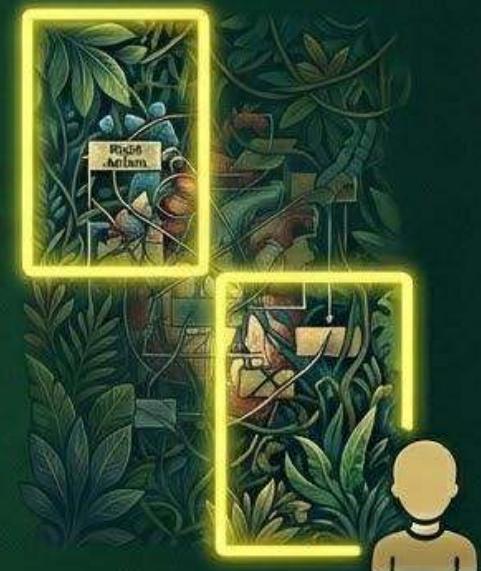
Student Action: View only one quadrant or label at a time.

Why It Works: Reduces visual crowding and improves focus on one concept.

Step 4 – Color-to-Label Mapping
Creating a Clear Visual Bridge Without Confusing Pointer Lines

Without 'Color-to-Label Mapping':

Teacher Action: Use many black pointer lines to connect labels to diagram parts.
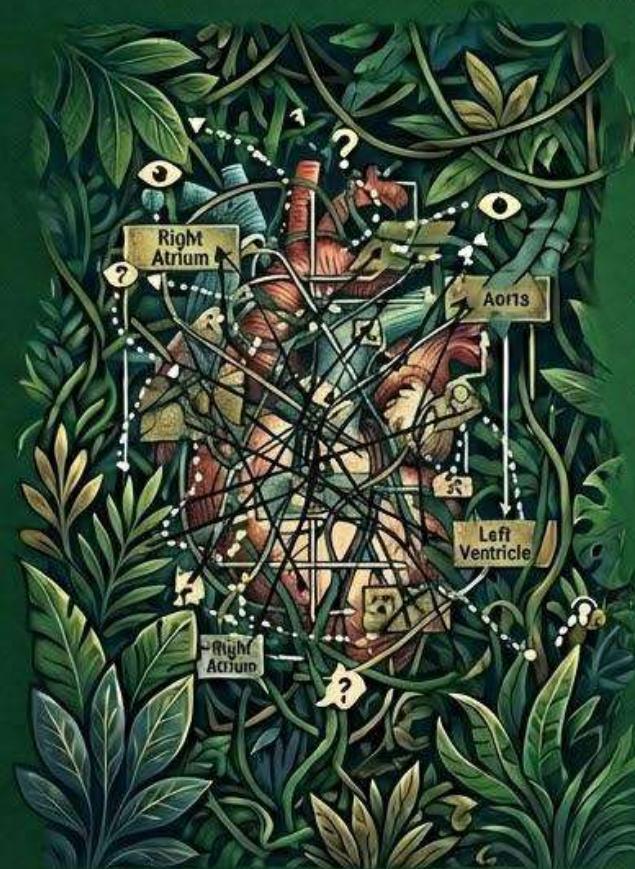
With 'Color-to-Label Mapping':

Teacher Action: Match label and diagram part using the same color.

Example: Highlight "Aorta" in red and color the aorta red.
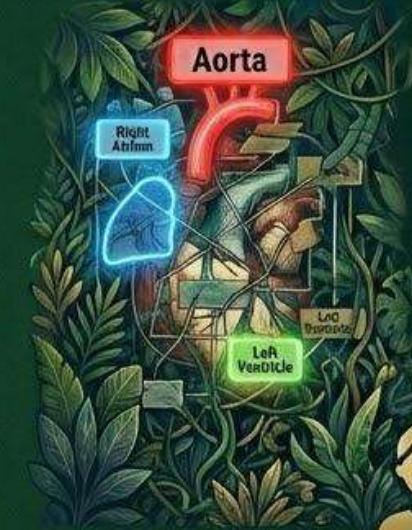
Why It Works: Creates a clear visual bridge without confusing pointer lines.

Visual Spatial Processing

Teacher Resource Handout

Processing Speed (Gs)
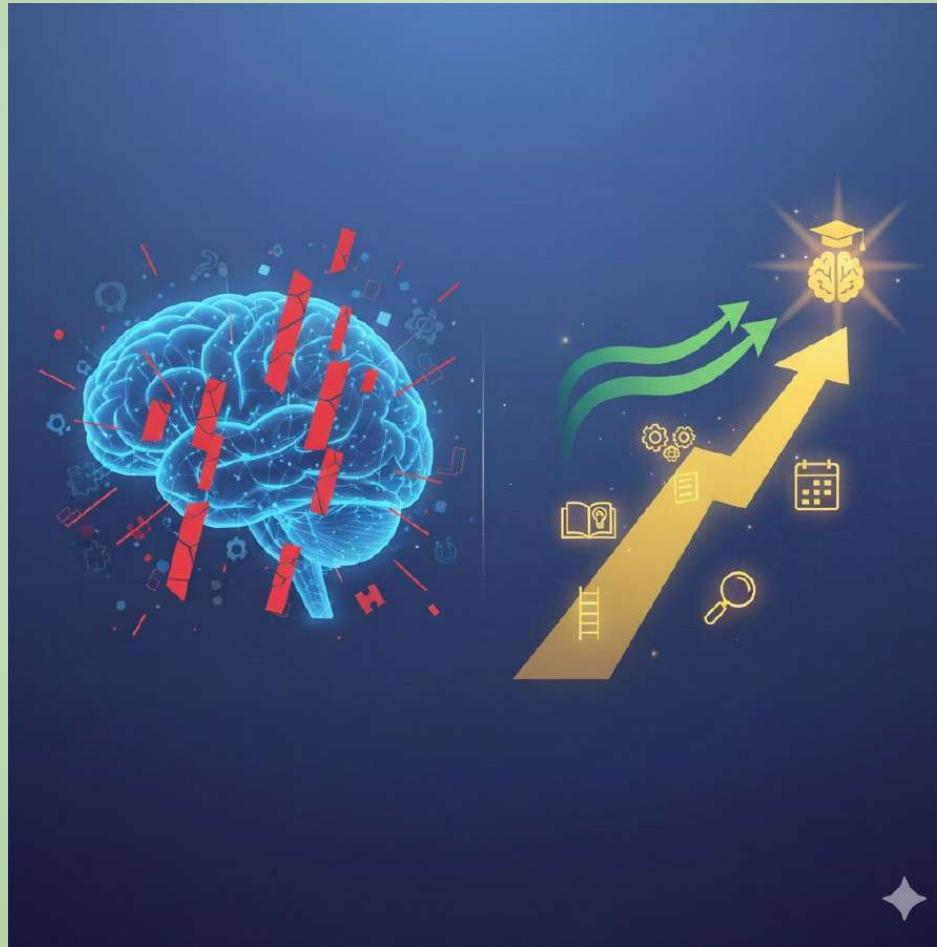
What is slow processing speed?

📚 How Processing Speed Affects Learning in Different Content Areas

Content Area	Examples of Processing Speed Use	When Processing Speed Is Slow...
Reading	Quickly decoding words, reading fluency, responding to comprehension questions	Reading may be labored; can't finish assignments or tests in time
Math	Rapid fact retrieval, solving problems within time limits	Struggles with timed math, loses place in multi-step problems
Writing	Getting ideas on paper, handwriting speed, editing on the fly	Writes slowly, incomplete work, limited written output
Science	Reading instructions, collecting/analyzing data, following sequences	Difficulty keeping up during experiments or group discussions
Social Studies	Reading texts, taking notes, synthesizing information	May miss key points in lectures or not complete written responses
Fine Arts/PE	Following directions in real-time, responding to music or movement cues	Struggles with timing, rhythm, or quickly adjusting movements

🎯 Why It Matters

Identifying processing speed deficits helps in:

- Designing IEP goals around **efficiency**, **output**, and **task completion**

- Providing **accommodations** (e.g., extended time, reduced workload, use of technology)

- Implementing **Specially Designed Instruction (SDI)** to build strategies for pacing, stamina, and planning

Processing speed challenges often impact a student's **confidence, independence**, and **academic success**, making accurate identification and support essential.

Tying to Special Education Services

Processing speed can be linked to services in the IEP such as:

- **Direct instruction** in fluency (reading, math, writing)

- **Academic support** from a special education teacher

- **Speech-language services** for expressive/receptive delays impacting processing

- **Occupational therapy** if motor planning or handwriting slows task completion

- **Assistive technology consultation** for tools that reduce demands on speed

From Assessment to Accommodations: A Translation Guide

Assessment Subtest	What it Measures	Classroom "Red Flag"	Justified Accommodation
Coding	Visual-motor integration & speed	Slow, labored handwriting; difficulty copying from the board.	No-copying policy: Provide printed notes or "guided notes" (cloze-style).
Symbol Search	Visual discrimination & scanning	Losing the place while reading; missing details in instructions.	Visual Simplify: High-contrast text, increased white space, and use of a line tracker.
Cancellation	Vigilance & selective attention	Struggling to find errors in work; getting "lost" in busy worksheets.	Reduced Quantity: Focus on quality over quantity; grade only the first 50% of an assignment.
Digit Span (WM)	Sequential auditory memory	Forgetting the start of a sentence by the time they reach the end.	Multimodal Input: Give verbal instructions and a written checklist simultaneously.

Specially Designed Instruction for Processing Speed

SDI Example: The "Rapid Retrieval & Output" Protocol

This instruction is designed for a student who has "high-level" ideas but "freezes" when it is time to put pen to paper or respond in class.

The Instruction:

1. The Strategy:
"The 60-Second Brain Dump"

Instead of letting the student get stuck in the "blank page" phase, you explicitly teach them a ritualized method for externalizing thoughts before the memory "decays."

The Instruction:

You teach the student to use a timer. For exactly 60 seconds, they must write (or voice-record) every keyword related to the task without worrying about grammar, spelling, or logic.
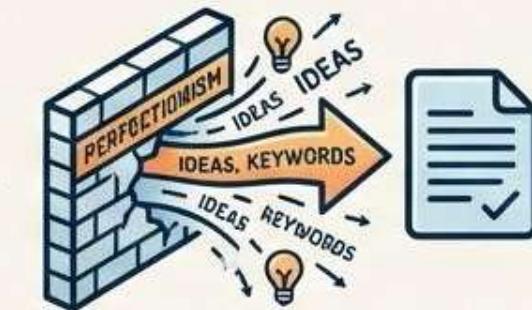
The Skill Being Taught:

You are training the student to bypass the "perfectionism" or "filter" that often slows down those with low processing speed.

2. The Strategy: "Predictive Scanning"

For students who scan text slowly (like in Social Studies or CS), you teach them to search for "Landmark" words rather than reading every word.

The Instruction:

You provide a text and a list of 3-5 "Target Words." You teach the student to use a highlighter to find those landmarks before they try to read the paragraph for meaning.

The Skill Being Taught:

This is Visual Search Instruction. You are training the eyes to move more efficiently across a field of data, reducing "search fatigue."
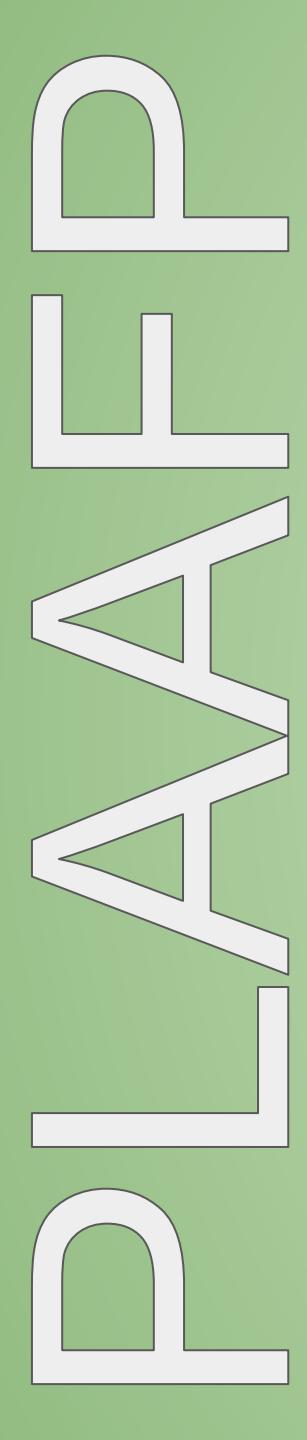
What Does This Look Like in an IEP?

PLAAFP

[Student] **demonstrates difficulty with processing speed**, which **impacts the ability to efficiently initiate and complete academic tasks across content areas.** Classroom observations and work samples indicate that [Student] often requires additional time to interpret directions, determine task expectations, and decide how to begin assignments, particularly when tasks include multiple steps, dense language, or unfamiliar formats.

These **processing delays frequently result in slow task initiation, incomplete work, and errors that occur when [Student] attempts to respond before fully understanding what is required.** While [Student] demonstrates adequate understanding of academic content when tasks are explained or structured, difficulty anticipating task demands interferes with independent performance.

When explicitly taught to preview directions, identify key information, and anticipate task structure prior to beginning work, [Student] demonstrates improved task initiation, accuracy, and completion. These data indicate that [Student] requires **Specially Designed Instruction** to address processing speed by explicitly teaching strategies that reduce real-time cognitive demands and support efficient access to instruction.

GOAL
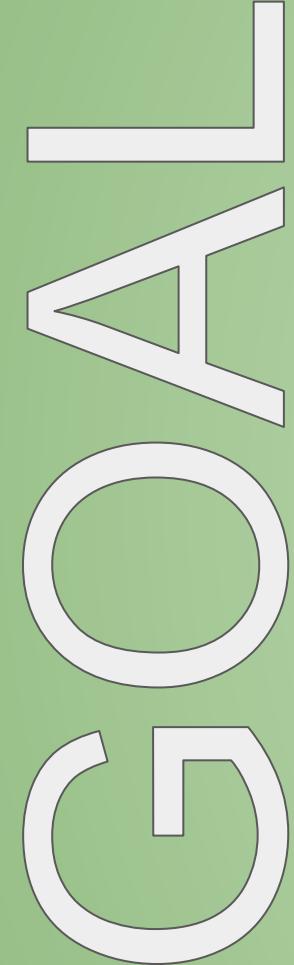
By [Date], when presented with an academic task, **[Student]** will apply predictive scanning strategies (e.g., highlighting keywords, previewing directions) to initiate the task within **2 minutes** of the prompt with **80% accuracy** over **10 consecutive trials**, as measured by teacher-recorded data and work samples.
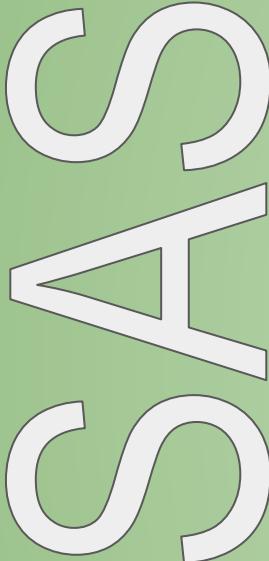
Presentation Accommodations

- Directions provided **in advance** of task initiation to allow previewing
- **Key words or steps highlighted** in directions or prompts
- Tasks presented with **clear visual structure** (headings, spacing, numbered steps)
- Reduced extraneous language in written directions when possible

Timing / Pacing Accommodations

- **Preview time** provided before timed tasks begin
- Flexible start time on assignments to allow task analysis before responding
- Extended time when tasks require rapid interpretation of new formats

Response Accommodations

- Permission to **mark or annotate directions** (underline, circle, note keywords)
- Access to **direction checklists or task previews** during independent work
- Ability to ask for **clarification of directions** before beginning tasks

Environmental / Organizational

- Directions provided **verbally and visually** when possible
- Teacher check-in to confirm understanding **before task initiation**, not during work

SAS

How Does This Play Out In The Classroom?

1 Note Taking: The Student is 2 Slides behind

Teaching the "Capture" method: Teach the student to write only the *noun* and *verb* of a slide, rather than the full sentence.

2 Math Word Problems: Student spends 10 minutes reading.

Teaching "Gisting": Teach the student to cross out all "fluff" words and only circle the numbers and the operational word (e.g., "more than").

3 Class Participation: Student knows the answer but the teacher mores on

Teaching the "Signal" habit: Teach the student to raise a hand as soon as they start thinking of an answer, signaling the teacher they need "Processing Grace."

Gisting Strategy: From "Too Much" to the Gist

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During the early morning hours of the school day, students who are transitioning between instructional environments may experience varying levels of difficulty adjusting to new expectations, routines, and task demands, particularly when directions are embedded within lengthy explanations that include descriptive language, contextual background information, and multiple clauses that are not directly related to the primary action required of the learner. In many cases, educators observe that students begin misunderstanding tasks without fully understanding what is being asked of them, resulting in incomplete responses, inaccurate answers, or avoidance behaviors that may be misinterpreted as lack of effort or motivation rather than difficulty processing the essential components of the assignment. When instructional language is not explicitly clarified, students may expend significant cognitive energy attempting to determine what information is relevant, which can interfere with their ability to demonstrate their true academic skills and knowledge.

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The Bottom Line

STUDENTS
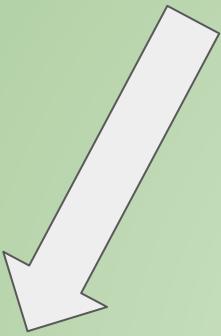
MISUNDERSTAND
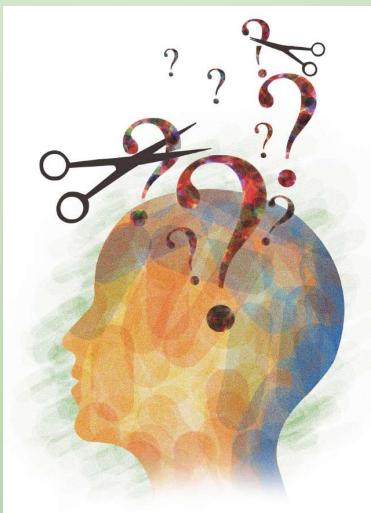
TASKS

Handout: SDI for Processing Speed

Questions / Comments

Thank You!

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Special Education Programs
Consultant

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(C) 307-431-1073

Teaching Gisting as Specially Designed Instruction (SDI)

Purpose: Gisting is an explicit instructional strategy that helps students identify the main idea by reducing language load. It supports processing efficiency, task initiation, comprehension, and accuracy—particularly for students with processing speed, language, or executive functioning needs.

Materials: Short passage (3–6 sentences), highlighters (2 colors), gist frame card, sticky notes (optional).

Step-by-Step Instruction

1 Teach the purpose: Explain that gisting removes extra words so students can understand the task quickly.

2 Identify WHO/WHAT (nouns): Students underline people, places, or things the text is about.

3 Identify WHAT IS HAPPENING (verbs): Students circle or highlight the main action verbs.

4 Remove extra language: Cross out or fade details that do not change the main meaning.

5 Create the gist: Students restate the message using a structured frame or word limit.

Gist Frames

• (Who/What) + (doing what) + (about what/why)
• Write the main idea in 10 words or fewer
• Write the main idea in 3–5 words (micro-gist)

Guided & Independent Practice

Model each step using a short passage. Practice together with immediate feedback. Gradually release responsibility so students gist independently in reading passages, directions, assignments, and word problems.

Differentiation (SDI Supports)

• Pre-highlight nouns or provide word banks for students with language needs
• Limit text length and allow oral gists for students with slow processing speed
• Use gist cards or sentence strips for students with working memory needs

Progress Monitoring Options

• Accuracy of gist using a rubric or checklist
• Time to correctly initiate tasks after directions
• Improvement in task completion and accuracy

Key Takeaway: Gisting does not lower expectations—it removes barriers so students can access the task and demonstrate understanding.

Understanding Processing Speed
Teacher Quick Reference

What Is Processing Speed?

Processing speed refers to how quickly the brain takes in information, makes sense of it, and produces a response. It reflects efficiency of thinking, not intelligence.

What Processing Speed Is Not

Processing speed is not laziness, lack of effort, poor motivation, defiance, or low ability. Students with slow processing speed are often working very hard internally.

What Slow Processing Speed May Look Like in the Classroom

• Takes longer to begin tasks
• Needs directions repeated or written
• Completes fewer problems but shows accuracy
• Struggles with timed tasks
• Knows answers but needs more time to respond
• Appears overwhelmed when rushed

Why Timed Work Is Especially Challenging

Timed tasks require thinking, decision-making, and responding at the same time. For students with slow processing speed, this can overload cognitive systems and reduce accuracy.

Instructional Supports That Help

• Provide extended wait time after questions
• Break tasks into smaller steps
• Reduce workload without reducing rigor
• Allow extended time for assignments and assessments
• Provide directions both verbally and in writing
• Allow alternate response formats when appropriate

Key Takeaway

Slow processing speed means slow output, not slow thinking. When pressure is reduced and time is provided, students are better able to demonstrate what they know.

1. SDI for "Gisting" (The Filter Strategy)

The Goal: To reduce the "visual and linguistic noise" of a task so the student can find the core meaning before their working memory and/or time it takes to complete a task is exhausted.

Step-by-Step Instruction:

1. **Direct Modeling (The "Redaction" Phase):** Show a paragraph on a screen. Use a digital "blackout" tool to cover every word except the nouns and verbs. Read the remaining words aloud to show that the "gist" (the core meaning) survived.
2. **Guided Practice (The "Circle & Cross" Method):** Give the student a printed paragraph. Have them **Circle** the "Action" (verb) and **Underline** the "Subject" (noun). Then, have them literally **Cross Out** adjectives or filler words (e.g., "the," "very," "beautiful").
3. **The "Post-It" Summary:** Once the "noise" is crossed out, the student writes a 3-word summary on a Post-It note. This "Gist" becomes their anchor for the rest of the assignment.
4. **Independent Practice:** Provide a multi-step math word problem. The student must "gist" the problem (e.g., "John has 5 apples, gives 2") before they are allowed to pick up a calculator.

Differentiation: SDI Supports (Pick What Fits)

For students with slow processing speed

- Provide **pre-highlighted nouns** for first few lessons
- Limit to **1–2 sentences** initially
- Use **oral gist** before written gist
- Allow "wait time" and repeated modeling

For students with language deficits

- Preteach 3–5 key vocabulary words
- Provide a **word bank** of possible verbs
- Use sentence frames consistently
- Practice with simpler syntax first

For students with working memory needs

- Provide a gist card on desk
- Use sticky notes: "Who/What" and "Verb"
- Chunk passages into 1–2 sentences at a time

Data Collection (Progress Monitoring)

Choose one measurable method:

Option 1: Accuracy rubric (0–2)

- 2 = gist includes correct who/what + correct action + main idea
- 1 = partially accurate
- 0 = unrelated or copied text

Option 2: Task initiation time

- Time from direction given → student starts correctly
- Track reduction in start-time lag

Option 3: Work completion/accuracy

- Compare accuracy before/after gisting routine for directions or word problems

What Could This Look Like In The IEP?

✅ IEP SDI Description

Specially Designed Instruction:
The student will receive explicit instruction in the use of the *gisting* strategy to reduce linguistic and cognitive load and to support efficient processing of instructional language. Instruction will include direct modeling and guided practice in identifying key nouns (who/what), primary verbs (action), and essential information while suppressing nonessential details. The student will be taught to restate instructional content and task directions in a concise summary (gist) prior to task initiation to improve comprehension, accuracy, and task completion.

✅ SDI With Instructional Methods

SDI Methodology:
Instruction will be explicitly scaffolded and systematically faded. The teacher will model the gisting process using think-alouds, followed by guided practice and independent application. Supports may include highlighted text, sentence frames, visual cues, and structured response formats. Instruction will be individualized based on student response and data.

✅ SDI Linked to Processing Speed / Executive Functioning

Purpose of SDI:
This instruction is designed to support the student's processing speed and executive functioning by reducing language complexity, clarifying task demands, and supporting timely task initiation. Gisting instruction will help the student efficiently identify the essential components of instructional language without altering academic expectations.

✅ IEP-Ready SDI With Frequency & Setting (Template)

Specially Designed Instruction:
The student will receive explicit instruction in the gisting strategy ____ times per week for ____ minutes in the ____ setting. Instruction will focus on reducing linguistic complexity of instructional materials by teaching the student to identify key nouns and verbs and summarize directions or content in a concise gist prior to beginning tasks.

✅ Progress Monitoring Example

Progress Monitoring:
Student progress will be monitored through data collection on accuracy of student-generated gists, task initiation time following instruction, and completion and accuracy of assigned tasks. Instructional adjustments will be made based on student performance data.

🧠 Gisting Strategy: Find the Action Core Example

◆ STEP 1: The Raw Text

Original word problem:

Samantha carefully counted the total number of books on the library shelf after returning several novels that she had borrowed earlier in the week.

◆ STEP 2: Redaction (Circle & Cross)

What the student marks:

- 🔵 **Circle (Nouns – Who/What):**
  - ○ *Samantha*
  - ○ *number*
  - ○ *books*
  - ○ *library shelf*

- 🟦 **Box (Verbs – Action):**
  - ○ *counted*
  - ○ *returning*

- ❌ **Cross Out (Fluff):**
  - ○ *carefully*
  - ○ *total*
  - ○ *several*
  - ○ *earlier in the week*

👉 After marking, the sentence visually looks **cleaner and less overwhelming**.

◆ STEP 3: The 3-Word Gist (Action Core)

From the circled nouns and boxed verbs, the student writes:

`[ Samantha ] [ counted ] [ books ]`

🧠 **This is the Action Core**

Everything else supports this idea — but doesn't drive the task.

🔹 STEP 4: Action!

Student answers:

My first step is to determine how many books there are.

✏️ SECOND QUICK EXAMPLE (Math Word Problem)

Raw Text:

A large rectangular garden with colorful flowers has a length of 12 meters and a width of 8 meters. What is the total area of the garden?

Redaction:

- 🔵 Nouns: *garden, length, width, area*
- 🟦 Verbs: *has, is*
- ❌ Fluff: *large, rectangular, colorful*

3-Word Gist:

[garden] [find] [area]

Action:

Multiply length × width.

🧑‍🏫 Why this example works so well

- Students **see** how much text can be ignored
- The gist becomes a **bridge** between reading and doing
- Especially powerful for:
  - Word problems

- ○ Constructed responses
- ○ Students with working memory or language load challenges

✏️ STUDENT WORKSHEET

Name: _____ **Date:** _____

STEP 1: THE RAW TEXT

📄 Read the text below.

STEP 2: REDACTION (CIRCLE & CROSS)

🖍 Mark the text above:

- ⬤ Circle the **nouns** (who / what)
- 🟦 Box the **verbs** (action)
- ❌ Cross out the **fluff** (extra words)

STEP 3: THE 3-WORD GIST

🧩 Write the Action Core:

☐ [_____]   [_____]   [_____]

☐

STEP 4: ACTION!

🚀 What is your **first step** now?

2. SDI for the "Signal Habit" (The Communication Grace)

The Goal: To teach the student to advocate for "Wait Time" so they don't give up when a teacher moves too quickly.

Step-by-Step Instruction:

1. **Awareness Training:** Help the student identify the "Loading" feeling. Ask: *"How does it feel when I ask a question and your brain is still looking for the answer?"* (Common answers: "tight chest," "blank mind").
2. **The "Pre-Answer" Signal:** Teach a low-profile physical signal. It could be a specific finger tap on the desk or a "half-raised" hand.
   ○ *The Instruction:* "When you hear a question and you *think* you might know it, give the signal **immediately**—even before you have the full answer ready."
3. **Role-Play with "Processing Grace":** Practice in a 1-on-1 setting. Ask a question, wait for the signal, and then intentionally look away or count to 10 before asking for the verbal response. This teaches the student that the signal **guarantees** them safety to think.
4. **Generalization:** Coordinate with other teachers. Tell the student: *"In Art class today, try to use your signal once. I will check in with the Art teacher to see how it felt."*

IEP Documentation Examples

Feature	SDI for Gisting	SDI for Signal Habit
IEP Goal	Student will identify 2-3 "anchor words" in a text to summarize the main idea with 80% accuracy.	Student will use a pre-determined signal to request "wait time" in 4 out of 5 classroom opportunities.
The "Teaching" (SDI)	Direct instruction in linguistic filtering, noun-verb identification, and text reduction techniques.	Explicit training in self-monitoring for processing "lag" and self-advocacy signaling.

3. SDI for "The Capture Method" (Noun-Verb Tagging)

The **Capture Method** is a specialized SDI designed to solve the "Note-Taking Trap." For students with processing speed deficits, the act of copying sentences from a board is a cognitive "dead end"—by the time they finish writing sentence A, the teacher is already on sentence C, and the student has missed the meaning of both. The **Capture Method** teaches the student to stop "copying" and start "tagging."

The Goal: To teach the student to record the minimum amount of data required to "re-trigger" the memory of the lesson later.

Step 1: Direct Instruction in "Skeleton Notes" (I Do)

Show the student a slide with a full sentence: *"The French Revolution began in 1789 because the peasants were hungry and taxed too heavily."*

- **The Instruction:** Explain that their hand is slower than the teacher's voice. They cannot "win" by writing everything.
- **The Demonstration:** Show how to "Capture" the skeleton: **"French Rev - 1789 - Hunger/Taxes."**

Step 2: Guided Practice in "Short-Hand Coding" (We Do)

Teach a universal set of symbols to replace high-frequency words.

- **The Instruction:** Create a "Capture Key" for the student's notebook.
  - → (leads to / result)
  - ≠ (not / opposite)
  - △ (change)
  - w/ (with)
- **The Practice:** Play a 30-second clip of a video. Have the student try to "Capture" only 3 symbols or words that summarize the clip.

Step 3: Instruction in "Post-Lecture Reconstruction" (The Bridge)

Capturing isn't enough; the student must be taught how to "expand" the notes while the memory is still fresh.

- **The Instruction:** Teach the **"5-Minute Rule."** Immediately after a lesson, the student uses their "Captured" tags to tell a peer or a teacher one full sentence about what they wrote.

- **The Skill:** This transitions information from the volatile "Capture" state into long-term memory.

Part 2: What this looks like in the IEP

The Measurable Goal

"Given a lecture or presentation, [Student] will independently use the 'Capture Method' to record at least 3 Noun-Verb 'tags' per main idea, with 80% accuracy as measured by a comparison between student notes and teacher-provided outlines."

The SDI Description (The "Teaching")

- **Instructional Shift:** Explicit instruction in auditory-to-visual shorthand, symbolic coding, and note reconstruction.
- **The Methodology:** The teacher will provide "Low-Stakes Capture Drills" (using short audio clips) and direct modeling of symbolic abbreviation.

Beyond the Bottleneck

Specially Designed Instruction (SDI) for Processing Speed & Working Memory

The Core Concept: Accommodation vs. SDI

- **Accommodation (The Support):** Giving a student 50% more time to finish a test. (Leveling the playing field).
- **SDI (The Instruction):** Teaching the student "The Capture Method" so they can record ideas faster. (Building a new skill).

Quick Implementation Checklist for Teachers

- [ ] **Provide "Guided Notes":** (The skeleton is there; the student just fills in the "Gist").
- [ ] **The 60-Second Brain Dump:** (Allow 1 minute of "messy" recording before formal writing begins).
- [ ] **Quality over Quantity:** (Grade the first 5 items for mastery rather than 20 for speed).
- [ ] **Visual Pacing:** Use high-contrast visual timers to help build an internal "tempo."

🧠 Visual–Spatial Processing (Gv)

Teacher Resource Handout

What Is Visual–Spatial Processing?

Visual–spatial processing (Gv) is the brain's ability to **interpret, organize, remember, and work with visual information** such as symbols, spacing, patterns, layouts, diagrams, maps, and written text.

> **Important distinction:** A student may have 20/20 vision and still experience significant difficulty processing visual information. This is a **brain-based access issue**, not a vision problem.

What Visual–Spatial Challenges Look Like in the Classroom

Students with visual–spatial processing deficits may:

- Lose their place when reading
- Skip lines or reverse letters/numbers (b/d, p/q, 6/9)
- Struggle with spacing, margins, or alignment
- Have difficulty copying from the board
- Misalign numbers in math despite understanding the concept
- Become overwhelmed by crowded worksheets or visuals

These errors are often **misinterpreted as carelessness or lack of effort**, when they are actually access barriers.

Why This Matters for Instruction and IEPs

Visual–spatial processing deficits directly impact:

- **Access to grade-level curriculum**
- **Accuracy of student work**
- **Validity of progress monitoring data**
- **Student independence and confidence**

Instruction must address *how* information is presented — not just *what* is taught.

Core Principle of SDI for Visual–Spatial Processing

Don't make the brain hold what the eyes can anchor.

Effective SDI externalizes visual demands so students can focus cognitive energy on thinking, not searching.

SDI Strategy 1: Reduce Visual Noise

What teachers do:

- Increase white space on worksheets
- Limit problems per page
- Use high-contrast fonts and backgrounds
- Remove unnecessary graphics or borders

Reduces visual scanning demands and prevents overload.

SDI Strategy 2: Visual Anchoring & Structure

Tools:

- Graph paper or grid templates
- Highlighted margins or columns
- Line guides, reading windows, or rulers

Provides physical boundaries so students don't have to mentally judge spacing or alignment.

SDI Strategy 3: Color-Coding With Purpose

Examples:

- Math place value: Ones = yellow, Tens = blue
- Writing structure: Topic sentence = green, details = blue, conclusion = red
- Diagrams: Parts labeled with consistent colors

Creates predictable visual pathways that support tracking and organization.

SDI Strategy 4: Verbalizing the Visual

Teacher language examples:

- "Start in the bottom-right box."
- "Move up one square, then left."
- "The letter b has a tall stick first, then a belly."

Converts visual–spatial tasks into verbal–sequential processing, often a student strength.

SDI Strategy 5: Guided & Skeleton Notes

Instead of: copying full notes from the board

Provide:

- Outlines with key words missing
- Diagrams partially completed
- Step lists with icons or symbols

Reduces visual-motor load while preserving instructional content.

Classroom Examples Across Content Areas

Reading:

- Use reading windows
- Highlight only key sentences
- Provide consistent text layout

Math:

- Graph paper for all calculations
- Color-coded steps
- Vertical alignment templates

Writing:

- Boxed paragraph planners
- Raised-line paper
- Speech-to-text for drafting

Science & Social Studies:

- Labeled diagrams with color keys
- Flow maps for processes
- Timelines with clear spacing

What This Looks Like In the Classroom

Observations should include:

- Structured materials (grids, templates, visuals)
- Explicit modeling of visual strategies
- Students using visual tools independently
- Reduced random errors related to spacing or tracking

This demonstrates **intentional SDI**, not just accommodations.

Key Takeaway for Teachers

Visual–spatial processing deficits affect *how students access information*, not their intelligence or motivation.

When instruction is visually structured, students can finally show what they know.

Step‑by‑Step SDI Examples (Classroom‑Ready)

The examples below show **exactly how SDI for visual–spatial processing is implemented**, not just what tools are used. These routines are designed to be **explicit, repeatable, and observable**.

SDI Example 1: Visual Masking for Reading (Figure‑Ground Deficits)

Purpose: Help students focus on one line or section of text at a time and reduce visual overload.

Materials:

- Index card or cardstock reading window (slit cut across the middle)
- High‑contrast text

Step‑by‑Step Instruction:

1. Teacher models placing the reading window over the first line of text.
2. Teacher says: "Only this line matters right now."

3. Student reads the exposed line.
4. Student slides the window down one line at a time.
5. Teacher checks comprehension after each short section.

Why this is SDI:

- Explicitly teaches *how* to visually scan text
- Alters access without changing content
- Reduces visual noise

SDI Example 2: Spatial Anchoring for Math Calculation (Visual-Spatial Tracking)

Purpose: Prevent number drift and misalignment during multi-digit math.

Materials:

- Large-square graph paper
- Two colored highlighters

Step-by-Step Instruction:

1. Teacher provides graph paper instead of standard lined paper.
2. Teacher models placing **one digit per box**.
3. Student highlights the ones column in yellow and the tens column in blue.
4. Teacher verbally narrates: "Start in the bottom-right yellow box."
5. Student solves one step at a time, moving vertically.
6. Student checks alignment using the grid before final answer.

Why this is SDI:

- Converts abstract spacing into physical structure
- Teaches a compensatory strategy for spatial judgment

SDI Example 3: Color-Coded Process Mapping (Multi-Step Tasks)

Purpose: Support sequencing and spatial organization in complex tasks.

Materials:

- Flow map template
- Colored markers or icons

Step-by-Step Instruction:

1. Teacher introduces a 3–4 step process visually (never more than 5).
2. Each step is assigned a consistent color.
3. Teacher models completing one step at a time.
4. Student places a marker on the current step.
5. Marker moves only after step completion.
6. Student verbally states the next step before continuing.

Why this is SDI:

- Externalizes sequencing demands
- Supports working memory and visual organization

SDI Example 4: Skeleton Notes for Copying & Writing (Visual-Motor Integration)

Purpose: Reduce copying demands while preserving instructional rigor.

Materials:

- Teacher-prepared outline or graphic organizer

Step-by-Step Instruction:

1. Teacher provides notes with most text already printed.
2. Only key words or symbols are missing.
3. Teacher models where to write each missing piece.
4. Student fills in information during instruction.
5. Teacher checks for accuracy and spacing.

Why this is SDI:

- Separates content learning from visual-motor strain
- Maintains access to grade-level instruction

SDI Example 5: Verbalizing the Visual (Spatial Language Bridging)

Purpose: Translate visual information into verbal-sequential processing.

Step-by-Step Instruction:

1. Teacher explicitly names spatial movements (e.g., "left," "right," "above").
2. Teacher models solving while narrating movements.
3. Student repeats the directions aloud.
4. Student completes task while verbalizing steps.
5. Teacher gradually fades prompts.

Why this is SDI:

- Leverages verbal strengths
- Bypasses weak visual processing pathways

Below are **explicit, repeatable routines** you can teach with gradual release (I Do → We Do → You Do). These examples target common visual–spatial sub-skills (figure-ground, spatial alignment, visual-motor integration, visual memory).

SDI Example A: Math Calculation — The Spatial Anchoring Method

Target need: spatial alignment / tracking / place value drift

Materials

- Large-square graph paper **or** a vertical alignment template
- Two highlighters (two consistent colors)
- Small sticker or "X" marker
- Mini checklist (post-it)

Step-by-step routine

1. **Set the space (Prep):** Provide graph paper or an alignment template (not standard lined paper).

2. **Create lanes (Color-code columns):** Highlight the **ones** column (Color 1) and the **tens** column (Color 2). Continue for hundreds if needed.
3. **Model direction (Verbal mapping):** Teacher narrates movement:
   ○ "Start in the bottom-right box."
   ○ "Move straight up."
   ○ "Now move left one column."
4. **Anchor the shift (Placeholder):** Before moving to the next line (e.g., multiplication), the student places an **X/sticker** in the ones place to force the shift.
5. **Self-check (3-point checklist):** Student checks:
   ○ **Aligned?** numbers inside boxes
   ○ **Direction?** right-to-left tracking
   ○ **Anchored?** placeholder used

Fading plan

● Week 1–2: teacher highlights columns
● Week 3–4: student highlights columns with prompt
● Week 5+: student uses template independently

SDI Example B: Reading — The Window + Key Sentence Routine

Target need: figure-ground / line skipping / visual overwhelm

Materials

● Reading window (card with a slot) or index card
● Highlighter (single consistent color)
● Sticky note

Step-by-step routine

1. **Window the text:** Student covers the page so only **one line** is visible.
2. **Stop-point rule:** After each paragraph, student places a sticky note and answers:
   ○ "Who/what is this mostly about?" (1–3 words)
3. **Key sentence highlight:** Teacher teaches a rule:
   ○ Highlight **only one sentence** per paragraph (the sentence that carries the main idea).
4. **Gist checkpoint:** Student writes a micro-gist on the sticky note:
   ○ "_____ (who/what) _____ (action) _____ (what)."
5. **Return to task:** Student uses gist to answer the question or summarize.

Teacher script example

- "If your eyes feel lost, your window is your 'GPS.'"
- "One highlight only—too much highlighting becomes new visual noise."

SDI Example C: Writing — The Spatial Blueprint for a Paragraph

Target need: organization on the page / spacing / visual-motor integration

Materials

- Boxed paragraph template (5 boxes)
- Colored labels or icons
- Optional: raised-line paper for handwriting

Step-by-step routine

1. **Blueprint first:** Student plans using a 5-box organizer (not open paper).
2. **Label each box:**
   - Box 1 = Topic sentence
   - Boxes 2–4 = Details
   - Box 5 = Conclusion
3. **One sentence per box:** Student writes exactly **one sentence** in each box.
4. **Copy with anchors:** If handwriting is a barrier, student:
   - Uses raised-line paper **or**
   - Dictates draft (speech-to-text) then revises visually
5. **Spacing check:** Student uses a quick visual checklist:
   - "Do I have spaces between words?"
   - "Did I stay inside the box?"

Fading plan

- Teacher provides template → student chooses template → student draws boxes independently

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SDI Example D: Science Diagrams / Maps — Visual Masking + Color-to-Label Mapping

Target need: interpreting complex visuals / locating information

Materials

- L-shaped masking tool (two index cards taped in an L)
- Diagram with color key
- Labels or legend strip

Step-by-step routine

1. **Mask first:** Student uses L-tool to isolate one section of the diagram.
2. **Match the color key:** Teacher explicitly teaches:
   - "Color tells you *category*; label tells you *name*."
3. **Point-and-say routine:** Student points and verbalizes:
   - "This part is _____ and it is located _____."
4. **Label in order:** Student labels only the masked section before moving on.
5. **Check for completion:** Student compares work to the legend strip.

Teacher script example

- "We don't scan the whole page. We isolate, label, then move."

Quick Reminder: What Makes These SDI

- Explicitly teach **how to access** visual information
- Provide a consistent, repeatable method
- Include modeling, guided practice, and fading
- Are observable and documentable through work samples

This handout is intended as a practical classroom reference to support Specially Designed Instruction (SDI) for students with visual–spatial processing needs.

UNIVERSAL STRATEGIES: Supporting Working Memory

How to Bypass the Cognitive "Bottleneck" in Specialized Subjects

When Working Memory (WM) is low, the brain's "RAM" fills up quickly. These strategies act as an **"External Hard Drive,"** offloading the mental burden so the student can focus on high-level learning.

🏗️ 1. The "External Brain" (Don't Hold It, Store It)

- **Checklists & Cheat Sheets:** In **Computer Science** or **Art**, provide a "technical recipe" (e.g., common code syntax or a paint-mixing guide) so students don't have to memorize steps while creating.
- **Visual Anchors:** In **Social Studies**, keep a "Word Wall" or a map visible. This prevents the "Context Loss" that happens when a student forgets a definition mid-sentence.

🧱 2. "Chunking" (Small Bites, Not Buffets)

- **The 3-Step Rule:** Never give more than three instructions at once. In **Music**, focus on mastering a 4-bar "chunk" rather than the whole page.
- **Micro-Goals:** Break large projects (like a research paper or a digital painting) into 15-minute tasks with clear "start" and "stop" points.

🎨 3. Visual Offloading (See the Big Picture)

- **Graphic Organizers:** Use Venn diagrams for **Social Studies** or flowcharts for **Computer Science** logic. Converting abstract thoughts into shapes reduces the load on the "Phonological Loop."
- **Grids & Frames:** Use physical grids in **Art** or color-coded sections in **Music** scores to help the eyes find their place instantly if focus is lost.

✍️ 4. "Scaffolding" (Start with a Frame)

- **Skeletal Notes:** Provide a handout with the "boring" parts already written down. This allows the student to use their limited WM for the "interesting" parts (synthesis and analysis).
- **Templates:** Use pre-formatted code files or pre-sketched canvases so the student doesn't "stall out" at the blank-page stage.

⏱️ 5. The "Processing Pause" (Respect the Lag)

- **The 5-Second Rule:** After asking a question, wait at least five seconds. This allows the "processor" to catch up without the "system" crashing under the pressure of a quick response.
- **Repeat & Rephrase:** If a student looks lost, don't just repeat the same words—change the wording to simplify the linguistic load.

This **Visual Mapping Quick-Start Guide** is designed to help teachers move from "talking about maps" to "using maps" as a daily working memory support. The goal is to create a consistent visual language that the student recognizes across every subject.

The "Universal 5" Essential Icons

To avoid overwhelming a student's working memory, teachers should use a consistent set of icons across the school day. When these icons appear on a map, the student immediately knows what "type" of thinking is required.

- **The Target (Goal/Outcome):** Use this for the "Main Idea" or the final answer.
- **The Footprint (Steps/Process):** Use this for chronological order or instructions.
- **The Lightbulb (New Vocabulary/Facts):** Use this for specific details the student needs to define.
- **The Scale (Comparison):** Use this for Venn diagrams or "Same vs. Different" tasks.
- **The Question Mark (The "Why"):** Use this for cause-and-effect or reasoning.

| Icon	Meaning	Classroom Use
Target	The Goal / Main Idea	What are we trying to solve?
Footprints	The Process / Steps	What do I do first, second, third?
Lightbulb	Key Fact / Vocabulary	What is the "must-know" information?
Scale	Compare / Contrast	How are these two things the same?
Question Mark	The "Why" / Cause	What made this happen?

3 Mini-Templates for Daily Use

1. The "Daily Routine" Anchor (Executive Functioning)

Instead of a written schedule, use a vertical **Flow Map**.

- **Top:** Start (Icon: Sun/Door)
- **Middle:** 3 Chunks of work (Icon: Footprints)
- **Bottom:** Reward/Home (Icon: Star/House)
- **Strategy:** The student moves a "You Are Here" clip down the side of the map as they finish each chunk.
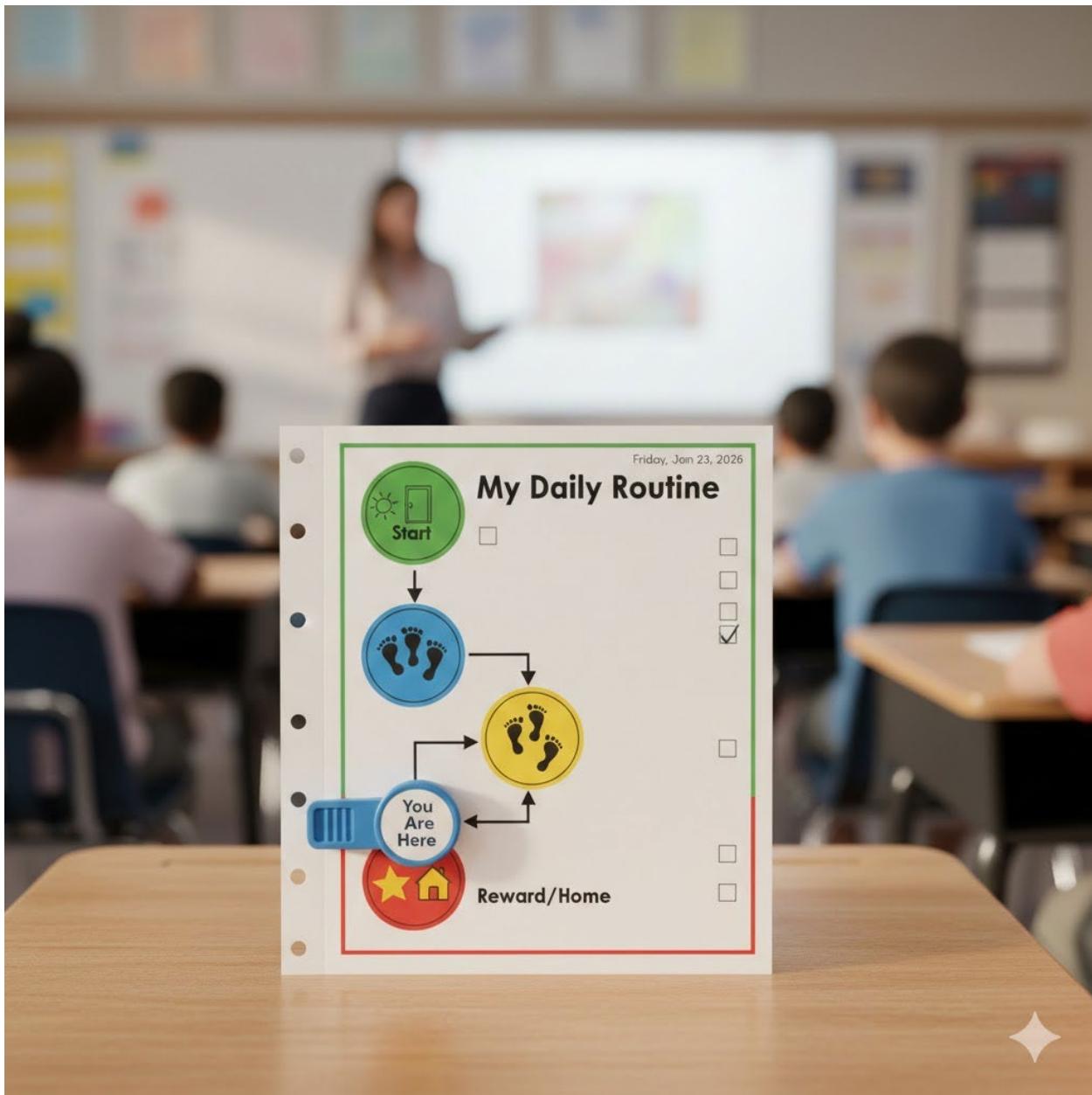
2. The "Vocabulary Web" (Literacy/Science)

When a student meets a new word, they shouldn't just write a definition.

- **Center:** The Word.
- **Spoke 1:** What is it like? (Synonym)
- **Spoke 2:** What is it NOT like? (Antonym)
- **Spoke 3:** Draw a tiny picture of it.
- **Strategy:** This uses **Dual Coding** to ensure the word is stored in multiple parts of the brain.
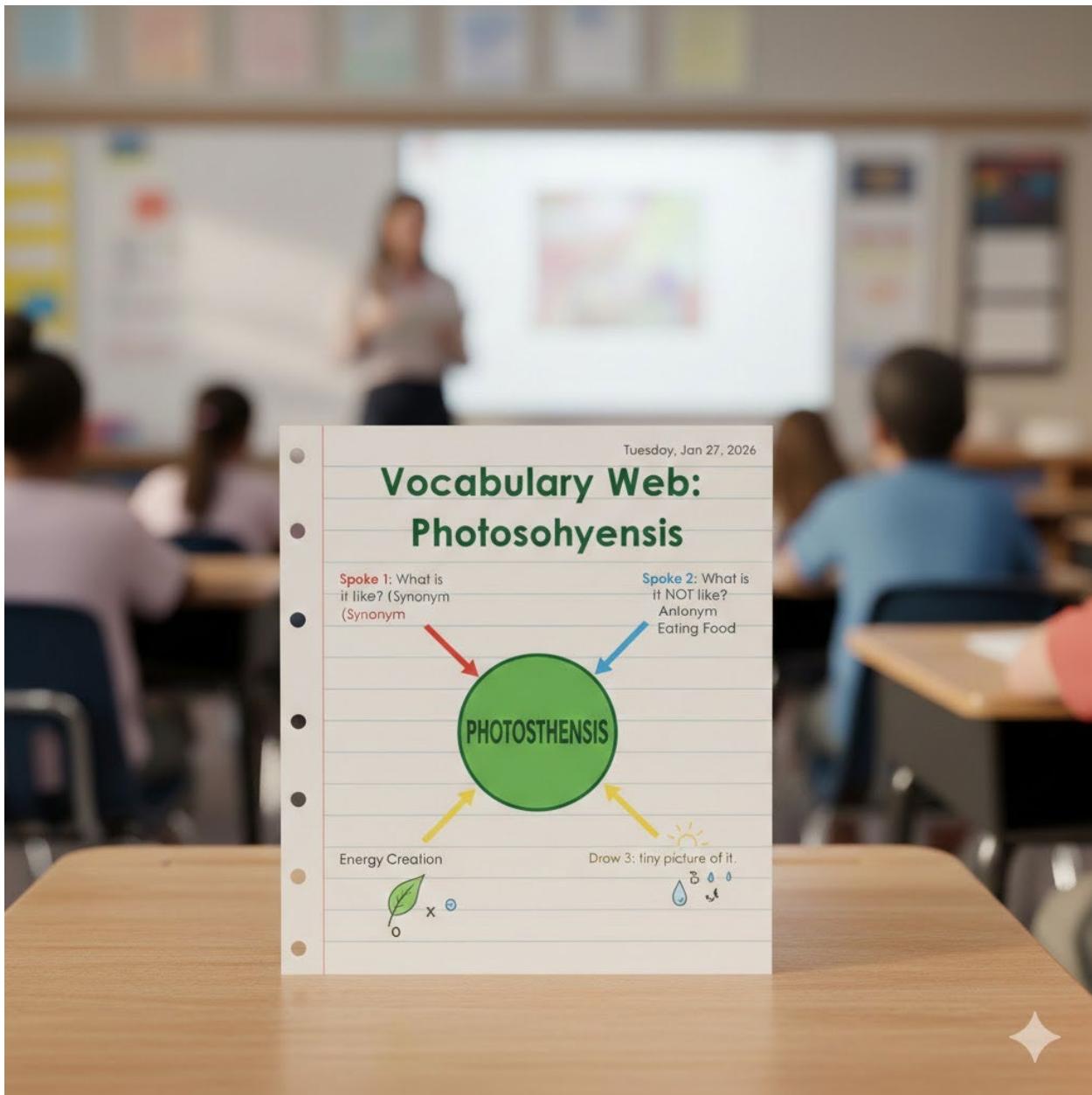
3. The "Math Problem Parser" (Numeracy)

To prevent the student from getting lost in a word problem:

- **Box 1:** Numbers (Circle the digits)
- **Box 2:** Words that tell me what to do (e.g., "altogether," "less than")
- **Box 3:** The Operation Symbol (+, -, multiplication, division)
- **Strategy:** This maps the **mental translation** from language to math symbols.

Presentation Checklist: The "Map Audit"

>Is there too much white space? (If a map is too spread out, the eye has to travel too far, losing focus.)

>Is there too much text? (If it takes more than 10 seconds to read the map, it's not a map—it's an essay.)

>Are the arrows clear? (Arrows must show the **direction of thought**. Random lines create confusion.)

Implementation Tip: The "Laminated Master"

Laminate a blank version of these three maps and tape them to the student's desk. The student can use a dry-erase marker to fill them in for *any* lesson, providing a permanent but flexible scaffold.

This handout is designed to be a one-page "Cheat Sheet" for teachers. It summarizes the **Why**, the **How**, and the **What**, including three reproducible layout ideas that can be hand-drawn on a whiteboard or photocopied for student use.

📝 Handout: Visual Mapping for Working Memory

Goal: To offload cognitive demand by creating an "External Brain" for the student.

Students with working memory deficits struggle to hold multiple pieces of information simultaneously. Visual maps allow them to:

1. **See Relationships:** Connections are shown by lines, not just inferred through text.
2. **Anchor Focus:** If they get distracted, the map shows exactly where they left off.
3. **Dual Code:** Combining a simple icon with a word doubles the chances of retrieval

When working with students who have working memory deficits, **Visual Mapping** serves as an "external hard drive" for the brain. It offloads the burden of holding information in the mind, allowing the student to focus on **processing** and **connecting** ideas instead of just **remembering** them.

CENTRAL NODE: The single, unmoving "anchor point" of a visual map - Think of it as the **Home Base**. No matter how many details a teacher shares, the student can always look back at the center to remember the main topic. It serves as the primary "chunk" of information that all other facts must "hook" onto.

A central node setup usually consists of three parts:

● **The Hub (The Node):** A single circle or box in the middle of the page containing the "Big

Idea" (e.g., *Photosynthesis*).
- **The Spokes:** 3 to 5 lines radiating outward that represent the "Main Categories" (e.g., *Light, Water, Oxygen*).
- **The Checkpoints:** Small boxes on each spoke where the student marks their progress.

Why it's "Central" to Working Memory

For a student with a memory deficit, their brain is like a desk with very little surface area. If you put 10 loose papers (facts) on it, some will fall off.

- The **Central Node** acts like a **staple**.
- It physically and visually binds the facts together so they occupy only **one** mental space

Presentation Script for Teachers:

"When you assign a chapter reading, don't say 'Read pages 50–60.' Instead, say, **'Take two minutes to build your GPS for pages 50–60.'** This ensures that before they ever encounter the first sentence, they have already built the mental 'hooks' needed to catch the information."

AFTER the activity - have students fill out the reflection card. This reflection card is the final piece of the strategy. It teaches the student **metacognition**—the ability to think about their own thinking. By rating the map's effectiveness, the student realizes that the map is a tool they control, not just an extra assignment.

Explain to the teachers that this card is the **"Data Collection"** piece.

For the IEP: You can use these cards as evidence for the goal we wrote earlier when we were talking about the verbal rehearsal loop strategy : *"[Student] will independently utilize a verbal/visual rehearsal strategy..."* * **For the Student:** It shifts the focus from "I'm bad at remembering" to "This specific map design worked well for me."

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🗺️ My "Chapter GPS" Setup Checklist

Use this before you start reading a new chapter to make sure your brain has a place to store what you learn.

1. Identify the "Home Base" (The Node)

- [ ] Look at the big, bold **Chapter Title**.
- [ ] Draw a large circle in the center of your page.
- [ ] Write the title inside. **Keep it short!** (Example: Instead of "The Life Cycle of Plants," just write "Plant Life.")

2. Find the "Main Roads" (The Spokes)

- [ ] Flip through the chapter and look only at the **Heading Titles** (the big, colorful text at the top of sections).
- [ ] Pick the **3 to 4 most important headings**.
- [ ] Draw one line (a spoke) coming out of your center circle for each heading.
- [ ] Write the heading name at the end of the line.

3. Add your "Checkpoints"

- [ ] Next to each spoke name, draw a small square **checkbox**.
- [ ] **The Rule:** You only get to check the box when you finish reading that section or when the teacher finishes that part of the lecture.

4. Code Your Colors

- [ ] Pick a different color for each spoke.
- [ ] Outline the spoke name and the box in that color. This helps your brain separate the "chunks" of information.

💡 Pro-Tips for Students

- **The "Two-Word" Rule:** Try not to write more than two words for any spoke. Your brain remembers "The Taxes" much better than "Why the British decided to tax the colonists."
- **Add a Tiny Picture:** Next to your spoke name, draw a 5-second doodle. (Example: A tiny sword for "The Battles" or a dollar sign for "The Taxes").
- **Scan First, Read Second:** Don't start reading until your map is built. The map is your **GPS**—you wouldn't start a road trip without turning on the GPS first!

🧠 My Map Reflection Card

Name: _____ **Topic:** _____

1. The "GPS" Check-In

- [ ] Did I know where we were in the lesson today? (Circle one)
  - **Yes!** I followed the spokes.
  - **A little.** I got lost once or twice.
  - **No.** I need a simpler map next time.

2. Working Memory Rating

How much "space" did I have on my mental whiteboard today?

- ⭐ **1 Star:** My brain felt full and "messy."
- ⭐⭐ **2 Stars:** The map helped me find my place when I got distracted.
- ⭐⭐⭐ **3 Stars:** I felt like I had an "External Brain" doing the heavy lifting!

3. The "Spoke" Audit

- **Which spoke was the easiest to follow?** _____
- **Which spoke was too confusing?** _____
- **Next time, I will:** * [ ] Use fewer words.
  - [ ] Add more pictures/icons.
  - [ ] Use brighter colors.

🛠️ The SDI Translation: "The 3 Pillars"

1. Explicit Strategy Instruction (The "How")

In the IEP, the SDI shouldn't just say "Student will use a map." It should state:

> *"Instruction in **physical anchoring techniques** using a flow map and tactile markers to maintain place during multi-step math and science tasks."*

- **The Teacher's Role:** You aren't just giving them the blue gem (the marker); you are teaching them the **logic of movement**. "When your pencil finishes the circle, your left hand moves the gem." This links a motor action to a cognitive transition.

2. Scaffolding the "Mental Load" (The "What")

SDI focuses on adapting the *delivery* of instruction.

- **The Shift:** Instead of teaching "Order of Operations" as a memory task (PEMDAS), you are teaching it as a **Spatial Task**.
- **Instructional Change:** The teacher provides a pre-populated Flow Map where the icons (e.g., a magnifying glass for "keywords") match the icons on the student's desk. This creates a "Universal Design" for that specific student.

3. Fading the Prompt (The "Independence")

The goal of SDI is eventually to remove the scaffold.

- **Level 1:** Teacher moves the marker for the student.
- **Level 2:** Teacher prompts: "Where does your marker go now?"
- **Level 3:** Student moves the marker independently and explains *why* (Metacognition).