WDE SPED
SPECIAL EDUCATION

Understanding the Brain's Roadblocks: Practical Strategies for Learning Success
Part 1

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SPECIAL EDUCATION

- **Explanation of Cognitive Index Scores**
  - Verbal Comprehension Index
  - Fluid Reasoning 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

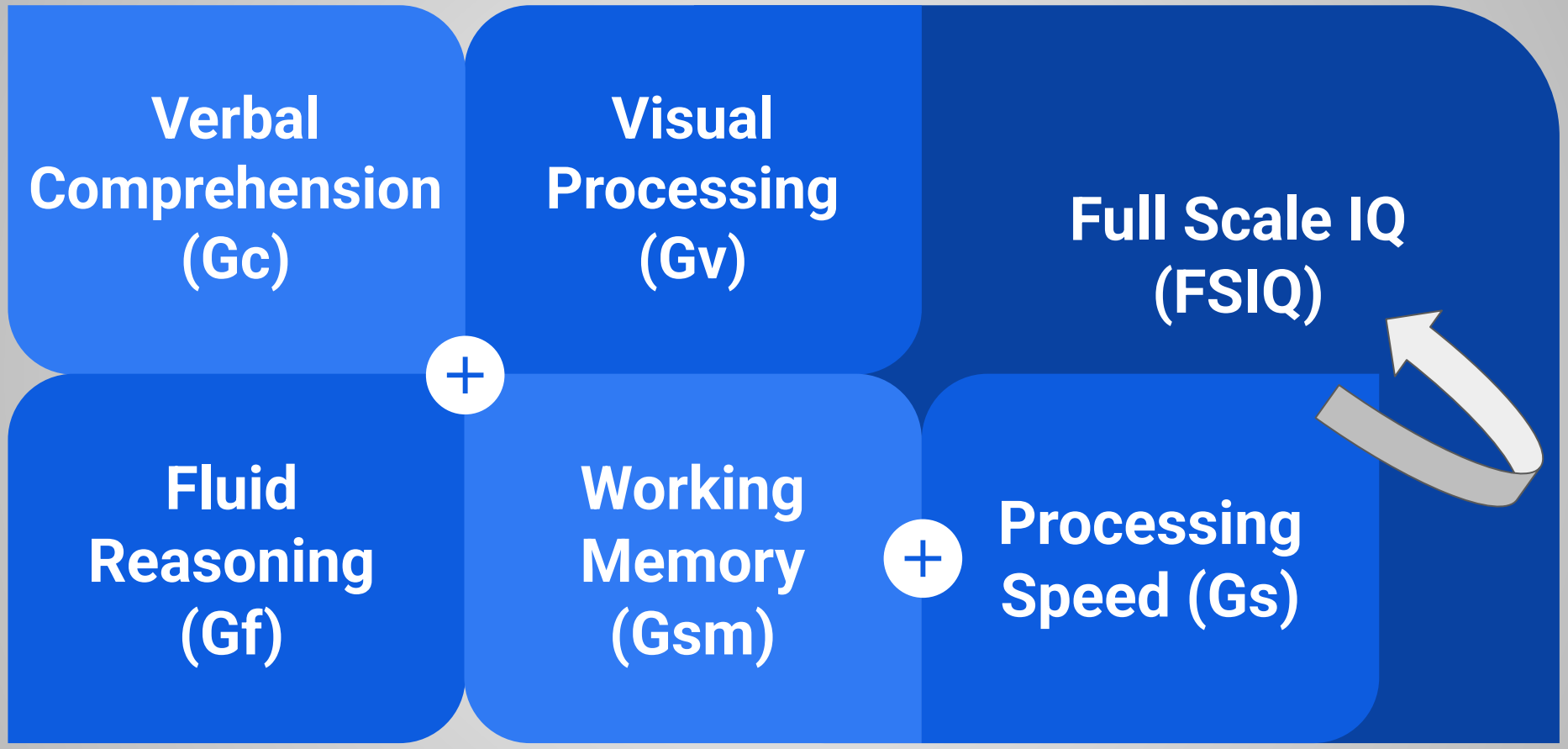
Understand Learning Styles

Develop Targeted Interventions

Scaled Score	Descriptor	Percentile Approx.
1 – 3	Extremely Low	< 2nd percentile
4 – 5	Very Low	2–8th percentile
6 – 7	Low Average	9–24th percentile
8 – 11	**Average**	**25th–74th percentile**
12 – 13	High Average	75–90th percentile
14 – 15	Very High / Superior	91–97th percentile
16 – 19	Extremely High	≥ 98th percentile

Interpreting Scaled Scores and Percentile Ranks

Cognitive Indexes



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)

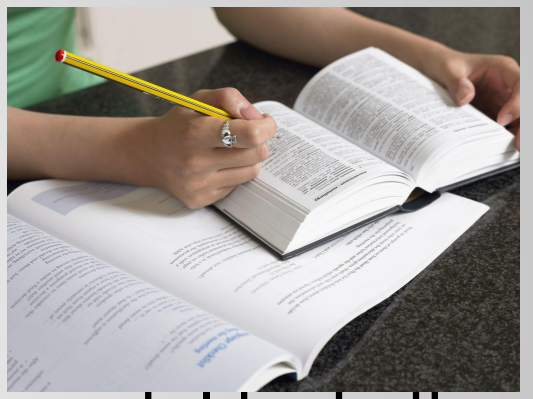
Ancillary Scores include:
Quantitative Reasoning Index
Auditory Working Memory Index
Nonverbal Index
General Ability Index
Cognitive Proficiency Index

Understanding the "g-Factor": General Intelligence in Education

Key Information for Teachers

What is "g"? (General Intelligence)

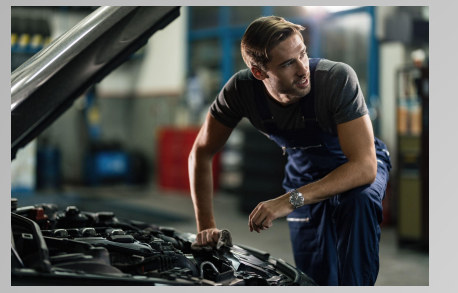
Think of "g" as **"overall mental horsepower"** or **"brain efficiency."** It's the general capacity for:



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

It's the idea that if a student is good at one mental task, they tend to be good at others too.

There's an underlying **common ability** that helps with all sorts of thinking and learning.



"g" in Simple Terms

Analogy 1: Car's Engine Size

- A bigger, more powerful engine handles diverse driving conditions better.
- Higher "g" = more powerful cognitive "engine."

Analogy 2: Computer's Processor & RAM

- Faster processor & more RAM run programs smoother, process information quicker, handle complex tasks easier.
- "g" = the brain's underlying processing power.

Where Does "g" Come From?

- **Not just learned knowledge:** It's more about the *ability to learn and reason* new things.
- **Biological Basis:** Many researchers believe "g" has a significant biological foundation (brain efficiency, neural connectivity).
- **Relatively Stable:** For an individual, "g" tends to be stable over time.
- **Measured by IQ Tests:** When a student gets a "Full Scale IQ" (FSIQ), that score is an estimate of their "g."

How is "g" Measured?

"g" is **not measured directly** by a single test.

It's estimated from a **composite score** (like the Full Scale IQ) derived from a battery of diverse cognitive tests.

These tests measure various types of thinking:

- Verbal comprehension
- Perceptual reasoning
- Working memory
- Processing speed

The FSIQ reflects the common underlying ability across all these areas.

Why is "g" Important for Teachers?

Explains General Learning Pace: Helps understand why some students pick up concepts quickly across many subjects, while others need more time and support.

Predictive Power: "g" is a strong predictor of:

- Overall academic achievement
- Success in higher education
- Job performance

Informs Broad Differentiation: Helps understand a student's general capacity for:

- Handling cognitive complexity
- Grasping abstract ideas
- Pacing of instruction

"g" and Classroom Implications

For Students with Higher "g":

- Provide opportunities for deeper dives, critical thinking, independent projects.
- Offer accelerated learning pathways.
- Less direct instruction may be needed.

For Students with Lower "g":

- More concrete examples and hands-on activities.
- Step-by-step instructions and breaking down tasks.
- More repetition and scaffolded learning.
- Focus on mastery of foundational skills.

Key Takeaway for Teachers

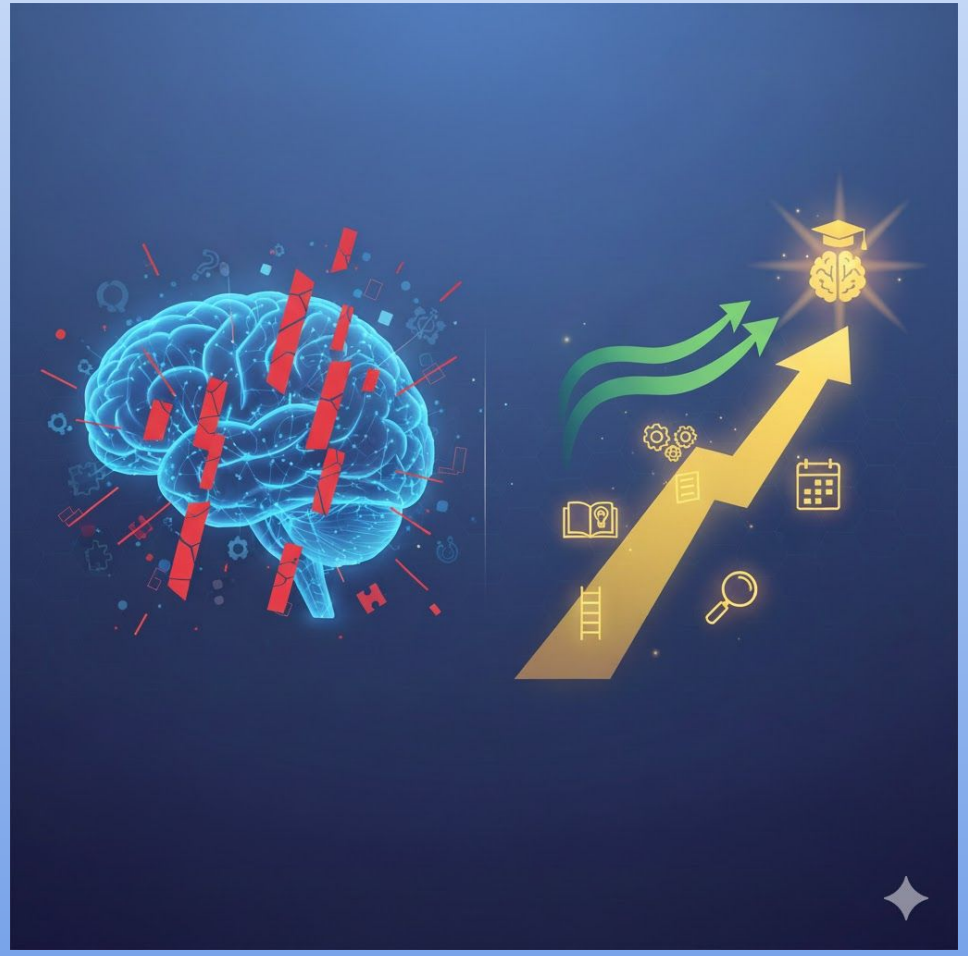
Understanding "g" helps us appreciate the diverse ways students learn and the cognitive demands of different tasks.

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.

Verbal Comprehension (Gc)



Verbal Comprehension (Gc)

- Also referred to as crystallized intelligence or knowledge ~ refers to a person's knowledge base (or general fund of information) that has been accumulated over time.
- Highly predictive of academic success
  - reading, writing, and math
  - connected with learning vocabulary, answering factual questions, and comprehending oral/written language
- These deficits impact a student's ability to **access, process, and demonstrate knowledge** across nearly all academic and social settings.

- **Reading** (especially reading comp.)
  - lack of vocabulary knowledge
    - making inferences
    - summarizing
    - grasping the main idea
  - basic concepts
  - general life experiences
- **Math**
  - vocabulary
    - comprehension of word problems
      - use of correct operation
  - basic math processes
    - listen and follow sequential directions
- **Writing**
  - poor vocabulary can result in redundant word use
  - limited content - lack of exposure/experiences

Application Across Other Content Areas

Science

- **Understanding technical language**: Grasping science vocabulary and processes (e.g., hypothesis, evaporation, energy).
- **Listening to experiments**: Comprehending directions for labs or investigations.
- **Explaining reasoning**: Using clear language to describe observations, results, or conclusions.
- **Making connections**: Relating scientific concepts to real-world phenomena.

Social Studies / History

- **Comprehending historical texts**: Understanding timelines, causes/effects, and key figures/events.
- **Interpreting maps or graphs**: Verbal descriptions of data or geographic information.
- **Discussion and debate**: Sharing ideas, asking questions, and analyzing multiple perspectives.
- **Sequencing events**: Using language to explain historical cause and effect relationships.

Application Across Other Content Areas

Arts / Music / Drama

- **Following multi-step directions**: In creative projects or performances.
- **Describing artistic choices**: Expressing intent or meaning behind creative work.
- **Understanding and interpreting lyrics, scripts, or artistic themes**.
- **Reflecting on work**: Using verbal language to self-assess or explain creative process.

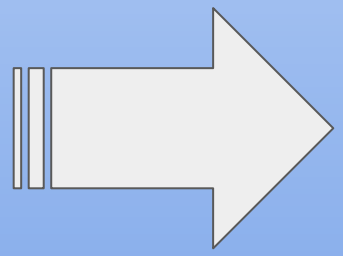
Technology / Computer Science

- **Following verbal instructions**: Understanding how to use software or follow coding sequences.
- **Reading technical vocabulary**: Grasping words like "algorithm," "function," or "input."
- **Collaborating and troubleshooting**: Explaining issues and proposing solutions in group work or tech-based projects.

Verbal Comprehension 🎯Impact on Key IEP Components 🎯

Understanding why a student struggles is critical for shifting the IEP from simply noting a problem (e.g., "The student struggles in reading") to creating a precise, functional plan.

- **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. A verbal comprehension deficit directly affects a student's:
  - **Background Knowledge:** It limits the acquisition of new concepts and vocabulary.
  - **Following Directions:** Multi-step or complex verbal instructions are difficult to decode and retain.
  - **Understanding Spoken Language:** This is crucial for lectures, classroom discussions, and social interactions.

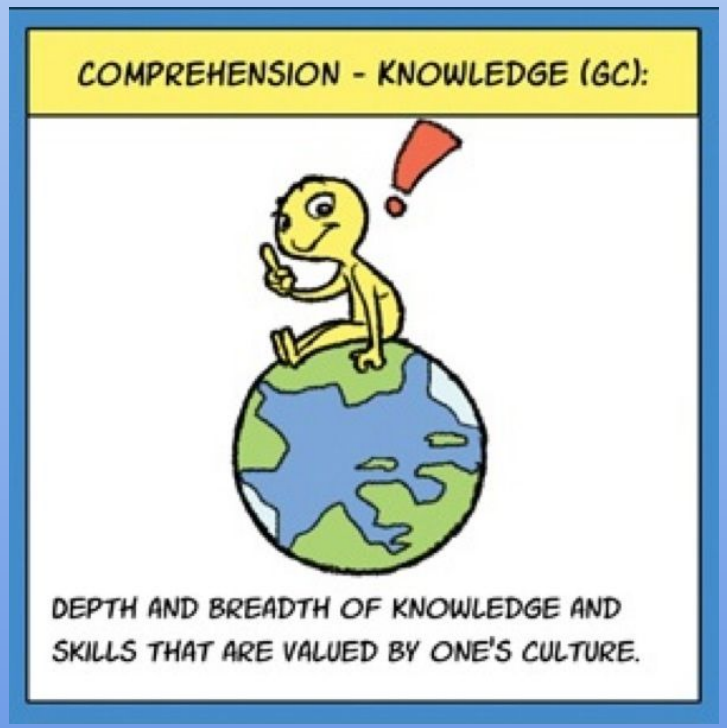


- **Measurable Annual Goals (MAGs):** The deficit dictates the specific areas that require intervention. Goals should be written to target the underlying verbal comprehension weakness, rather than just the resulting academic failure.
  - *Example Goal Focus:* Instead of "The student will improve their test scores," the goal should be "The student will answer **inferential** comprehension questions about an orally presented text with 80% accuracy."

Verbal Comprehension 🎯Impact on Key IEP Components 🎯

- **Special Education and Related Services:** A clear deficit profile helps the team determine which services are needed, such as **Speech-Language Pathology** for direct intervention on vocabulary, syntax, or inferential reasoning.

- **Supplementary Aids, Services, and Accommodations**: This is the most practical application. The deficit dictates the specific supports required to give the student equitable access to the curriculum.



Verbal Comprehension

Determining Appropriate Accommodations

A verbal comprehension deficit means the student struggles to understand and apply **word knowledge** and **verbal concepts**. This requires specific accommodations to bypass the deficit during learning and assessment. In short, understanding the *verbal comprehension deficit* is the **"Why"** that drives the **"What"** (goals) and the **"How"** (strategies/accommodations) of the entire IEP.

AREA OF IMPACT	ACCOMMODATION IN THE CLASSROOM
Difficulty with Vocabulary/Concepts	Pre-teaching key vocabulary with visuals, simplified language
Difficulty Processing Long Instructions	**Visual Schedules** or checklists for multi-step tasks**, breaking instructions into smaller chunks**
Difficulty with Listening Comprehension	Providing **written transcripts** or outlines of lectures, **recording lessons**
Difficulty Expressing Knowledge	Allowing the student to **demonstrate knowledge non-verbally** (i.e. drawing, creating a graphic organizer, pointing to the correct answer)

Instructional Strategies

Understanding the Challenges of Verbal Comprehension Deficits

Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Comprehension-Knowledge (vocabulary) (Gc) Deficit

Classroom Instruction	Instructional Materials	Environmental	Strategies
Rich in language and experiences	Chapter Glossaries	Word of the Day Calendars	KWL
Frequent practice/exposure to words	Vocabulary activities	Word Walls	Use context when reading to to ascertain meaning
Define words within instruction	Include Story Starters	Distraction free seating	Word Searches, Crossword Puzzles
Embed instruction in a meaningful context - relate new vocabulary to learner experiences, increase listening skills through game-like formats	Dictionaries, Thesaurus, Encyclopedias; Vocabulary Cartoons, word webs	Closed Doors, Closed Windows	Have students illustrate new vocabulary - make it personal ; capitalize on opportunities to practice new words.

Specially Designed Instruction
Verbal Comprehension

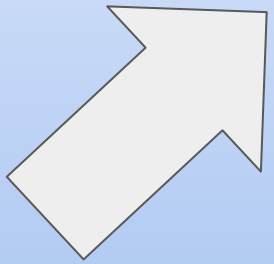
Specially Designed Instruction (SDI) for a student with a **verbal comprehension deficit** (often linked to low Gc or Crystallized Intelligence) involves modifying the **content**, **methodology**, or **delivery** of instruction to explicitly teach the skills they struggle to acquire.

The goal of this SDI is to bridge the gap between their understanding of language and the demands of the curriculum.

🗣️ Methodology: Adapting *How* You Teach

Concrete and Multimodal Presentation

- **SDI: Explicitly teaching vocabulary and concepts using multiple modalities.**
  - **Activity:** When introducing a new term (e.g., "analyze," "photosynthesis"), the student receives a multi-sensory prompt.
  - **Example:** The teacher provides the **word** (verbal/written), a **simple definition** (verbal/written), a **picture/diagram** (visual), and an **action/manipulative** (kinesthetic) that represents the concept.
  - **Goal:** Move the abstract concept of a word into a concrete, memorable, and usable tool for the student.



🎯 Setting the Stage: The Concept and the Problem

- **Concept: Analyze** (to examine methodically and in detail the constitution or structure of something, typically for purposes of explanation and interpretation).
- **Student Deficit:** The student understands concrete words (like *chair* or *run*) but struggles with abstract verbs that require mental action (like *evaluate* or *infer*). Simply hearing or reading the word *analyze* is insufficient.

Step-by-Step Multi-Modal Delivery

STEP	MODALITY	TEACHER ACTION /SCRIPT	STUDENT ACTION
1. The Word	Verbal/Written	"Today, we are learning a new skill word: Analyze." (Teacher writes the word clearly on the board/screen.)	Student writes the word in a designated vocabulary journal.
2. The Simple Definition	Verbal/Written	"When you analyze something, you break it into small parts and figure out how those parts work together." (Teacher posts a clear, simplified definition.)	Student underlines the phrase "break into small parts."
3. The Visual	Visual/Diagram	(Teacher shows an image of a broken clock or a puzzle box with pieces laid out.) "Look at this broken clock. To fix it, you have to analyze it. You look at the gears, the springs, the hands, and figure out how they connect."	Student sketches a quick icon or visual next to the word (e.g., a magnifying glass, a pie chart).
4. The Kinesthetic/Action	Kinesthetic/Manipulative	(Teacher hands the student a Lego model or a simple object made of a few distinct parts.) "I want you to analyze this. I want you to physically break it apart, one piece at a time, and lay the pieces out. That physical action—taking it apart—is the concrete action for analyze."	Student physically dismantles the object, focusing on the individual parts.
5. Practice & Cue	Application/Cue	"From now on, when I say, 'Please analyze the document,' I want you to first think of the word 'Analyze', then the action 'break it apart'. What are you going to do?"	Student replies: "Break it into parts!" (The physical action becomes the mental anchor for the abstract concept.)

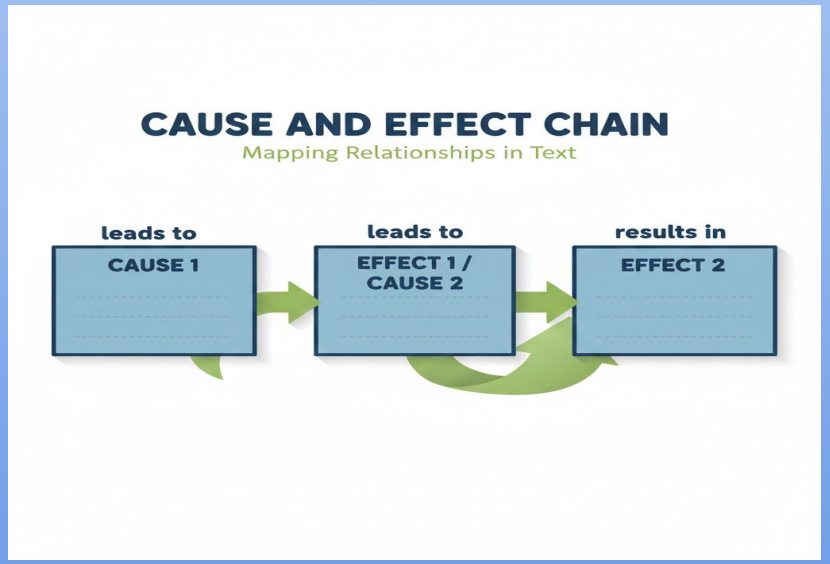
🗣️ Methodology: Adapting *How* You Teach

Systematic use of Graphic Organizers

- **SDI: Direct, explicit instruction on how to use specific graphic organizers to map relationships.**
- **Activity:** The student is taught the function of a different graphic organizer for each comprehension task (e.g., a **Venn diagram** for comparing/contrasting, a **flowchart** for sequencing events, or a **main idea/detail web** for finding the central concept).
- **Example:** Before reading, the teacher models a **"think-aloud"** process for filling in a cause-and-effect chart, and the student completes the chart with **scaffolding** during and after reading.
- **Goal:** Providing a visual structure to organize verbal information, replacing the mental organization the student struggles to perform.

🎯 Setting the Stage: The Lesson and the Tool

- **Comprehension Task:** Reading a text about a historical event (e.g., the factors leading to a war or revolution) or a scientific process (e.g., the water cycle).
- **Targeted Relationship: Cause and Effect**.
- **Graphic Organizer:** A **Cause-and-Effect Chain** (boxes linked by arrows, or an organizational chart).



7-Step Explicit Instruction Process

Step 1 - Introduce the Relationship and the Tool (Why and What)

Teacher explicitly defines the relationship and introduces the organizer

Script: "When we read today, we need to understand **why** something happened and **what** happened because of it. That is **Cause and Effect**. This is our **Cause-and-Effect Chain** [Teacher holds up the organizer]. The **Cause** box shows *why*, and the **Effect** box shows *what happened next*."

Step 2 - Model the Skill with a High Interest, Non-Academic (I Do)

The teacher models filling in the organizer using a simple, relatable, real-life example to build immediate understanding.

- **Example:** "My alarm didn't go off this morning (Cause). So, I woke up late (Effect). Because I woke up late (New Cause), I missed the bus (New Effect)."
- **Action:** The teacher fills in the organizer boxes clearly and draws the connecting arrows, demonstrating the flow.

Step 3 - Introduce Keywords and Signal Words

The teacher teaches the student to look for verbal cues in the text.

- **Script:** "Writers use special words to tell us when they are giving a cause or an effect. Look for words like **'because,' 'since,' 'due to,'** which tell you the **Cause**. Look for words like **'therefore,' 'as a result,' 'consequently,'** which tell you the **Effect**."
- **Action:** The teacher highlights these signal words on a small reference card that the student can use while reading.

7-Step Explicit Instruction Process

Step 4 - Model the Text Strategy with Think-Aloud (I Do - Applied

Before reading the target text, the teacher models the entire process.

- **Action:** The teacher reads the first paragraph of the target text aloud. When they encounter a signal word (e.g., "The economic depression was widespread, **due to**...") they stop.
- **Think-Aloud:** "I see the phrase **'due to.'** That tells me the next thing I read is the **Cause**. The Cause is 'the economic depression was widespread.' I'll write that in my first Cause box."

Step 5 - Guided Practice (We Do)

The teacher and student work together on the next section of the text, using strong scaffolding.

- **Action:** The student reads the next few sentences. The teacher may point to a potential signal word.
- **Questioning:** "I see the phrase **'as a result.'** What does that phrase usually signal? (Effect). Good. Now, what was the effect of the depression described in that sentence? Where does that go on our organizer?"

Step 6 - Independent Practice with Check-Ins (You Do)

The student completes the rest of the organizer independently, using the reference card and the model from Step 4.

- **Action:** The student works alone, but the teacher checks in frequently (e.g., after the student completes every other box) to provide corrective feedback and praise for correct use of the tool.

Step 7 - Review and Generalization

The teacher leads a brief discussion on *how* the organizer helped.

- **Script:** "Look at your finished chain. Now you can easily see the flow of events and understand the relationship. This organizer helped us **break apart** the information. Next time we read, we might use a **Venn Diagram** to compare two things. What relationship does a Venn Diagram help us map?"
- **Goal:** Explicitly connect the organizational tool to the specific cognitive task, promoting flexible use of organizers in the future.

🗣️ Methodology: Adapting *How* You Teach

Chunking and Processing Time

- **SDI: Breaking down verbal instruction and allowing extended processing time for response.**
- **Activity:** The teacher deliberately uses **short, concise sentences** for directions and explanations.
- **Example:** Instead of saying, "Take out your textbook, turn to chapter four, and read the first two sections silently to look for key terms," the instruction is **chunked**: "Take out your textbook" (Wait 5 seconds). "Turn to chapter four" (Wait 5 seconds). "Read the first two sections silently."
- **Goal:** Reducing the load on auditory working memory to ensure the student can fully comprehend the first piece of information before processing the next.

🎯 The Challenge: An Unmodified Instruction

Teacher (Unmodified): "Okay class, take out a clean sheet of paper, put your name and the date in the top right corner, then brainstorm three main ideas from our discussion, and finally, write one topic sentence using those ideas." (A stream of four demands delivered quickly.)

Step-by-Step Chunked Delivery

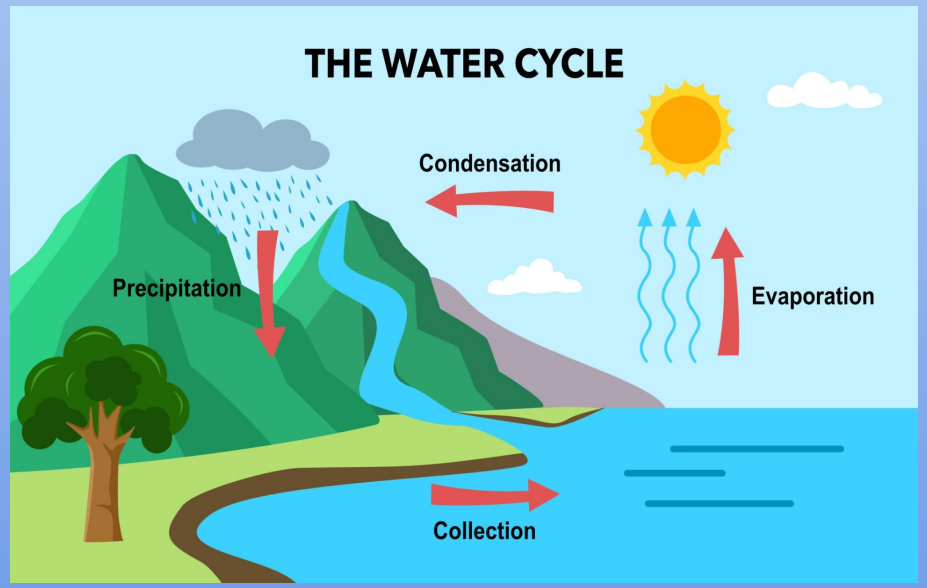
STEP	MODALITY	TEACHER ACTION /SCRIPT	STUDENT ACTION
1. First Step	"First, take out a clean sheet of paper."	Teacher holds up one finger and waits 5-7 seconds.	Student locates and places the paper on their desk.
2. Second Step	"Second, put your name and today's date in the top right corner."	Teacher holds up two fingers and waits 5-7 seconds, allowing time for writing.	Student writes their name and the date as directed.
3. Third Step	"Third, brainstorm three main ideas we just discussed."	Teacher holds up three fingers and waits 10 seconds for the student to begin writing.	Student begins jotting down the three ideas (they have successfully processed the first two steps).
4. Fourth Step	"Finally, write one clear topic sentence using those three ideas."	Teacher holds up four fingers and waits for the student to transition to writing the sentence.	Student begins drafting the final topic sentence.

💧 SDI Example: Pre-teaching Foundational Language

The goal is to ensure the student has a firm, multi-modal understanding of 3-5 high-leverage terms and concepts *before* the general science class begins the main lesson.

🎯 Setting the Stage: The Upcoming Lesson

- **General Education Lesson:** The Water Cycle (Condensation, Evaporation, Precipitation).
- **Target SDI Vocabulary (Foundational Language): Evaporate**, **Condense**, **Precipitate**.
- **Time/Setting:** A brief 10–15 minute session in a resource room or during a specific check-in time, one day before the main lesson.



🚶 The Teacher's 5-Step Pre-teaching Process

Step 1: Identify and Introduce the Core Terms

The teacher presents the list of terms the student will need to know to access the general education lesson.

- **Action:** The teacher writes the three words on a small card or in a notebook dedicated to pre-teaching.
- **Script:** "Tomorrow in science, you're learning about the water cycle. If you understand these three words—**evaporate, condense, and precipitate**—the whole lesson will make sense."

Step 2: Explicitly Teach Each Term with Simple Analogies

For each term, the teacher provides a **simple, non-academic definition** and a relatable analogy.

- **Term: Evaporate**
  - **Definition:** "To change from a liquid (water) into a gas (steam) and go up into the air."
  - **Analogy:** "Think about what happens to a puddle on a hot day. The sun makes the water **evaporate**—it just disappears, it goes up!"
- **Term: Condense**
  - **Definition:** "To change from a gas (steam) back into a liquid (water droplets)."
  - **Analogy:** "Think about when you take a hot shower and the mirror gets foggy. The hot steam hits the cold mirror and **condenses** into water drops."

🚶 The Teacher's 5-Step Pre-teaching Process

Step 3: Implement Visual and Kinesthetic Cues

The teacher ties a simple, reproducible visual or action to each word.

- **Evaporate:** The teacher and student both use their hands to demonstrate water rising (moving hands slowly upward).
- **Condense:** The teacher and student both cup their hands, then bring their fists slowly together (representing gas/steam coming together to form a droplet).
- **Precipitate:** The teacher and student point their fingers downward (representing rain or snow falling).

Step 4: Quick-Check Practice

The teacher quickly checks for understanding by asking for the action, not just the definition.

- **Teacher:** "Show me the action for **evaporate**."
- **Student:** (Moves hands upward.)
- **Teacher:** "What's an example of **condensing**?"
- **Student:** "Water drops on a mirror when it's steamy."

🚶 The Teacher's 5-Step Pre-teaching Process

Step 5: Bridge to the General Education Class

The teacher connects the pre-taught vocabulary directly to the upcoming activity or materials.

- **Script:** "When your science teacher shows you the big diagram tomorrow, you will see the arrow pointing up, labeled **'evaporation.'** Because you already know what that means, you won't have to stop and ask. You can focus on learning the whole cycle!"

This pre-teaching method ensures the necessary language foundation is strong, enabling the student to participate and comprehend the main lesson alongside their peers.

📚 Content: Adapting *What* You Teach

Direct instruction in Context Clues

- **SDI: Explicitly teaching a strategy for using context to infer the meaning of unfamiliar words.**
- **Activity:** The teacher uses the **"four contexts"** or a similar framework (e.g., definition, synonym, antonym, example) to teach the student how to look for clues in the surrounding text.
- **Example:** The student is presented with sentences containing an unfamiliar word. The SDI is a step-by-step checklist: 1) Circle the unfamiliar word. 2) Underline words/phrases that might give a clue. 3) Guess the meaning. 4) Substitute the guess to check if the sentence makes sense.
- **Goal:** Teaching a compensation strategy for a limited vocabulary or difficulty with **verbal reasoning**.

🎯 Setting the Stage: Word Detective - Context Clues

- **Teacher is working with the student before they read a history passage that contains the unfamiliar word “amendment.”**

SDI - Context Clues

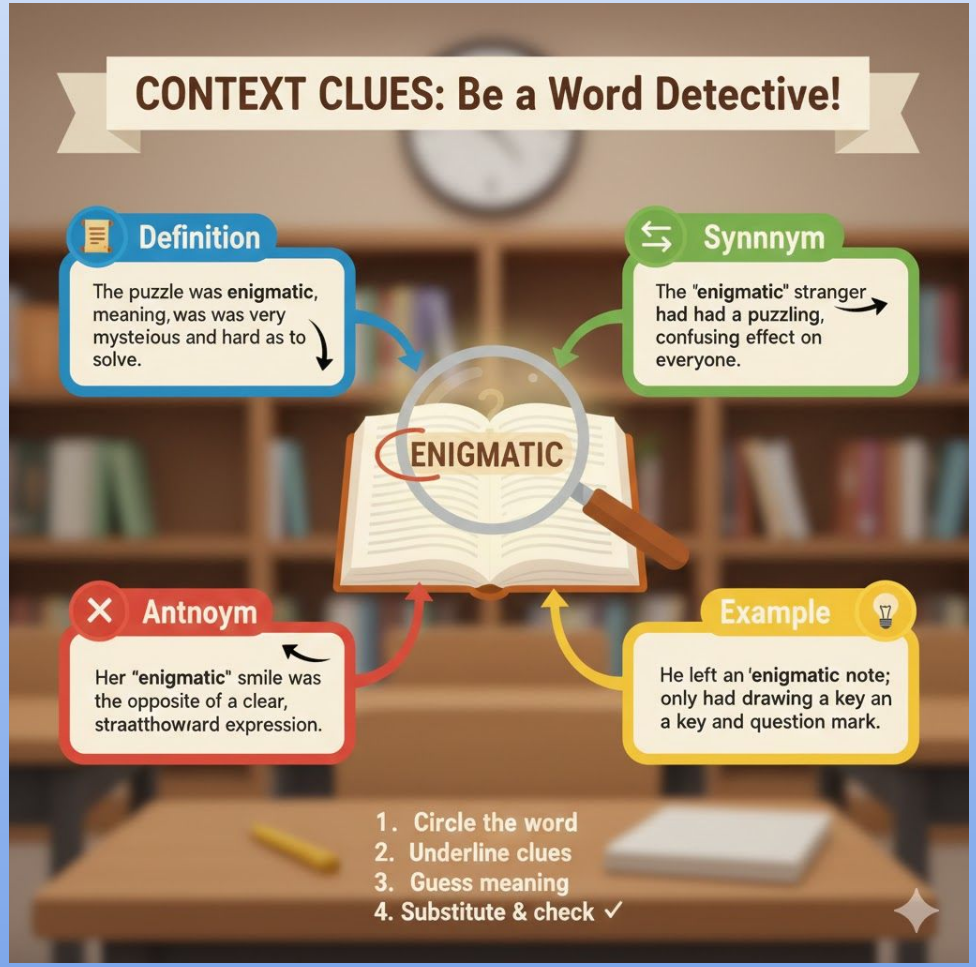
1. Introduce the Strategy (The Why)

The teacher explicitly states the goal and the strategy, explaining that good readers don't always know every word, but they know how to find clues.

- **Teacher Script:** "Today, we're learning to be word detectives. When you find a word you don't know, we won't stop and ask me. We're going to use a **four-step checklist** to find its meaning right in the sentence. This will help you read on your own!"

2. Model the Checklist and Definition Clue (I Do)

The teacher models the checklist steps using a sentence that contains a clear definition clue, making their thinking process visible.



Step-by-Step Checklist

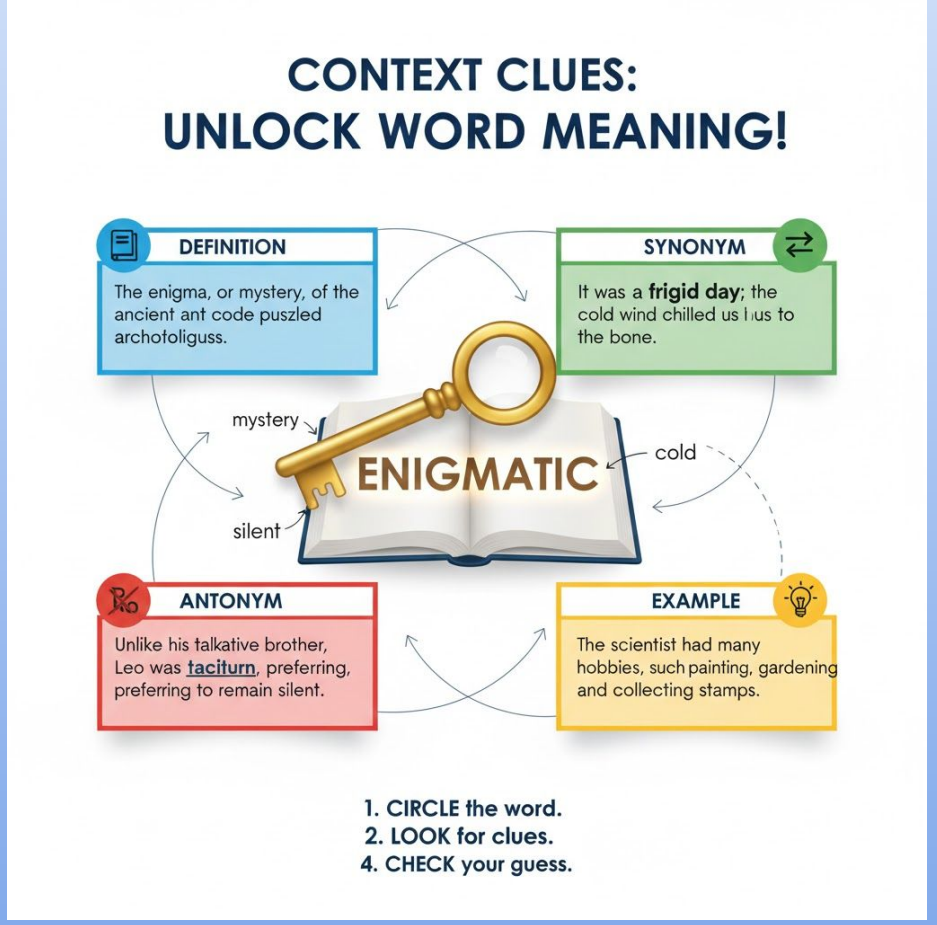
STEP	ACTION	TEACHER THINK-ALOUD
1. Circle the Unknown Word	The teacher points to and circles 'amendment' in the sentence: "The politician suggested an amendment, which is a formal change or addition to a law."	"I don't know the word 'amendment.' I'll circle it so I know what I'm looking for."
2. Underline the Clues	The teacher looks for keywords like is, means, which is, and underlines the defining phrase: 'which is a formal change or addition to a law.'	"Writers often put the definition right after a word. I see 'which is,' and that's a HUGE clue! I'll underline the phrase that explains it."
3. Guess the Meaning	The teacher looks only at the underlined phrase to form a guess.	"The clues say 'a change or addition to a law.' My best guess for 'amendment' is 'change to a law.'"
4. Substitute and Check	The teacher replaces the unfamiliar word with the guess and reads the sentence aloud.	"Let's check it: 'The politician suggested a change to a law, which is a formal change or addition to a law.' That makes perfect sense! I found the meaning."

SDI - Context Clues

3. Guided Practice (We Do)

The teacher provides a new sentence with a similar clue and guides the student through the same four steps.

- **Sentence (Synonym Clue):** "She was **pensive** after the meeting, and spent the entire afternoon contemplating what had happened."
- **Teacher Questioning:**
  - "What's our first step? (**Circle** 'pensive')."
  - "Now, look for clues. Do you see any word that means the *same* as 'pensive?' What about **'contemplating?'** Underline it!"
  - "If contemplating means thinking deeply, what's your guess for **pensive?**" (Student guesses: 'thoughtful' or 'thinking').
  - "Read the sentence with your guess. Does it work?"



4. Independent Application and Generalization

The student practices on their own and begins to generalize the strategy to other clue types.

- **Action:** The student uses the four-step checklist on a pre-selected paragraph of the main assignment.
- **Generalization:** The teacher introduces the graphic of the different clue types (definition, synonym, antonym, example) and assigns a simple icon or action to each one. For instance, an **Antonym Clue** means the word *opposite* of the unknown word is nearby.

KEY TAKEAWAYS - The Importance of Identifying Verbal Comprehension Deficits

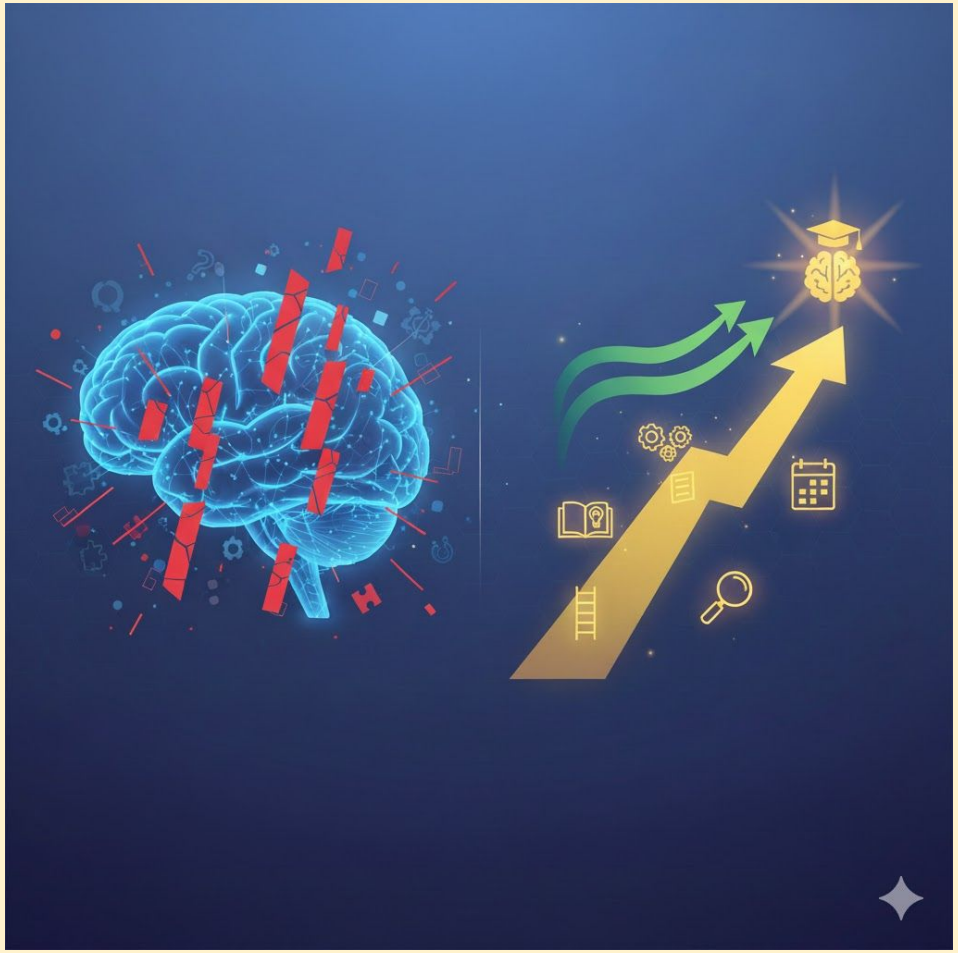
- **Targeted Instruction**: Identifying these deficits allows educators to develop strategies such as **explicit vocabulary instruction**, **visual aids**, and **scaffolded verbal tasks**.

- **IEP and SDI**: Provides insight into how to design **Specially Designed Instruction (SDI)** tailored to improve verbal comprehension skills.

- **Academic Success**: Verbal comprehension is foundational for **reading comprehension**, **oral communication**, and **following directions**, so identifying challenges and providing instruction in this area is critical for supporting students' academic progress.

- **Social-Emotional Development**: Verbal comprehension is also linked to a student's ability to **engage socially** and **develop relationships**, so addressing deficits in this area can improve overall **social communication** skills.

Fluid Reasoning (Gf)



Fluid Reasoning (Gf)

- Highest level of reasoning skills that involve inferential and qualitative thinking
- Relationship to higher level skills
  - reading
  - math
  - writing
- Impacts
  - ability to solve problems
  - draw inferences
  - transfer and generalize learning
    - making connections between new material and acquired knowledge
  - thinking conceptually

- **Reading**
  - poor inferential/predictive skills
  - weak ability to grasp the main idea
  - evaluation of writer's point of view and purpose
- **Math**
  - number sense, estimation, fractions
  - application of math skills in different areas
  - determine best solution to word problems
  - represent numbers or problems in a variety of ways
- **Writing**
  - organizing thoughts to effectively communicate ideas
  - weakness in creative writing
  - difficulty with the establishment of purpose / perspective when writing
- **Science**
  - Hypothesize, adjust reasoning based on data
- **Social Studies/History**
  - Draw connections between historical events
  - Understanding of cause and effect
  - Evaluating multiple perspectives

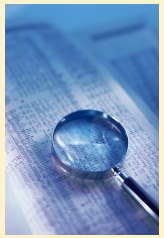
Tying Fluid Reasoning to Special Education Services

Fluid reasoning deficits often appear in students with:

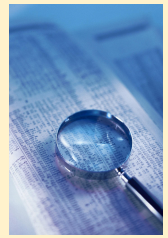
- **Learning disabilities (LD)** in math reasoning or reading comprehension
- **Autism Spectrum Disorder (ASD)** — difficulty with flexibility and problem solving
- **ADHD** — challenges with working memory and logical planning
- **Traumatic Brain Injury (TBI)** — impaired abstract and adaptive reasoning

Services May Include:

- **Special education instruction** in math, reading, or executive functioning
- **Speech-language therapy** (e.g., language reasoning, inference, story retell)
- **Psychological or counseling support** for flexible thinking and social understanding
- **Assistive technology tools** (e.g., graphic organizers, sequencing apps)



“Look Fors” - Identifying Fluid Reasoning Deficits from an Educational Evaluation / Observations



Struggles with Novel Problems - Difficulty solving unfamiliar tasks without step-by-step guidance.

Weak Pattern Recognition and Logic - Trouble identifying relationships, sequences, and patterns.

Low Fluid Reasoning Scores on Cognitive Tests- Below average performance on subtests like Matrix Reasoning or Concept Formation..

Rigid Thinking - Difficulty shifting strategies or adapting to new rules or approaches.

Math Word Problem Challenges - Can’t apply known math concepts to solve real-world problems..

Visual-Spatial Reasoning Difficulties - Trouble with puzzles, spatial tasks, or abstract visuals. .

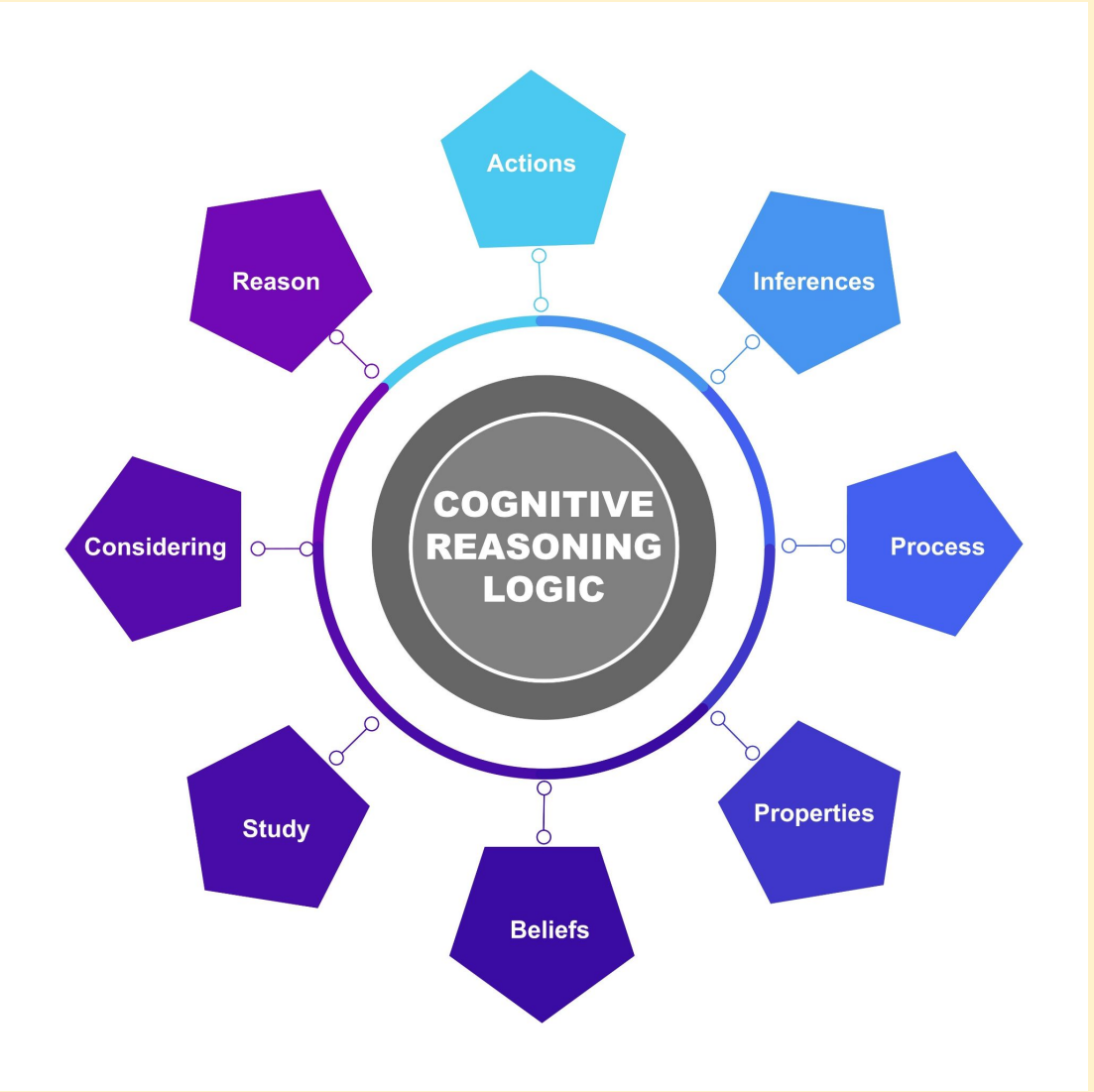
Needs Repetition and Modeling for Abstract Ideas- Struggles to understand abstract or logical concepts without concrete examples.

Inconsistent or Random Problem-Solving Approaches - Lacks clear strategies; difficulty explaining reasoning.

Teacher/Evaluator Observations of Reasoning Challenges - Noted difficulties with logic-based tasks across subjects (e.g. science, reading, games).

Low Frustration Tolerance - Gives up quickly on reasoning tasks; avoids unfamiliar problems.

Fluid Reasoning (Gf) is a crucial cognitive ability—the capacity to think logically, solve **novel problems**, identify **patterns and relationships**, and draw inferences, all independent of prior knowledge (crystallized intelligence). A student's Fluid Reasoning ability significantly impacts the development and implementation of their **Individualized Education Program (IEP)**, particularly in defining **Present Levels of Academic and Functional Performance (PLAAFPs)**, establishing **IEP goals**, and determining necessary **accommodations and modifications.**



✅ Why These "Look Fors" Matter

Identifying fluid reasoning deficits helps:

- Inform **IEP goals** related to problem-solving, abstract thinking, and reasoning.

- Support **Specially Designed Instruction (SDI)** that includes modeling, scaffolding, and visual problem-solving strategies.

- Enhance student independence in applying knowledge to new and varied tasks.

By using these "look fors," educators can better detect fluid reasoning challenges and tailor interventions for long-term academic and cognitive growth.

🎯 Impact on PLAAFPs 🎯

The student's Fluid Reasoning score from a cognitive assessment (like the WISC or WJ-IV) serves as a vital piece of data in the PLAAFP section of the IEP. A weakness in this area will likely be linked to specific academic struggles.

- **Problem-Solving Deficits:** Students with weak fluid reasoning abilities will struggle to solve complex, multi-step, or non-routine problems, especially in **Math Reasoning** (e.g., word problems) and **Science**.

- **Inferential Thinking:** Difficulties will emerge in **Reading Comprehension** when they need to make inferences, draw conclusions, or understand abstract concepts that aren't explicitly stated

- **Applying Rules/Concepts:** They will have trouble taking a rule or procedure learned in one context and **generalizing** or applying it to a new, unfamiliar situation.

- **Executive Functioning Link:** Fluid Reasoning is closely related to executive functions like attention and working memory. Weakness may manifest as difficulty with **planning, organization, and sustaining focus** on complex tasks.

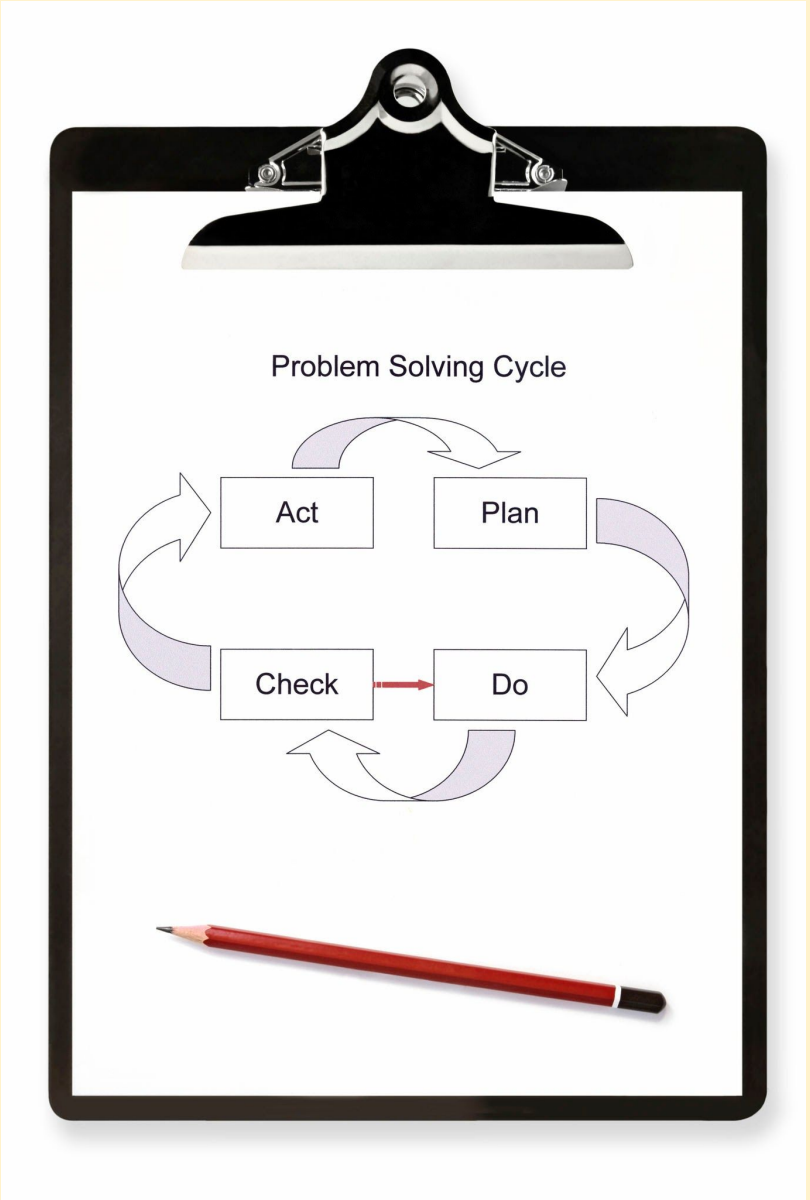
📝 Establishing IEP Goals 📝

IEP goals should directly address the academic or functional deficits stemming from weak Fluid Reasoning. These goals often focus on explicitly teaching and practicing the underlying reasoning skills.

Academic Area Impacted	Sample Skill Focus for IEP Goal
Math Reasoning	Explicitly teaching and applying problem-solving strategies (e.g., structured steps) to solve novel, multi-step word problems.
Reading Comprehension	Developing the ability to make inferences and draw conclusions based on text evidence and identifying patterns (like text structure or character motivation).
Written Expression	Sequencing ideas logically, organizing complex information using a structure (like a graphic organizer), and drawing connections between main ideas and supporting details.
Executive Functioning	Using a 'think-aloud' model to verbally identify the steps and rules needed to start and complete an unfamiliar task.

🛠️ Accommodations and Instructional Strategies 🛠️

Accommodations and instructional methods are critical for helping students access the curriculum by bypassing the fluid reasoning deficit, while interventions work to strengthen the skill.



Instructional Strategies

Since students with weak fluid reasoning struggle with **inductive (specific to general)** and **deductive (general to specific)** reasoning, interventions must be explicit and structured:

- **Explicit Instruction:** Use **direct, explicit teaching** of rules and concepts, rather than relying on "discovery learning" or open-ended exploration.
- **Concrete to Abstract:** Use **manipulatives, real-world examples, and visual aids** to make information concrete before transitioning to abstract concepts.
- **Model "Think Alouds": Verbally model** the process of solving a problem, making connections, and identifying the steps, demonstrating the "fluid" thinking process.
- **Sequential Steps:** Break down complex tasks into **smaller, sequential steps** that can be memorized or followed as a checklist.
- **Repetition and Review:** Provide extensive **repetition and review** of concepts to ensure over-learning, as the student will struggle to generalize the skill to new situations quickly.

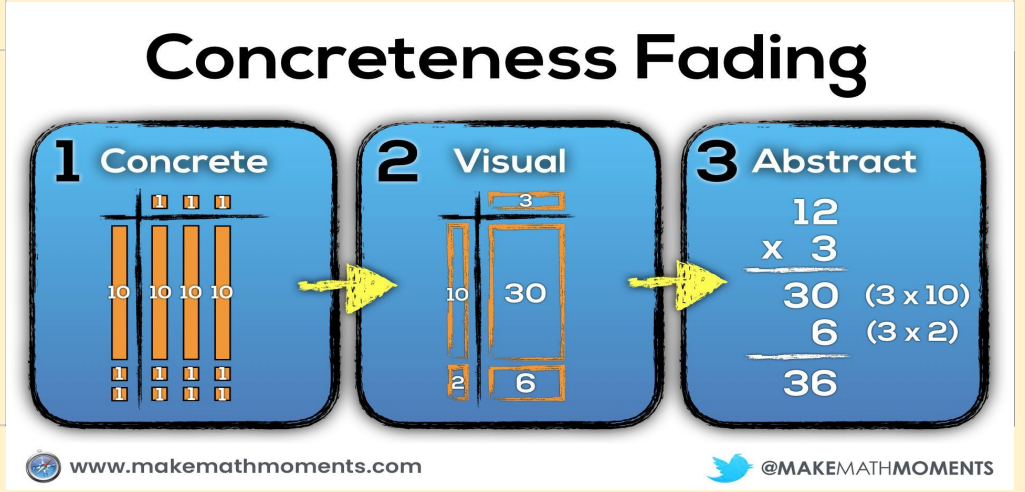
📢 Instructional Strategies - Explicit Instruction 📢

Goal: To directly teach the rule, concept, or procedure the student needs to apply, eliminating ambiguity and the need for independent discovery.

STEP	ACTION	EXAMPLE (Solving a Division Word Problem)
1. Define the Skill	Clearly state the lesson's objective, the rule, or the concept.	"Today, we are learning the rule for when to divide in a word problem: Division is used when we share a total amount equally into smaller groups."
2. Model (I Do)	Show the student exactly how to use the rule, concept, or procedure. Do not skip steps.	Present a word problem. Say: "I see the total number of cookies, and the problem asks me to share them equally among friends. Since I am sharing equally, I must divide."
3. Guided Practice (We Do)	Work through several examples with the student, having them apply the rule with frequent prompts and feedback.	Present a new, similar problem. Ask: "What is the total amount? What is the problem asking you to do with that total? Is that dividing or multiplying?"
4. Independent Practice (You Do)	Allow the student to practice the skill independently using new examples, monitoring their application of the rule.	Give the student a set of division word problems to solve on their own, referring back to the stated rule as needed.

Instructional Strategies - Concrete to Abstract

Goal: To build a conceptual foundation by starting with physical or highly visual representations before moving to symbolic (abstract) math or language.

Step	Action	Example (Understanding Fractions)
1. Concrete Experience	Introduce the concept using manipulatives or real-world objects the student can touch and move.	Use a pizza cut into 8 slices. Physically show the student what happens when you take away 1 slice. "This is one part out of eight total parts, or 1/8 of the pizza."
2. Pictorial Representation	Transition to a visual, two-dimensional drawing or diagram that represents the concrete objects.	Draw a rectangle and divide it into 8 equal parts. Shade one part. "This picture represents the 1/8 we just saw with the pizza."
3. Abstract Representation	Introduce the symbolic notation (the numbers and symbols) and link it back to the concrete and pictorial stages.	Write the fraction: 1/8. Explain that the 1 is the part you shaded (the numerator), and the 8 is the total number of parts (the denominator).
4. Practice and Generalization	Have the student work with new, purely abstract problems, but always encourage them to mentally (or physically) revert to the concrete/pictorial image if they get stuck.	

🤔 Instructional Strategies - Model “Think Alouds” 🤔

Goal: To make the internal, fluid reasoning process **audible and visible** to the student, modeling how to approach a novel problem.

Step	Action	Example (Analyzing a Cause-and-Effect Relationship in Text)
1. Set the Context	Explain that you are going to show them how an expert (you) thinks through a problem.	"I'm going to read this paragraph, and then I will show you exactly how I think about figuring out the main cause and its effect."
2. Model the Process	Read the text/problem aloud, pausing frequently to verbalize your thoughts, decisions, and connections.	Read: "The rain fell heavily for five days." Pause. Say: "I notice that the weather is the main event here. Heavy rain for a long time—that's the CAUSE I'm looking for." Read: "...causing the river to overflow its banks." Pause. Say: "The text is telling me the RESULT of the rain. The rain made the river overflow. I've now connected the CAUSE (rain) to the EFFECT (overflow). I didn't see the words 'cause' and 'effect,' but I figured out the relationship based on the text."
3. Invite Participation	On the next example, invite the student to finish your thought or apply the modeled process.	Read a new passage and stop. Ask: "I see a big event happened here. What do you think the next step in my thinking process would be?"

📋 Instructional Strategies - Sequential Steps 📋

Goal: To reduce the cognitive load of a complex task by turning it into a manageable checklist, mitigating the student's difficulty with planning and organizing novel tasks.

Step	Action	Example (Writing a 5-Sentence Summary)
1. Analyze the Task	Identify every component or sub-skill needed to complete the complex task.	The task is "Write a 5-sentence summary." Components: Find main idea, find 3 supporting details, write an opening sentence, write three body sentences, write a closing sentence, check for errors.
2. Create the Checklist	Sequence the components into a mandatory, easy-to-read checklist or flow chart.	Summary Checklist: 1. Find the Main Idea. 2. Write the Main Idea as the Topic Sentence. 3. Find Supporting Detail 1. 4. Write it as Sentence 2. 5. Find Supporting Detail 2. (and so on...)
3. Practice Using the Tool	The student practices completing the task only by following the checklist, marking off each step as it's completed.	The student uses the checklist while writing a summary, using it as a reference, not a guide for creative thinking.

🔁 Instructional Strategies - Repetition and Review 🔁

Goal: To ensure skills are over-learned and transferred from short-term to long-term memory, enabling successful application to new contexts.

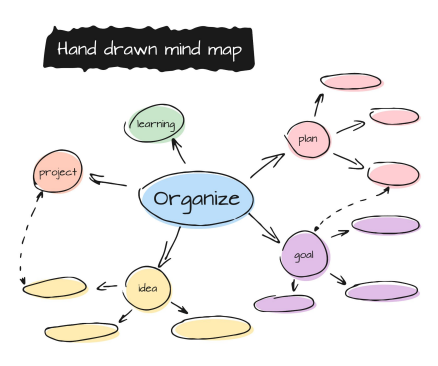
Step	Action	Example (Reviewing a Mathematical Formula)
1. Distributed Practice	Review the concept/skill briefly over several days or weeks rather than one long session (e.g., 5 minutes a day for 4 days).	At the start of math class Monday through Thursday, quickly review the formula for the area of a rectangle.
2. Varied Contexts	Present the same skill/concept in slightly different contexts or formats to encourage generalization.	Day 1: Calculate the area of a drawn rectangle. Day 2: Find the area of a real-world object (desk). Day 3: Solve a word problem about finding the area of a garden.
3. Cumulative Review	Integrate previously mastered skills into current instruction to prevent forgetting and reinforce connections.	When solving a complex volume problem, include a step that requires the student to first calculate the area (the previously learned skill).

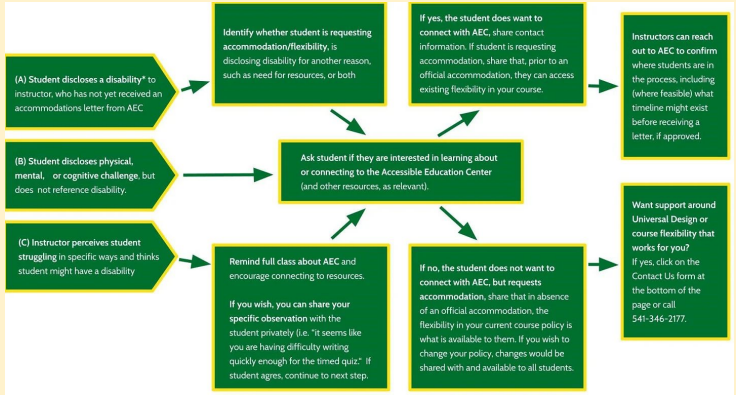
🛠️ Accommodations 🛠️

Graphic Organizers: Use concept maps or writing templates to help students **visually organize** their ideas, a common Fluid Reasoning weakness.

Reference Materials: Allow the student to use a **step-by-step guide** or checklist during complex tasks to reduce reliance on immediate mental manipulation of novel information.

Highlighting Key Information: For word problems, highlight key information and eliminate irrelevant details to focus the student's attention on the **relevant pattern/rule** needed to solve it.





What About Executive Functioning?

📝 Example SDI: The "PLAN" Strategy 📝

This SDI uses the **Sequential Steps** strategy combined with **Explicit Instruction** to teach the student a fixed, transferable procedure for approaching any major assignment.

Student Deficit Targeted

- **Task Initiation:** Difficulty starting complex assignments.
- **Planning/Organization:** Inability to break down a multi-step task (e.g., a research report) into manageable parts.

The Intervention: Explicit Instruction of the "PLAN" Checklist

The teacher (or specialist) uses explicit instruction to teach the student this mnemonic checklist.

STEP 1: P - Plan Your Work

Sub-Step	Teacher Instruction (I Do/We Do)	Student Action (You Do)
P1. Identify the Goal	Guide the student to highlight the core requirement of the task (e.g., "Write a 5-paragraph report on two causes of the Civil War").	The student writes down the **goal** in a dedicated spot on their assignment sheet.
P2. Estimate Time	Explicitly teach the student to estimate how much time *each part* will take (e.g., "Finding sources will take 1 hour, Outlining will take 30 minutes").	The student creates a simple **timeline** for the assignment.
P3. Gather Materials	Have the student physically collect all necessary items *before* starting the content (notebook, pen, laptop, organizer).	The student checks off the required **materials list**.

STEP 2: L - List the Steps

Sub-Step	Teacher Instruction (I Do/We Do)	Student Action (You Do)
L1. Break It Down	Model breaking the complex task into a **sequential checklist** (e.g., "Research Topic 1," "Write Thesis," "Draft Paragraph 1").	The student uses a pre-printed **template** with 5-10 pre-defined steps for the specific assignment type (e.g., research report template).
L2. Order the Steps	Emphasize that the steps must be done in a logical order (e.g., you can't edit before you draft).	The student numbers the checklist items to ensure proper sequencing.

STEP 3: A - Attack the First Step

Sub-Step	Teacher Instruction (I Do/We Do)	Student Action (You Do)
A1. Focus/Start	Provide an immediate, brief "starter" task (e.g., "Just find one relevant keyword for your search"). This addresses task initiation.	The student completes **only the first item** on the list (e.g., "Find one source").
A2. Use Resources	Remind the student where to look for help if the first step is too hard (e.g., reference materials, class notes).	The student refers to their **reference sheet** (an accommodation) for formatting or research tips.

STEP 4: Notice and Check

Sub-Step	Teacher Instruction (I Do/We Do)	Student Action (You Do)
N1. Self-Monitor	Teach the student to pause after completing a major step and ask: "Does this step look correct? Am I still following the plan?"	The student places a **check mark** next to the completed item on the checklist and briefly **reviews** their work for that step.
N2. Move to Next	Direct the student to the *next sequential item* on the list and repeat the process.	The student proceeds directly to the next item on the plan without getting overwhelmed by the overall scope of the project.

SDI - Reading Comprehension and Fluid Reasoning

🧠 Example SDI: The "Text Clues + My Knowledge = Inference" Formula

This SDI is a structured, **Explicit Instruction** approach combined with a **Graphic Organizer** to teach the student how to systematically generate an inference.

Student Deficit Targeted

- **Inferential Reading Comprehension:** Difficulty answering "why," "how," or "what happened next" questions when the answer is not explicitly stated.
- **Pattern Recognition (Gf):** Inability to hold disparate text clues in working memory and combine them logically.

SDI - Reading Comprehension and Fluid Reasoning

The Intervention: Explicitly Teaching the Inference Equation

The teacher (or specialist) uses a structured organizer and "Think Alouds" to model the three components necessary for successful inference.

Step 1: Introduction and Definition

- **Define Inference:** Explicitly state the objective: "Inference is a **smart guess** or conclusion you make using what the author **tells** you and what you **already know**."
- **Introduce the Formula:** Display the formula prominently: **Text Clues + My Knowledge = Inference** .

SDI - Reading Comprehension and Fluid Reasoning

Step 2: P-K-I Graphic Organizer Instruction

The student is provided with a simple, three-column graphic organizer: **P** (Text Evidence/Clues), **K** (Prior Knowledge), and **I** (Inference).

Step	Teacher Instruction (I Do/We Do)	Student Action (You Do)
1. Text Clues (P)	Model highlighting or noting specific pieces of evidence from the text that relate to the inference question. Emphasize that these must be direct quotations or clear facts.	The student reads a short passage and lists (or copies) 2-3 direct clues from the text into the "P" column.
2. Prior Knowledge (K)	Guide the student to connect the clues to their background knowledge or general life experience. Model the Think Aloud: "The text says the character wore a heavy coat and shivered. I know that people wear heavy coats and shiver when it's cold."	The student writes down a relevant general fact or experience in the "K" column (e.g., "Shivering means I am cold").
3. Inference (I)	Model combining the two columns logically to answer the question, creating a statement that is plausible but unstated. Model the conclusion: "The text clues and my knowledge tell me the temperature in the room is cold, even though the author didn't say the word 'cold'."	The student writes the final, full-sentence inference in the "I" column.

SDI - Reading Comprehension and Fluid Reasoning

Step 3: Generalization and Fading

- **Repetition and Review:** The student uses this graphic organizer procedure with **multiple passages** over several days until the process becomes automatic.
- **Fading:** Gradually reduce the structure. The final goal is for the student to **internalize** the "Text Clues + My Knowledge" formula and perform the steps mentally when reading new material.

This SDI explicitly teaches the **logical pattern-finding** process necessary for inference, providing the necessary external structure to compensate for the student's internal fluid reasoning weakness.

Factors That May Facilitate Learning and Aid in Bypassing or Minimizing the Effects of a Fluid Reasoning (Gf) Deficit

Classroom Instruction	Instructional Materials	Environmental	Strategies
Think-alouds to externalize the reasoning process	Expanded answer keys containing the reason for correct/incorrect choices	Problem Solving Charts	Metacognitive Strategies (mnemonics)
Guided Practice	Guided lists for implementing procedures/formulas	Procedural charts/lists	Use tools that help categorize: Graphic organizers, concept maps
Cooperative Learning / Reciprocal Teaching	Text features to include boldfact, italics	Preferred seating next to peers with strong reasoning skills	Separate steps to complete problems
Compare new concepts to previously learned concepts	Graphic organizers that allow for a visual description of relationships among concepts		In math- make problems applicable to real life and prior experiences

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THANK YOU!

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