

# Connecting Cognitive Impacts to Instructional Strategies



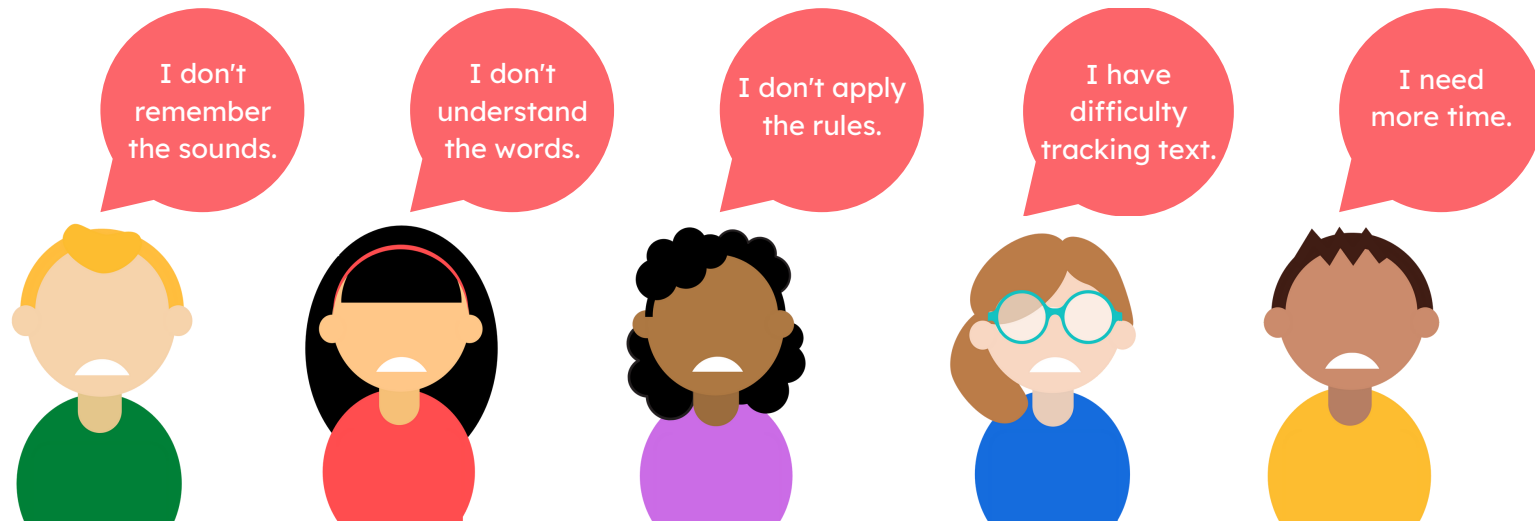
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# The Purpose of This Guide

The purpose of this guide is to help special educators connect with their students through specially designed instruction. Specially designed instruction means adapting, as appropriate to the needs of a student, the content, methodology, or delivery of instruction.

Connecting with the needs of each individual student means connecting IEPs to address the **IMPACT** of the disability. Most IEP teams begin with performance gaps revealed in assessments. Performance gaps explain **WHAT** a student is missing. To truly connect with a student, the special educator needs to understand the cognitive challenges revealed in the psychological evaluation. Cognitive challenges tell teachers **WHY** a student is missing it.

For example, a student with weak working memory has difficulty decoding for different reasons than a student with poor verbal comprehension. These two students require two different plans or strategies to overcome the performance gap because they have two different **WHYs**.



# A Thinking Challenge Analogy



## Working Memory: The Mail Room

Working Memory is where ideas and information are received and distributed to the other parts of the brain where they need to go to be worked on. Working Memory prioritizes by importance and focuses on getting the message to the right place on time.



## Verbal Comprehension: The Library

Verbal Comprehension is where the brain goes to find existing knowledge about ideas and information. In order to understand, the brain has to find information that is relevant and sufficient.



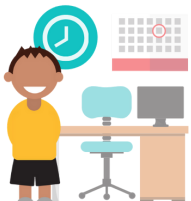
## Fluid Reasoning: The Laboratory

Fluid Reasoning is where the brain follows methods and procedures. It experiments and learns by doing. This is where novel problems are solved and open questions are answered by using strategies, tools and resources.



## Visual Spatial Reasoning: The Conference Room

Visual Spatial Reasoning is the part of the brain that reads graphs and diagrams, interprets data, and breaks information down from wholes to parts. This is where visualization happens, patterns emerge, and the mind maps concepts together.



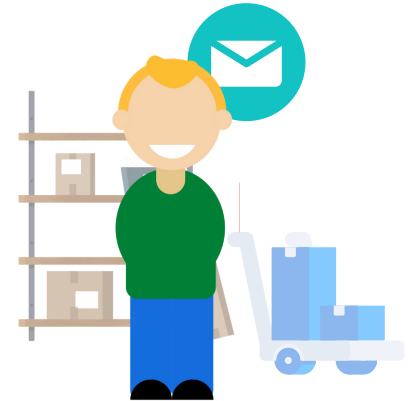
## Processing Speed: The Office

Processing Speed is how the brain organizes tasks, completes the paperwork, and files reports without mistakes. The office has to work quickly and efficiently to process orders and maintain documentation.

# Working Memory

Working Memory is like the brain's mailroom. This is where new information is received, sorted, stored, and delivered.

The Working Memory Index measures a child's ability to register, maintain, and manipulate visual and auditory information in conscious awareness. These tasks measure one's skills in attention, concentration, and mental reasoning as well as visual and auditory discrimination. Working memory is a fundamental process for learning.



## Impact

## Goal Conditions

### Reading Foundations

### Given multisensory instruction...

Students with weak working memory have difficulty...

Examples:

- attending to print cues and remembering letters
- remembering sounds to perform phonemic tasks.
- recalling sounds to decode words.
- remembering sight words.
- decoding multisyllabic words.
- recalling grade level sight words.
- reading with accuracy and fluency.

- Elkonin boxes
- tracing
- see, say, do
- picture supports
- sand trays
- finger tapping

### Reading Comprehension

### Given multisensory instruction...

Students with weak working memory have difficulty...

Examples:

- recalling details and information from grade-level texts.
- recalling details to determine the main idea in grade-level texts.
- remembering details about elements in grade-level texts.
- determining the meaning of words and phrases.
- attending to how grade-level texts are organized.
- recalling information from pictures and text.
- recalling facts from words and images in grade-level texts.
- remembering evidence that supports the author's point.

- text annotation
- graphic organizers
- paraphrasing
- text transformation (reformulating text in as in a comic strip, foldable, or poem)

## Impact

## Goal Conditions

### Written Expression

### Given multisensory instruction such as...

Students with weak working memory have difficulty...  
sequencing ideas a written opinion.  
planning and organizing informative writing.  
maintaining focus in narrative writing.

graphic organizers  
picture prompts  
color coded word banks  
record ideas in audio before writing

### Math

### Given multisensory instruction such as...

Students with weak working memory have difficulty...  
recalling numbers and attending while counting.  
analyzing place value.  
attending to and using properties.  
recalling facts to solve word problems.  
attending to and analyzing equations and expressions.  
applying math strategies and procedures.  
solving multi-step problems.  
precisely working with time, money and data.  
working precisely with geometry.

concrete or visual modeling  
manipulatives  
mnemonics  
procedural checklists  
think aloud

## Suggested Accommodations

### Presentation Strategies

- Preview the lesson
- Connect new concepts to prior knowledge
- Use visuals to support information like anchor charts, diagrams, pictures
- Repeat instructions

### Enagagement Strategies

- Chunking
- Paraphrasing
- Highlighting relevant information
- Providing immediate positive feedback for effort and persistence

### Expression Strategies

- Use of guides and checklists
- Use of graphic organizers
- Sentence starters
- Word banks

# Verbal Comprehension

Verbal Comprehension is like the brain's library. This is where the brain goes to find existing knowledge that is relevant and sufficient for understanding new concepts.

The Verbal Comprehension Index measures a child's ability to access and apply acquired word knowledge. Specifically, this score reflects one's ability to verbalize meaningful concepts, think about verbal information, and express oneself using words.



## Impact

## Goal Conditions

### Reading Foundations

Students with poor verbal comprehension have difficulty

- comprehending print cues and letters.
- synthesizing sounds in spoken words.
- recognizing and analyzing word parts.
- decoding unfamiliar words.
- retrieving sight words.
- using context clues.
- reading with sufficient accuracy to support comprehension.

### Given visual supports...

- picture cues
- color coding word parts such as consonants and vowels, syllable patterns, or prefixes and suffixes
- context clue annotation
- phrase scooping to support fluency

### Reading Comprehension

Students with poor verbal comprehension have difficulty

- comprehending key details in grade-level texts.
- relating details to retell grade-level stories.
- relating to characters, settings, and events in grade-level stories.
- comprehending new words in grade-level texts.
- comprehending common text types.
- understanding author and illustrator roles in grade-level texts.
- describing relationships between illustrations and grade-level stories.
- comparing and contrasting grade-level stories.

### Given visual supports...

- graphic organizers
- anchor charts
- diagrams
- concept maps
- text annotation
- illustrations
- related multiple media

## Impact

## Goal Conditions

### Written Expression

Students with poor verbal comprehension have difficulty expressing a written opinion.  
using domain vocabulary in informative writing.  
due to limited schema for use in narrative writing.

### Given visual supports such as...

graphic organizers  
picture prompts  
word banks  
sentence starters  
outlines

### Math

Students with poor verbal comprehension have difficulty understanding relationships between numbers, symbols, and words.  
comprehending and using math language.  
understanding properties.  
determining operations in word problems.  
abstract reasoning for solving time and money problems.  
comprehending data.  
recognizing similarities and patterns.  
understanding abstract math concepts.  
understanding geometry vocabulary.

### Given visual supports such as...

concrete and/or visual modeling  
manipulatives  
real world problems and examples  
math vocabulary glossary with simple synonyms for math language  
highlighted information in word problems  
diagrams  
number lines  
anchor charts/concept maps  
clear and concise written directions

## Suggested Accommodations

### Presentation Strategies

- Preteach new vocabulary
- Incorporate interests when teaching new concepts
- Use of graphic organizers to teach new concepts
- Highlight new vocabulary and major concepts

### Enagagement Strategies

- Frequently check in with student to ensure comprehension
- Provide a word bank
- Connect new concepts to prior knowledge
- Provide a reward system

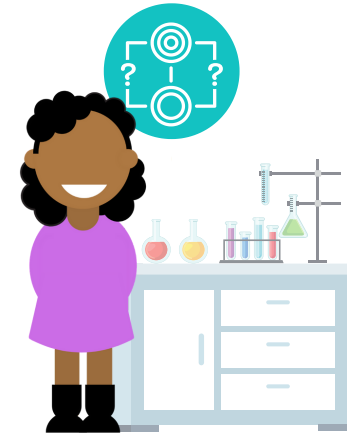
### Expression Strategies

- Use anchor charts or word walls
- Provide visual to support new concepts
- Paraphrase what has been taught periodically during lesson
- Offer options to written assignments

# Fluid Reasoning

Fluid Reasoning is like the brain's laboratory. This is where the brain follows methods and procedures. It experiments and learns by doing. This is where novel problems are solved and open questions are answered by using strategies, tools and resources. Fluid reasoning applies knowledge and rules, gathers relevant data, and generalizes information to solve problems.

The Fluid Reasoning Index measures a child's ability to detect the underlying conceptual relationship among visual objects and use reasoning to identify and apply rules. These tasks measure one's skills in attention, concentration, and mental reasoning as well as visual and auditory discrimination.



## Impact

## Goal Conditions

### Reading Foundations

Students with fluid reasoning deficits have difficulty

- adjusting reading based on print cues and letter recognition.
- sequencing and manipulating sounds in spoken words.
- applying strategies to decode and analyze unfamiliar words.
- applying morpheme knowledge such as tenses and plurals
- using strategies to read grade level sight words.
- reading grade-level texts with accuracy and expression.

### Given step by step instruction...

Examples:

- teaching concepts from simple to complex
- direct explicit presentations
- explicit instruction in word patterns and rules
- breaking material into smaller chunks or time frames
- modeling fluent reading

### Reading Comprehension

Students with fluid reasoning deficits have difficulty

- determining relevant ideas in grade-level texts.
- sequencing details to retell grade-level topics.
- connecting individuals, events, and ideas in grade-level texts.
- using parts of a book to understand texts.
- explaining information from illustrations and grade-level texts.
- explaining reasons for authors' points.
- generalizing information from different texts.

### Given step by step instruction...

Examples:

- review of prior concepts
- crystal clear goals and objectives
- graphic organizers
- concept maps
- text annotation
- anchor charts
- exemplars
- think aloud
- problem solving strategies



## Impact

## Goal Conditions

### Written Expression

Students with fluid reasoning deficits have difficulty  
organizing a written opinion.  
analyzing and applying relevant facts in informative writing.  
applying structure in narrative writing.

### Given step by step instruction...

graphic organizers  
writing templates  
outlines  
use of resources

### Math

Students with fluid reasoning deficits have difficulty  
  
reasoning through word problems.  
representing numbers in a variety of ways.  
applying properties.  
reasoning related to place value.  
applying repeat reasoning to solve problems.  
sequencing steps in multistep problems.  
analyzing expressions and equations.  
applying abstract reasoning.  
determining appropriate tools and strategies for measurement.

### Given step by step instruction...

providing exemplars  
modeling think aloud  
using manipulatives  
giving real world problems and examples  
highlighting relevant information in word problems  
posting anchor charts/concept maps  
providing procedural checklists

## Suggested Accommodations

### Presentation Strategies

- Provide teacher think aloud when teaching new concepts
- Supply an outline of lessons
- Use numerous examples to explain new concepts
- Preview tasks and expectations

### Enagement Strategies

- Use graphic organizers to provide a summary of information
- Give analogies that are relatable
- Provide time for student to explain their work
- Designate a peer buddy to collaborate on task

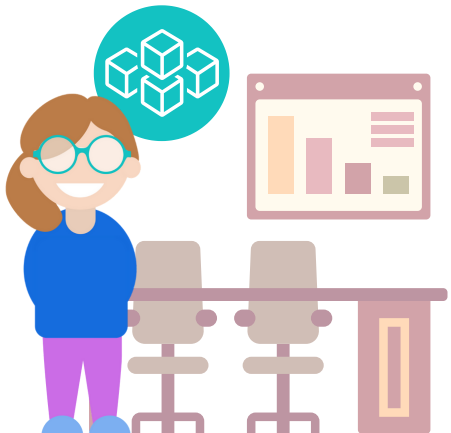
### Expression Strategies

- Provide time to verbalize thought process
- Show exemplars
- Supply procedural checklists
- Ask clear and concise questions

# Visual-Spatial Reasoning

Visual Spatial Reasoning is like the brain's conference room. This is the part of the brain that reads graphs and diagrams, interprets data, and breaks information down from wholes to parts. This is where visualization happens, patterns emerge, and the mind maps concepts together.

The Visual Spatial Index measures a child's ability to evaluate visual details and understand visual spatial relationships to construct geometric designs from a model. This skill requires visual-spatial reasoning, integration and synthesis of part-whole relationships, attentiveness to visual detail, and sometimes using hand-eye coordination, and working quickly and efficiently with visual information.



## Impact

## Goal Conditions

Reading Foundations	Given clear verbal instruction...
<p>Students with visual spatial deficits have difficulty</p> <ul style="list-style-type: none"> <li>recognizing print cues, direction, and letters.</li> <li>forming letters.</li> <li>recognizing sight words.</li> <li>tracking print to read accurately and fluently.</li> </ul>	<p>Examples:</p> <ul style="list-style-type: none"> <li>modeling tracking using finger</li> <li>adding verbal directions to aid letter formation</li> <li>multiple opportunities to practice sight words in short phrases</li> </ul>
Reading Comprehension	Given clear verbal instruction...
<p>Students with visual spatial deficits have difficulty</p> <ul style="list-style-type: none"> <li>locating key details in grade-level texts.</li> <li>determining how details support a central idea. (seeing the big picture)</li> <li>determining how text elements fit together.</li> <li>locating details in pictures and graphics to determine meaning.</li> <li>recognizing different types of texts.</li> <li>analyzing visual media.</li> </ul>	<p>Examples:</p> <ul style="list-style-type: none"> <li>highlighting key details</li> <li>paraphrasing stories and texts</li> <li>think aloud for using text features</li> <li>captioned pictures and graphics</li> <li>opportunities to explain understanding verbally.</li> </ul>

## Impact

## Goal Conditions

### Written Expression

Students with visual spatial deficits have difficulty using text features to organize a written opinion. choosing and using graphics to support informative writing. visualizing ideas for narrative writing.

### Given clear verbal instruction...

Examples:  
  
verbal prompts  
writing templates  
outlines

### Math

Students with visual spatial deficits have difficulty modeling math problems. tracking numerals in equations and expressions. comparing quantities. visual spatial skills for understanding place value. understanding directionality and inverse relationships. recognizing place value. recognizing part whole relationships such as fractions and ratios. working with time, money, and data. graphing expressions and equations. solving geometry problems.

### Given clear verbal instruction...

Examples:  
  
verbal explanations of math concepts  
glossary of math definitions and procedures  
think aloud  
highlighted information in word problems  
opportunities to explain reasoning verbally  
concrete or real world models for geometry

## Suggested Accommodations

### Presentation Strategies

- Provide clear and concise oral instructions
- Provide time for asking questions for clarification
- Pair oral instructions with visual/concrete manipulatives
- Check for level of understanding

### Enagement Strategies

- Build in time to summarize the important information from each lesson
- Provide uncluttered handouts with few or no nonessential images
- Provide a highlighter for key information while reading
- Clearly space words and problems on a page

### Expression Strategies

- Provide copies of notes
- Use assistive technology
- Offer a choice of assessments/assignments
- Provide a lot of space for answers

# Processing Speed

Processing is like the brain's office. This is where the brain organizes tasks, completes the paperwork, and files reports without mistakes. The office has to work quickly and efficiently to process orders and maintain documentation.

The Processing Speed Index measures a child's speed and accuracy of visual identification, decision making, and decision implementation. Performance is related to visual scanning, visual discrimination, short-term visual memory, visuomotor coordination, and concentration. This skill may be important to a child's development in reading, and ability to think quickly in general.



## Impact

## Goal Conditions

### Reading Foundations

### Given appropriately paced instruction...

Students with slow processing have difficulty

- processing print cues and automatic letter recognition.
- processing sounds in words quickly and efficiently.
- reading sight words automatically.
- reading with sufficient accuracy and fluency to support comprehension.

Examples:

- predictable lesson routines
- repeated practice
- use of familiar words and texts
- modeling prosody

### Reading Comprehension

### Given appropriately paced instruction...

Students with slow processing have difficulty

- efficiently processing key details in grade-level texts.
- retelling grade-level stories.
- identifying characters, settings, and events in grade-level stories.
- processing the meaning of new words and phrases.
- processing different types of texts.
- recognizing roles of authors and illustrators.
- efficiently relating information from illustrations and text.
- comparing details in different texts.

Examples:

- providing familiar or preferred texts
- giving 8 second wait time for answering questions
- giving time for skimming and scanning
- previewing lessons
- reducing content and number of questions
- chunking
- giving ample time for error correction
- providing visual cues
- frequently checking for understanding

## Impact

## Goal Conditions

Written Expression	Given appropriately paced instruction...
<p>Students with slow processing have difficulty</p> <p>formulating a written opinion.</p> <p>processing information to use in informative writing.</p> <p>persevering through narrative writing tasks.</p>	<p>Examples:</p> <p>shortening assignments</p> <p>showing exemplars</p> <p>offering alternatives to handwriting</p>

Math	Given appropriately paced instruction...
<p>Students with slow processing have difficulty</p> <p>counting with automaticity.</p> <p>solving math problems quickly on paper.</p> <p>processing information in word problems.</p> <p>solving multi-step problems</p> <p>applying properties and procedures to solve problems.</p> <p>processing the meaning of expressions and equations.</p> <p>processing spatial relationships.</p> <p>efficiently working with time and money.</p> <p>translating and transferring data.</p> <p>processing and applying principles of geometry.</p>	<p>Examples:</p> <p>breaking down problems into smaller steps</p> <p>giving time for repeated practice of math facts</p> <p>annotating word problems</p> <p>giving only the number of problems to demonstrate mastery of concepts</p> <p>frequent checks for understanding</p> <p>8 second wait time for verbal responses</p> <p>extended time on math assignments</p> <p>handouts with exemplars and simple written directions</p>

Suggested Accommodations		
<p><b>Presentation Strategies</b></p> <ul style="list-style-type: none"> <li>• Create consistent daily class routines</li> <li>• Break the lesson into smaller chunks</li> <li>• Talk slowly when giving oral directions</li> <li>• Give simple written directions</li> </ul>	<p><b>Enagement Strategies</b></p> <ul style="list-style-type: none"> <li>• Provide frequent checks for understanding</li> <li>• Give extra verbal response time for answering questions</li> <li>• Use of a highlighter or sticky notes</li> <li>• Supply notes or lesson outlines</li> </ul>	<p><b>Expression Strategies</b></p> <ul style="list-style-type: none"> <li>• Provide alternatives for lengthy handwritten assignments</li> <li>• Show an exemplar before the start of the task</li> <li>• Provide extended time to complete assignments</li> <li>• Give access to tools that support processing (calculator/spell check)</li> </ul>



TAKE A LOOK  
at [dotit.app](https://dotit.app)



#### PLAN QUICKER

*Click, click, connect impact to plans*

Dot It planning helps teachers and teams generate plans in minutes that

- compliantly address cognitive challenges.
- account for intensity.
- are truly individualized so you know they will be effective.

#### SERVE SMARTER

*Click, click, connect standards to services*

Dot It group lessons make it doable to

- teach students with all different impacts on grade-level at the same time.
- schedule a defensible continuum of services that honors LRE.
- ensure that the expectations in your plans are on the instructional table every day.

#### DOCUMENT CLEARER

*Click, click, connect student work to documentation*

Dot It documentation captures

- progress monitoring on grade-level standards using simple rubrics.
- teacher notes about instructional effectiveness.
- uploaded authentic student work that directly matches what is in your plan.

## References

Flanagan, D.P. and Alfonso, V.C. (2017) Essentials of WISC-V Assessment. John Wiley & Sons, Hoboken.

Schneider, W. J., & McGrew, K. S. (2012). The Cattell-Horn-Carroll model of intelligence. In D. P. Flanagan & P. L. Harrison (Eds.), Contemporary intellectual assessment: Theories, tests, and issues (pp. 99–144). The Guilford Press.

Hall, T. (2012). Universal design for learning in the classroom: Practical applications. New York: Guilford Press.