

## Chart of Cognitive Functions and Learning Outcomes

Cognitive Function	Description of Cognitive Function	Common Features if there is a Problem in this Function	Learning Outcomes
Motor Symbol Sequencing	Ability to learn and produce a written sequence of symbols	Messy handwriting, miscopying, irregular spelling, speech rambling, careless written errors in mathematics, poor written performance	Improve handwriting; reduce careless errors in written work; develop fine motor skills, sequential motor memory and motor planning in writing, capacity for hand-eye coordination
Symbol Relations	Ability to understand the relationships among two or more ideas or concepts	Difficulty with reading comprehension, trouble with mathematical reasoning, trouble with logical reasoning, difficulty reading an analog clock, problem understanding cause and effect, reversals of 'b'-'d'; 'p'-'q' (younger students and in more severe cases)	Develop ability to read a clock; improve capacity necessary for understanding relationships between concepts necessary for logical and mathematical reasoning and reading comprehension that affect all aspects of curriculum and life
Memory for Information/ Instructions	Ability to remember chunks of auditory information	Trouble remembering oral instructions, difficulty following lectures or extended conversations, problem acquiring information through listening	Develop auditory memory and the capacity to remember and follow oral instructions and retain information for learning; improve the capacity to remember chunks of information
Predicative Speech	Ability to see how words and numbers interconnect sequentially into fluent sentences and procedures	Problem putting information into one's own words, speaking in incomplete sentences, difficulty using internal speech to work out consequences, trouble following long sentences, breakdown of steps in mathematical procedures	Improve the capacity to understand a sentence of increasing difficulty and length; improve the ability to put information into own words; develop the capacity for the sense of how symbols (words and numbers) interconnect sequentially; improve the ability to follow procedures in mathematics; develop the ability to write and speak in complete sentences
Broca's Speech Pronunciation	Ability to learn to pronounce syllables and then integrate them into the stable and consistent pronunciation of a word	Mispronouncing words, avoiding using words because of uncertainty of pronunciation, limited ability to learn and use phonics, difficulty learning foreign languages, difficulty thinking and talking at the same time, flat and monotone speech with lack of rhythm and intonation	Develop/improve the capacity for sound-symbol correspondence; develop the phonemic memory necessary for the phonetic aspect of reading; develop the ability to pronounce multisyllabic words correctly; develop the ability to read with greater oral expression

<b>Cognitive Function</b>	<b>Description of Cognitive Function</b>	<b>Common Features if there is a Problem in this Function</b>	<b>Learning Outcomes</b>
Symbolic Thinking	Ability to develop and maintain plans and strategies through the use of language	Problem being self-directed and self-organized in learning, limited mental initiative, difficulty keeping attention relevantly oriented to the demands of a task necessary for completion, difficulty thinking, planning, problem solving, trouble seeing the main point	Develop/improve the ability to grasp the main point of written or orally presented material; develop the ability to state the main idea of a selection using one's own words; develop the ability to maintain plans and strategies for problem solving; develop the capacity to express ideas more clearly in writing; develop the capacity to self-direct, to develop initiative and to remain focused on tasks to completion
Symbol Recognition	Ability to visually recognize and remember a word or symbol	Poor word recognition, slow reading, difficulty with spelling, trouble remembering symbol patterns such as mathematical or chemical equations	Develop/improve the capacity to visually recognize and remember words or symbols necessary for reading, spelling and mathematics
Lexical Memory	Ability to remember several unrelated words	Problems with associative memory, trouble following auditory information, trouble learning names of things such as animals, places, people, colors, days of the week	Improve vocabulary development and auditory memory for words
Non-Verbal Thinking	Ability to register and interpret non-verbal information and plan and problem solve non-verbally	Problems interpreting non-verbal information such as body language, facial expression and voice tone, weak social skills, difficulty perceiving and interpreting one's own emotions, difficulty thinking, planning, problem solving non-verbally	Develop the capacity for non-verbal thinking and problem-solving; develop the ability to interpret body language, facial expression and voice tone and to respond appropriately in interpersonal interactions; develop ability to interpret and modulate his/her own emotions
Quantification Sense	Ability to carry out internal sequential mental operations, such as mental mathematics	Finger counting, trouble retaining numbers in one's head, difficulty making change, problem learning math facts, poor sense of time management, difficulty with time signature in music	Develop the capacity for number sense; develop the capacity for carrying out internal sequential, mental computation of addition and subtraction; develop the ability to use time wisely through scheduling and organization; develop an understanding of quantification related to money, time, space