

LOGICAL-MATHEMATICAL WAYS OF KNOWING

Adapted by Leslie Wessman from the work of Howard Gardner, Thomas Armstrong, Linda Campbell, and David Lazear.

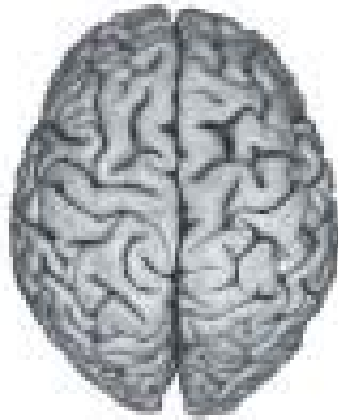
DEFINITION

You can see Logical-Mathematical intelligence in operation most clearly when you are involved in a situation that required problem solving or meeting a new challenge. This intelligence is often associated with what we call “scientific thinking.” This intelligence makes it possible to calculate, quantify, consider propositions and hypotheses, and carry out complex mathematical operations. We use our LM intelligence when we recognize abstract patterns, such as counting by twos or knowing if we’ve received the right change at the supermarket. We use it when we find connections or see relationships between seemingly separate and distinct pieces of information. It is responsible for the various patterns of thinking we use in our daily lives, such as making lists, creating a schedule, setting priorities, and planning something for the future.

BRAIN CONNECTION

The LM intelligence represents an intriguing mix of left- and right-brain hemisphere processes. On the one hand, the ability to read and produce mathematical signs & symbols is a left-hemisphere processing mode. On the other hand, the

ability to understand numerical relationships, to discern abstract patterns, and to comprehend LM concepts and formulas is a right-hemisphere processing mode. LM intelligence both attempts to explain the concrete world, and is at the same time interested in the exploration of abstract theories or systems.



LEARNING CAPACITIES

- Abstract Pattern Recognition
- Inductive Reasoning
- Deductive Reasoning
- Discerning Relationships & Connections
- Performing Complex Calculations
- Scientific Reasoning

CLASSROOM TOOLS

- Outlining
- Graphic Organizers

- Number Sequences
- Calculation
- Deciphering Codes
- Abstract Symbols and Formulas
- Problem Solving
- Pattern Games

ASSESSMENT INSTRUMENTS

All of the “Tools” and:

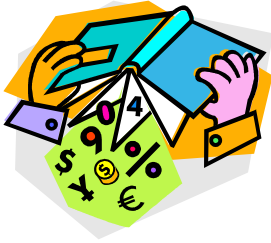
- Logical Analysis
- Critiques
- Mental Model Building
- Logic Exercises
- Case Studies
- Calculation Processes

CAREER POSSIBILITIES

- Scientists
- Mathematicians
- Accountants
- Engineers
- Computer Programmers
- Doctors

FURTHER READING

Lazear, David. Seven Ways of Knowing: Understanding Multiple Intelligences, 1991.



Logical-Mathematical Capacities Developmental Journey

Basic Skill Level	Complex Skill Level	Coherence Level
<p><i>(involves development of simple concrete object manipulation skills, concrete pattern recognition, and the ability to perform simple abstract thinking)</i></p>	<p><i>(involves learning a variety of problem-solving processes, effective thinking patterns, and standard mathematical calculation skills and operations)</i></p>	<p><i>(involves development of advanced mathematical process skills and operations, as well as integrated, application-oriented thinking, including the transfer of learning)</i></p>
<ul style="list-style-type: none"> • Capacity to perform concrete object manipulations based on specific criteria • Ability to count and perform basic sequencing tasks (for example, putting things in an order) • Recognition of numbers and being able to relate number symbols to concrete objects • Competence to engage in simple abstraction involving concrete objects • Recognition of simple, concrete cause-and-effect relationships 	<ul style="list-style-type: none"> • ability to perform a range of standard mathematical operations and calculations • grasp of a variety of problem-solving skills and possible approaches • development of a variety of thinking patterns and knowing how to use them • ability to engage in abstract thinking based on conceptual information • understanding of various mathematical processes and logic patterns 	<ul style="list-style-type: none"> • competence in linking various mathematical operations for complex problem solving • knowledge of how to find unknown quantities in a problem-solving situation • understanding and utilizing a variety of metacognitive processes and behaviors • performance of logical thinking and standard math proofs • ability to engage in both inductive and deductive reasoning processes