

# TEACHER SECTION

## AUDIENCE:

- Years 4–7
- All Ability Levels
- Whole Group
- Small Group
- Individual Student

## FOR...

- Instruction
- Enrichment
- Extension
- Differentiation

## GOALS / OBJECTIVES:

- to explore logic
- to understand logical processes
- to encourage analytical thinking
- to integrate logic with problem solving
- to provide opportunities for higher level thinking
- to facilitate thinking play
- to make connections between the above and real-life/real-world situations

# INTRODUCTION

Written for students in years 4–7, this book is designed so that kids can learn about logic and how and when to apply logic strategies to a variety of problem-solving activities in both the paper-and-pencil world and the real world. The goal is to ignite an interest in and fascination about logic for students so they may use the skills in everyday situations!

Why should a teacher and their students spend time studying and practising logic? The transfer/application of the thinking skills being taught is far reaching. The use of logic can be applied effectively when thinking about ideas and concepts within the array of information presented within, between and among the various curricula students encounter at any level of their school experience. Additionally, logical and critical thinking are both applicable to the social issues encountered by students in their lives each day. Logic can provide students with a valuable skill they can use to bring about the successful resolution to a conflict.

## What is logic?

Logic is a systematic process for understanding and then solving problems. Logic has been called a science, an art, a set of principles and even a philosophy. It is a way of thinking that people use to understand the relationship between pieces of information in order to answer questions, find solutions, describe situations, and make decisions effectively and efficiently. The logic process uses information that is obvious or given as well as information that is only implied or inferred. A third type of information is not given or implied; it is information that, based on the given and implied, is logically determined by the problem solver through synthesis. Using the combination of given, implied and synthesised information to arrive at a solution to a problem is logic.

# TERMS

Each of the kinds of logic problems in the APPLICATION section of the book will be presented within three categories: Patterns, Analogies and Word Problems. The purpose of this limitation is to enable the student to more readily understand each kind of logic by isolating it through specific activities. This will create the opportunity for comparing as well as overlapping the various types of logic problem-solving processes. These skills can then be applied to real-life, real-world situations by using the activities given and the student-created problems in the EXTENSION section of the book.

In order for students to understand the variety of logical thinking possible, an explanation of the terms is provided.

## Types of Logic Reasoning and Thinking

**Classic Reasoning** comprises the basic constructs for all other applications of logical thinking and includes both deductive and inductive reasoning.

- **Deductive Reasoning** is reasoning that goes from the general to the specific (e.g. cause to effect).  
**Example:** Gravity makes things fall. The apple hit my head because of gravity.
- **Inductive Reasoning** is reasoning that goes from particular facts to a general conclusion.  
**Example:** The crows that I have seen have been black. Therefore, all crows are black.

**Convergent thinking** brings information together in order to solve a problem; it is one of two basic kinds of thinking that are used for all other applications of logical processing

**Example:** How could the invasion of East Timor by Indonesia be a modern example of the idea of empire in action?

**Divergent thinking** moves away in diverging directions so as to involve a variety of aspects; it sometimes leads to novel ideas and solutions and is associated with creativity; it is one of two basic kinds of thinking used for all other applications of logical processing.

**Example:** List all the non-shoe uses you can think of for a shoe.

# FORMAT

The book is divided into two main parts: the Teacher Section and the Student Section. However, the teacher may choose to duplicate some of the pages and distribute them to the students. Answers are provided at the end of the book.

## Part 1: TEACHER SECTION

### WHAT IS LOGIC?

- Introduction
- Logical Thinking and Reasoning Terms
- The Logic Matrix
- Format

### HOW DOES IT WORK?

- Differentiation
- Multiple Intelligences
- Creative Problem Solving (CPS)
- Bloom
- The Logic Connection: CPS/Bloom/Logic
- The Logic Spiral
- How To Use This Book
- Simulation to Be Done with Students

## Part 2: STUDENT SECTION

### INTRODUCTION

**APPLICATION**—The same format is followed for each type of logic problem: Numerical/ Verbal/Visual-Spatial Logic

1. Introduction
2. Sample
3. Simple to Complex Activities
4. Create Your Own

### EXTENSION

- Applications/Introduction
- Practical Uses
  - Making Decisions
  - Making Things Better
  - Arguing Points
  - Finding Truths
  - Logic and Multiple Intelligences

## ANSWERS AND SAMPLE GRIDS

## RESOURCES

5. A. Yesterday was today.  
 B. Today was yesterday.  
 C. Therefore, tomorrow is yesterday.
- A. Valid  
 B. Invalid

Explain Your Reasoning: \_\_\_\_\_

Re-write the statements so that the logical conclusion is valid!

- A. \_\_\_\_\_  
 B. \_\_\_\_\_  
 C. \_\_\_\_\_

6. A. Sally had cake on her birthday.  
 B. Sally got sick on her birthday.  
 C. Therefore, birthday cake makes you sick.
- A. Valid  
 B. Invalid

Explain Your Reasoning: \_\_\_\_\_

Re-write the statements so that the logical conclusion is valid!

- A. \_\_\_\_\_  
 B. \_\_\_\_\_  
 C. \_\_\_\_\_