

# DIVISION III (GRADES 4-5)

## Mathematics Pentathlon® Games & Essential Resources

### **JUGGLE™**

In this game players “juggle” polyominoes in order to be the first to complete their 9 x 9 grid-like gameboards. The roll of two dice determines which pieces are selected from five different types of polyominoes, including pentominoes and tetrominoes. In the process of playing the game students develop a deeper understanding of mathematical relationships involving area, perimeter, and transformational geometry (flips/reflections, turns/rotations, and slides/translations). Spatial and logical reasoning skills are enhanced as students try to balance probability and chance, as well as numerical and structural relationships.

### **CONTIG 60™**

The four basic operations (addition, subtraction, multiplication, and division), probability, and algebraic thinking are integrated in this strategy-chance game. Numerical values are arranged in a particular pattern on the gameboard. For each play students form number sentences based on the roll of 3 regular dice and place chips on corresponding numbered spaces. Arranging 5 chips along contiguous horizontal, vertical, or diagonal lines relates to one goal of the game. A second goal pertains to scoring and connected chip placement. By playing this game students practice basic skills in a highly motivational format that also enhances their problem-solving and computational reasoning abilities.

### **STARS & BARS™**

This multiple classification-logic game uses geometric attribute cards and a grid-type board to help students develop understanding of multi-variable relationships and algebraic principles. For each play students try to maximize their scores by placing cards onto the gameboard and comparing them to adjacent cards that are one, two, three, or four-ways different. The horizontal, vertical, and diagonal placement of the cards onto the gameboard contributes to the development of logical, computational, and spatial thought.

### **FAB-A-DIFFY™**

Fraction bars that pictorially represent various fraction values are used in this computational reasoning game. In playing this game students attempt to make arithmetic combinations on the specially designed gameboard. Conceptual understanding of equivalence and addition and subtraction of fractions as well as algebraic principles are developed while students connect symbolic procedures with visual models.

### **QUEEN'S & GUARDS™**

This spatial reasoning game combines the simplicity of rules found in Checkers with the complexity of strategy experienced in Chess. A gameboard of tessellated hexagons that form concentric bands and pawns (queens) and chips (guards) are used to simulate the agonistic pattern of bees in a beehive. By learning how to construct a variety of triangular and other structural arrangements on the gameboard, students develop spatial thinking as well as many other logical reasoning skills, including deductive and inductive thought.

**The Guide for Teaching & Sequencing the Mathematics Pentathlon® Program for Division III (Grades 4-5):** This step-by-step Program Guide of Math Pentathlon lessons provides effective and detailed guidance to adults who are teaching the Math Pentathlon Program at their school. The Guide is organized into monthly lesson plans with 4 lessons per month for weekly implementation.

**Adventures in Problem Solving Activity Book II (Grades 4-7):** This publication connects the games with ongoing classroom and club instruction. Prerequisite skills for playing the games as well as many other problem-solving activities are described in a user-friendly format.

**Investigation Exercises Book II (Grades 4-7):** These problem-solving worksheets develop a more analytic focus and greater insight into the multiple strategies of each game.

# MATH CONTENT & STANDARDS: MATHEMATICS PENTATHLON® PROGRAM

## (The Games, Adventures in Problem Solving, and Investigations Exercises)



Developed in Games and Adventures/ Investigations only



Developed in Adventures and/or Investigations only

		COMPUTATIONAL REASONING													LOGICAL/SCIENTIFIC REASONING						SPATIAL/GEOMETRIC REASONING																					
		Counting	Number Sense	Algebra	Number/Numeral Recognition	One-to-One Correspondence	Equality	Inequality	Addition	Subtraction	Multiplication	Division	Fractions	Decimals	Measurement	Prime & Composite or Odd & Even Numbers	Exponentiation	Factorials	Probability	Observation	Classification	Communication	Patterning	Hypothesizing & Experimentation	Deductive Reasoning	Inductive Reasoning	Number Theory	Combinatorics	Geometric Figures & Regions	Directionality	Topology	Networks	Structural Analysis of Space	Symmetry & Reflections	Congruence	Similarity	Area	Transformational Geometry				
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