

# **Indiana Academic Standard & Mathematics Pentathlon**

## **Kindergarten Alignment of Mathematics Pentathlon with the Indiana Academic Standards**

### **Standard 1**

#### **Number Sense**

K.1.1 Match sets of objects one-to-one.

Kings & Quadruphages game

Adventures in Problem Solving Book I – pp. 131-134

Investigation Exercises Book I – pp. 3-13

Star Track game

Adventures in Problem Solving Book I - p. 70

Calla game

Investigation Exercises Book I – pp. 15-17

Shape Up game

Adventures in Problem Solving Book I – pp. 14-19, 27-29

Investigation Exercises Book I – pp. 3-4

K.1.2 Compare sets of up to ten objects and identify whether one set is equal to, more than, or less than another.

Kings & Quadruphages game

Adventures in Problem Solving Book I – pp. 131-134

Investigation Exercises Book I – pp. 3-13

Star Track game

Adventures in Problem Solving Book I – pp. 66-69

Investigation Exercises Book I – pp. 9-17

K.1.3 Know that larger numbers describe sets with more objects in them than sets described by smaller numbers.

Kings & Quadruphages game

Adventures in Problem Solving Book I – pp. 131-134

Investigation Exercises Book I – pp. 3-13

Star Track game

Adventures in Problem Solving Book I – pp. 66-69

Investigation Exercises Book I – pp. 9-17

## Number Sense (continued)

K.1.4 Divide sets of ten or fewer objects into equal groups.

Adventures in Problem Solving Book I – pp. 189-193

K.1.5 Divide shapes into equal parts.

Hex-A-Gone game

Adventures in Problem Solving Book I – pp. 189-193

K.1.6 Count, recognize, represent, name, and order a number of objects (up to 10).

Calla game

Investigation Exercises Book I – pp. 5-6, 11, 14-19

Star Track game

Adventures in Problem Solving Book I – pp. 59-63, 70-72

Investigation Exercises Book I – pp. 9-17

Shape Up game

Kings & Quadruphages game

K.1.7 Find the number that is one more than or one less than any whole number up to 10.

Calla game

Star Track game

Shape Up game

K.1.8 Use correctly the words *one/many*, *none/some/all*, *more/less*, and *most/least*.

Kings & Quadruphages game

Adventures in Problem Solving Book I – pp. 131-134

Investigation Exercises Book I – pp. 3-13

Star Track game

Adventures in Problem Solving Book I – pp. 66-69

Investigation Exercises Book I – pp. 9-17

**Note:** These lessons stress *more/less*.

K.1.9 Record and organize information using objects and pictures.

Hex-A-Gone

Calla

Kings & Quadruphages

Star Track

Shape-Up all use objects to model concepts/problems.

Shape Up also uses pictures.

Adventures in Problem Solving Book I and Investigation Exercises Book I use a combination of objects, pictures, and symbols.

## Standard 2

### Computation

K.2.1 Model addition by joining sets of objects (for any two sets with fewer than 10 objects when joined).

Star Track game  
Adventures in Problem Solving Book I – pp. 73  
Investigation Exercises Book I – pp. 3-17  
Shape Up game  
Adventures in Problem Solving Book I – pp. 30-36  
Investigation Exercises Book I – pp. 5-15  
Calla game

K.2.2 Model subtraction by removing objects from sets (for numbers less than 10).

Star Track game  
Adventures in Problem Solving Book I – pp. 64-65  
Investigation Exercises Book I – pp. 3-17  
Shape Up game  
Investigation Exercises Book I – pp. 5-15

K.2.3 Describe addition and subtraction situations (for numbers less than 10).

Star Track game  
Adventures in Problem Solving Book I – pp. 64-65, 73  
Investigation Exercises Book I – pp. 3-17  
Shape Up game  
Adventures in Problem Solving Book I – pp. 30-36  
Investigation Exercises Book I – pp. 5-15  
Calla game

## Standard 3

### Algebra and Functions

K.3.1 Identify, sort, and classify objects by size, number, and other attributes. Identify objects that do not belong to a particular group.

Shape Up game  
Adventures in Problem Solving Book I – pp. 11-29  
Investigation Exercises Book I – pp. 3-4  
Hex-A-Gone game  
Adventures in Problem Solving Book I – pp. 163-164

## **Standard 4**

### **Geometry**

K.4.1 Identify and describe common geometric objects: circle, triangle, square, rectangle, and cube.

Shape Up game

Adventures in Problem Solving Book I – pp. 11-29

Investigation Exercises Book I – pp. 3-4

Hex-A-Gone game

Adventures in Problem Solving Book I – pp 163-164

K.4.2 Compare and sort common objects by position, shape, size, roundness, and number of corners.

Shape Up game

Adventures in Problem Solving Book I – pp. 11-29

Investigation Exercises Book I – pp. 3-4

Hex-A-Gone game

Adventures in Problem Solving Book I – pp 163-164

## **Standard 5**

### **Measurement**

K.5.1 Make direct comparisons of the length, capacity, weight, and temperature of objects and recognize which object is shorter, longer, taller, lighter, heavier, warmer, cooler or holds more.

Star Track game

Adventures in Problem Solving Book I – p. 74

Hex-A-Gone game

Investigation Exercises Book I – pp. 5-8

## Standard 6

### Problem Solving

K.6.1 Choose the approach, materials, and strategies to use in solving problems.

All Division I games (Shape Up, Kings & Quadraphages, Calla, Hex-A-Gone, and Star Track)

Adventures in Problem Solving Book I - all pages that relate to each of the Division I games

Investigation Exercises Book I – all pages that relate to each of the Division I games

**Note:** See Note below this standard.

K.6.2 Use tools such as objects or drawings to model problems.

All Division I games (Shape Up, Kings & Quadraphages, Calla, Hex-A-Gone, and Star Track)

Adventures in Problem Solving Book I - all pages that relate to each of the Division I games

Investigation Exercises Book I – all pages that relate to each of the Division I games

**Note:** See Note below this standard.

K.6.3 Explain the reasoning used with concrete objects and pictures.

All Division I games (Shape Up, Kings & Quadraphages, Calla, Hex-A-Gone, and Star Track)

Adventures in Problem Solving Book I - all pages that relate to each of the Division I games

Investigation Exercises Book I – all pages that relate to each of the Division I games

**Note:** See Note below this standard.

K.6.4 Make precise calculations and check the validity of the results in the context of the problem.

All Division I games (Shape Up, Kings & Quadraphages, Calla, Hex-A-Gone, and Star Track)

Adventures in Problem Solving Book I - all pages that relate to each of the Division I games

Investigation Exercises Book I – all pages that relate to each of the Division I games

**Note:** See Note below this standard.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

# Indiana Academic Standard & Mathematics Pentathlon

## GRADE 1 Alignment of Mathematics Pentathlon with the Indiana Academic Standards

### Standard 1

#### Number Sense

1.1.1 Count, read, and write whole numbers up to 100.

Calla game

Adventures in Problem Solving Book I - pp. 97-103

1.1.2 Count and group objects in ones and tens.

Calla game

Adventures in Problem Solving Book I - pp. 97-103

1.1.3 Identify the number of tens and ones in numbers less than 100.

Calla game

Adventures in Problem Solving Book I - pp. 97-103

**Note:** Connect with hundred chart at C-S, P-S, and S modes.

1.1.4 Name the number that is one more than or one less than any number up to 100.

Calla game

Adventures in Problem Solving Book I - pp. 97-103

1.1.5 Compare whole numbers up to 10 and arrange them in numerical order.

Calla game

Adventures in Problem Solving Book I - pp. 60-62

**Note:** For this indicator stress numerical order.

1.1.7 Recognize when a shape is divided into congruent (matching) parts.

Hex-A-Gone game

Adventures in Problem Solving Book I - pp. 189-193

1.1.8 For a shape divided into 8 or fewer congruent (matching) parts, describe a shaded portion as “\_\_ out of \_\_ parts” and write the fraction.

Hex-A-Gone game

Adventures in Problem Solving Book I - pp. 194-199

## Number Sense (continued)

1.1.9 For a set of 8 or fewer objects, describe a subset as “\_\_ out of \_\_ parts” and write the fraction.

Hex-A-Gone game

Adventures in Problem Solving Book I - pp. 194-199

### Standard 2

## Computation

1.2.1 Show the meaning of addition (putting together, increasing) using objects.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 73;

Investigation Exercises Book I - pp. 3-17;

Calla game;

Adventures in Problem Solving Book I - pp. 103-115;

Investigation Exercises Book I - pp. 20-27

1.2.2 Show the meaning of subtraction (taking away, comparing, finding the difference) using objects.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 64-69, 73;

Investigation Exercises Book I - pp. 3-17

1.2.3 Show equivalent forms of the same number (up to 20) using objects, diagrams, and numbers.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36

1.2.5 Understand the meaning of the symbols +, -, and =.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 64-69, 73;

Investigation Exercises Book I - pp. 3-17

## **Computation (continued)**

1.2.6 Understand the role of zero in addition and subtraction.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 64-69, 73;

Investigation Exercises Book I - pp. 3-17

1.2.7 Understand and use the inverse relationship between addition and subtraction facts (such as  $4 + 2 = 6$ ,  $6 - 2 = 4$ , etc.) to solve simple problems.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 64-69, 73;

Investigation Exercises Book I - pp. 3-17

### **Standard 3**

## **Algebra and Functions**

1.3.4 Create and extend number patterns using addition.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game;

Adventures in Problem Solving Book I - pp. 64-69, 73;

Investigation Exercises Book I - pp. 3-17

### **Standard 4**

## **Geometry**

1.4.1 Identify, describe, compare, sort, and draw triangles, rectangles, squares, and circles.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 11-29;

Investigation Exercises Book I - pp. 3-4;

Hex-A-Gone! game;

Adventures in Problem Solving Book I - pp. 163-164

## Standard 5

### Measurement

1.5.1 Measure the length of objects by repeating a non-standard unit or a standard unit.

Star Track game;

Adventures in Problem Solving Book I - p. 74

1.5.2 Use different units to measure the length of the same object and predict whether the measure will be greater or smaller when a different unit is used.

Investigation Exercises Book I - pp. 5-8

## Standard 6

### Problem Solving

1.6.1 Choose the approach, materials, and strategies to use in solving problems.

Shape-Up game;

Adventures in Problem Solving Book I - pp. 30-36;

Investigation Exercises Book I - pp. 5-15;

Star Track game; A

Adventures in Problem Solving Book I - pp. 73

1.6.2 Use tools such as objects or drawings to model problems.

The games of Hex-A-Gone, Calla, Kings & Quadruphages, Star Track, and Shape-Up all use objects as tools to model problems.

Shape-Up also uses pictures.

Adventures in Problem Solving Book I and Investigation Exercises Book I use a combination of objects, pictures, and symbols.

**NOTE:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

# Indiana Academic Standard & Mathematics Pentathlon

## GRADE 2 Alignment of Mathematics Pentathlon with the Indiana Academic Standards

### Standard 1

#### Number Sense

2.1.1 Count by ones, twos, fives, and tens to 100.

Adventures in Problem Solving Book I – pp. 97-103

**Note:** Stress counting by tens, then twos and fives in Standard Configuration.

2.1.2 Identify the pattern of numbers in each group of ten, from tens through nineties.

Adventures in Problem Solving Book I – pp. 97-103

2.1.3 Identify numbers up to 100 in various combinations of tens and ones.

Adventures in Problem Solving Book I – pp. 97-103

2.1.4 Name the number that is ten more or ten less than any number 10 through 90

Adventures in Problem Solving Book I – pp. 97-103

2.1.5 Compare whole numbers up to 100 and arrange them in numerical order.

Adventures in Problem Solving Book I – pp. 97-103

2.1.6 Match the number names (*first, second, third, etc.*) with an ordered set of up to 100 items.

Adventures in Problem Solving Book I – pp. 97-103

**Note:** When teaching place value using Standard Configuration, place different values in a linear manner and ask students to identify which first, second, third, and so on. Also, place nonconsecutive values in a row and ask them to identify which values would come first, second, etc...

2.1.7 Identify odd and even numbers up to 100.

Adventures in Problem Solving Book I – pp. 97-103

## Number Sense (continued)

2.1.8 Recognize fractions as parts of a whole or parts of a group (up to 12 parts).  
Adventures in Problem Solving Book I – pp. 189-199

2.1.9 Recognize, name, and compare the unit fractions:  $\frac{1}{2}$ ,  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{1}{5}$ ,  $\frac{1}{6}$ ,  $\frac{1}{8}$ ,  $\frac{1}{10}$ , and  $\frac{1}{12}$ .

Use pattern block model with two hexagons as a whole – model  $\frac{1}{2}$ ,  $\frac{1}{4}$ ,  $\frac{1}{6}$  and  $\frac{1}{12}$ . Ask students to explain if  $\frac{1}{2}$  or  $\frac{1}{12}$  is larger. What about  $\frac{1}{4}$  and  $\frac{1}{6}$ , etc...

2.1.10 Know that, when all fractional parts are included, the result is equal to the whole and to one.

Adventures in Problem Solving Book I - pp. 189-199

## Standard 2

### Computation

2.2.1 Model addition of numbers less than 100 with objects and pictures.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp.75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

2.2.2 Add two whole numbers less than 100 with and without regrouping.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

## Computation (continued)

2.2.3 Subtract two whole numbers less than 100 without regrouping.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12

2.2.4 Understand and use the inverse relationship between addition and subtraction.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12

2.2.5 Use estimation to decide whether answers are reasonable in addition problems.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

2.2.6 Use mental arithmetic to add or subtract 0, 1, 2, 3, 4, 5, or 10 with numbers less than 100.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

### **Standard 3**

## **Algebra and Functions**

2.3.1 Relate problem situations to number sentences involving addition and subtraction.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17

2.3.2 Use the commutative and associative rules for addition to simplify mental calculations and to check results.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18;  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

### **Standard 4**

## **Geometry**

2.4.1 Construct squares, rectangles, triangles, cubes, and rectangular prisms with appropriate materials.

Par 55 game;  
Adventures in Problem Solving Book I – 11-29

2.4.2 Describe, classify, and sort plane and solid geometric shapes (triangle, square, rectangle, cube, rectangular prism) according to the number and shape of faces, and the number of edges and vertices.

Par 55 game;  
Adventures in Problem Solving Book I – 11-29

2.4.3 Investigate and predict the result of putting together and taking apart two- and three-dimensional shapes.

Adventures in Problem Solving Book I – pp. 164-165, 178, 181-185;  
Hex-A-Gone Chapter of Investigation Exercises Book I – pp. 3-4

## **Geometry (continued)**

2.4.4 Identify congruent two-dimensional shapes in any position.

Par 55 game;

Adventures in Problem Solving Book I – 11-29

2.4.5 Recognize geometric shapes and structures in the environment and specify their locations.

Par 55 game;

Adventures in Problem Solving Book I – 11-29

### **Standard 5**

## **Measurement**

2.5.4 Estimate area and use a given object to measure the area of other objects.

Hex-A-Gone game;

Investigation Exercises Book I – pp. 5-8

### **Standard 6**

## **Problem Solving**

2.6.1 Choose the approach, materials, and strategies to use in solving problems.

### **Support from**

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko);

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games

2.6.2 Use tools such as objects or drawings to model problems.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko);

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games

## Problem Solving (continued)

2.6.3 Explain the reasoning used and justify the procedures selected in solving a problem.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games

2.6.4 Make precise calculations and check the validity of the results in the context of the problem.

**All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;**

**Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;**

**Investigation Exercises Book I – all pages that relate to each of the Division II games**

2.6.5 Understand and use connections between two problems.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

# **Indiana Academic Standard & Mathematics Pentathlon**

## **GRADE 3 Alignment of Mathematics Pentathlon with the Indiana Academic Standards**

### **Standard 1**

#### **Number Sense**

- 3.1.1 Count, read, and write whole numbers up to 1,000.  
Adventures in Problem Solving Book I – pp. 97-103
- 3.1.2 Identify and interpret place value in whole numbers up to 1,000.  
Adventures in Problem Solving Book I – pp. 97-103
- 3.1.3 Use words, models, and expanded form to represent numbers up to 1,000.  
Adventures in Problem Solving Book I – pp. 97-103
- 3.1.5 Compare whole numbers up to 1,000 and arrange them in numerical order.  
Adventures in Problem Solving Book I – pp. 97-103
- 3.1.7 Identify odd and even numbers up to 1,000 and describe their characteristics.  
Adventures in Problem Solving Book I – pp. 97-103
- 3.1.8 Show equivalent fractions using equal parts.  
Adventures in Problem Solving Book I – pp. 189-202;  
Adventures in Problem Solving Book II – pp. 164-171,  
Investigation Exercises Book II – pp. 3-9
- 3.1.9 Identify and use correct names for numerators and denominators.  
Adventures in Problem Solving Book I – pp. 189-199;  
Adventures in Problem Solving Book II – pp. 159-168
- 3.1.10 Given a pair of fractions, decide which is larger or smaller by using objects or pictures.  
Adventures in Problem Solving Book I – pp. 189-202;  
Adventures in Problem Solving Book II – pp. 159-171

## Standard 2

### Computation

3.2.1 Add and subtract whole numbers up to 1,000 with or without regrouping, using relevant properties of the number system.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18,  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

3.2.2 Represent the concept of multiplication as repeated addition.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

3.2.3 Represent the concept of division as repeated subtraction, equal sharing, and forming equal groups.

Adventures in Problem Solving Book II – pp. 115-118

3.2.4 Know and use the inverse relationship between multiplication and division facts, such as  $6 \times 7 = 42$ ,  $42 \div 7 = 6$ ,  $7 \times 6 = 42$ ,  $42 \div 6 = 7$ .

Adventures in Problem Solving Book II – pp. 115-118

3.2.5 Show mastery of multiplication facts for 2, 5, and 10.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

3.2.7 Use estimation to decide whether answers are reasonable in addition and subtraction problems.

Sum Dominoes and Dice game;  
Adventures in Problem Solving Book I – pp. 75-95;  
Investigation Exercises Book I – pp. 5-18,  
Ramrod game;  
Adventures in Problem Solving Book I – pp. 141-157;  
Investigation Exercises Book I – pp. 3-17;  
Kwatro-Sinko game;  
Adventures in Problem Solving Book I – pp. 213-222;  
Investigation Exercises Book I – pp. 3-12;  
Par 55 game;  
Investigation Exercises Book I – pp. 20-33

## Computation (continued)

3.2.8 Use mental arithmetic to add or subtract with numbers less than 100.

Sum Dominoes and Dice game;

Adventures in Problem Solving Book I – pp. 75-95;

Investigation Exercises Book I – pp. 5-18,

Ramrod game;

Adventures in Problem Solving Book I – pp. 141-157;

Investigation Exercises Book I – pp. 3-17;

Kwatro-Sinko game;

Adventures in Problem Solving Book I – pp. 213-222;

Investigation Exercises Book I – pp. 3-12;

Par 55 game;

Investigation Exercises Book I – pp. 20-33

### Standard 3

## Algebra and Functions

3.3.4 Understand and use the commutative and associative rules of multiplication.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

3.3.5 Create, describe, and extend number patterns using multiplication.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

3.3.6 Solve simple problems involving a functional relationship between two quantities.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

### Standard 4

## Geometry

3.4.1 Identify quadrilaterals as four-sided shapes.

Par 55 game;

Adventures in Problem Solving Book I – pp. 11-29

**Note:** Stress the term quadrilateral while doing these activities.

3.4.5 Draw a shape that is congruent to another shape.

Par 55 game;

Adventures in Problem Solving Book I – pp. 11-29

**Note:** In Par 55 and Shape Up have students identify shapes that are congruent. Also have them draw the related congruent shapes.

3.4.6 Use the terms *point*, *line*, and *line segment* in describing two-dimensional shapes.

## Geometry (continued)

3.4.10 Recognize geometric shapes and their properties in the environment and specify their locations.

Par 55 game;

Adventures in Problem Solving Book I – pp. 11-29

### Standard 5

## Measurement

3.5.3 Find the perimeter of a polygon.

### Support from

Adventures in Problem Solving Book II – pp. 39-41, 53-54, and 56

3.5.4 Estimate or find the area of shapes by covering them with squares.

Adventures in Problem Solving Book II – pp. 39-46, and 55-56

### Standard 6

## Problem Solving

3.6.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko);

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

3.6.2 Decide when and how to break a problem into simpler parts.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko);

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, Adventures in Problem Solving Book I and Investigation Exercises Book I provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

## Problem Solving (continued)

3.6.3 Apply strategies and results from simpler problems to solve more complex problems.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, Adventures in Problem Solving Book I and Investigation Exercises Book I provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

3.6.4 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.

**All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;**

**Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;**

**Investigation Exercises Book I – all pages that relate to each of the Division II games.**

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

3.6.5 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

## Problem Solving (continued)

3.6.6 Know and use strategies for estimating results of whole-number addition and subtraction.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

3.6.7 Make precise calculations and check the validity of the results in the context of the problem.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

3.6.8 Decide whether a solution is reasonable in the context of the original situation.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

3.6.9 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.

All Division II games (Par 55, Ramrod, Sum Dominoes & Dice, FIAR, and Kwatro-Sinko;

Adventures in Problem Solving Book I – all pages that relate to each of the Division II games;

## **Problem Solving (continued)**

Investigation Exercises Book I – all pages that relate to each of the Division II games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

# Indiana Academic Standard & Mathematics Pentathlon

## GRADE 4 Alignment of Mathematics Pentathlon with the Indiana Academic Standards

### Standard 1

#### Number Sense

4.1.5 Rename and rewrite whole numbers as fractions.

FAB-A-DIFFY game;

Adventures in Problem Solving Book I – pp. 189-199;

Adventures in Problem Solving Book II – pp. 159-171

**Note:** Stress forming various whole cakes and describing them (orally and with symbols) as fractions in different ways. For example, ask students to build 3 whole hexagonal cakes using 2 hexagons to represent each whole. This problem would represent  $2/2 + 2/2 + 2/2$  or  $6/2$ . The same result could be shown using 3 hexagons to represent each whole ( $3/3 + 3/3 + 3/3 = 9/3$ ). This same concept could be represented using duplicates of whole fraction bars, e.g.  $4/4 + 4/4 = 8/4$  or  $6/6 + 6/6 = 12/6$ .

4.1.6 Name and write mixed numbers, using objects or pictures.

FAB-A-DIFFY game;

Adventures in Problem Solving Book I – pp. 189-199;

Adventures in Problem Solving Book II – pp. 159-171

**Note:** Stress combining 2 like (equivalent) fractions greater than 1 whole using pattern blocks and converting to a mixed number. For example, ask students to build 2 whole and  $1/2$  hexagonal cakes using 2 hexagons to represent each whole. This problem would represent  $2 \frac{1}{2}$ . This same concept could be represented using fraction bars, e.g. 3 whole bars and the  $4/6$  bar would equal  $3 \frac{2}{3}$ .

4.1.7 Name and write mixed numbers as improper fractions, using objects or pictures.

FAB-A-DIFFY game;

Adventures in Problem Solving Book I – pp. 189-199;

Adventures in Problem Solving Book II – pp. 159-171

**Note:** Stress combining 2 like (equivalent) fractions greater than 1 whole using pattern blocks and converting to an improper fraction. For

## Number Sense (continued)

example, ask students to build 2 whole and  $\frac{1}{2}$  hexagonal cakes using 2 hexagons to represent each whole. This problem would represent  $\frac{5}{2}$ . This same concept could be represented using fraction bars, e.g. 3 whole bars and the  $\frac{4}{6}$  bar would equal  $1\frac{1}{3}$ .

### Standard 2

## Computation

4.2.1 Understand and use standard algorithms for addition and subtraction.

Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-127 and 130-132;  
Stars & Bars game

4.2.2 Represent as multiplication any situation involving repeated addition.

Adventures in Problem Solving Book II – pp. 40-44 and pp. 115-118

4.2.3 Represent as division any situation involving the sharing of objects or the number of groups of shared objects.

Adventures in Problem Solving Book II – pp. 115-118

4.2.4 Demonstrate mastery of the multiplication tables for numbers between 1 and 10 and of the corresponding division facts.

Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-136;  
Investigation Exercises Book II – pp. 3-15;  
Juggle game;  
Adventures in Problem Solving Book II – pp. 40-44;  
Investigation Exercises Book II – pp. 6-11

4.2.5 Use a standard algorithm to multiply numbers up to 100 by numbers up to 10, using relevant properties of the number system.

Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-136;  
Investigation Exercises Book II – pp. 3-15

4.2.6 Use a standard algorithm to divide numbers up to 100 by numbers up to 10 without remainders, using relevant properties of the number system.

Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-136;  
Investigation Exercises Book II – pp. 3-15

## Computation (continued)

4.2.7 Understand the special properties of 0 and 1 in multiplication and division.

Contig 60 game;

Adventures in Problem Solving Book II – pp. 115-136;

Investigation Exercises Book II – pp. 3-15;

Juggle game;

Adventures in Problem Solving Book II – pp. 40-44;

Investigation Exercises Book II – pp. 6-11

4.2.8 Add and subtract simple fractions with different denominators, using objects or pictures.

FAB-A-DIFFY game;

Adventures in Problem Solving Book II – pp. 159-180;

Investigation Exercises Book II – pp. 3-12 (FAB Chapter) and pp. 3-9 (Frac Fact Chapter)

4.2.11 Know and use strategies for estimating results of any whole-number computations.

Contig 60 game;

Adventures in Problem Solving Book II – pp. 115-135;

Investigation Exercises Book II – pp. 3-15

### Standard 3

## Algebra and Functions

4.3.1 Use letters, boxes, or other symbols to represent any number in simple expressions, equations, or inequalities (i.e., demonstrate an understanding of and the use of the concept of a variable).

Adventures in Problem Solving Book II – pp. 53, 57-59, 124-125, 132-135

4.3.2 Use and interpret formulas to answer questions about quantities and their relationships.

Juggle game; Adventures in Problem Solving Book II – pp. 39-41, 53-54, 56

4.3.3 Understand that multiplication and division are performed before addition and subtraction in expressions

Contig 60 game;

Adventures in Problem Solving Book II – pp. 132, 134-135,

Investigation Exercises Book II – pp. 3-12

4.3.7 Relate problem situations to number sentences involving multiplication and division.

Adventures in Problem Solving Book II – pp. 40-41

## Standard 4

### Geometry

4.4.1 Identify, describe, and draw rays, right angles, acute angles, obtuse angles and straight angles using appropriate mathematical tools and technology.

Adventures in Problem Solving Book II – pp. 19-26

4.4.3 Identify, describe, and draw parallelograms, rhombuses, and trapezoids, using appropriate mathematical tools and technology.

Adventures in Problem Solving Book II – pp. 215, 219-222

4.4.4 Identify congruent quadrilaterals and give reasons for congruence using sides, angles, parallels and perpendiculars.

Stars & Bars game

**Note:** Use the congruent squares and non-square rectangles of the 3 different colors of the Stars & Bars cards and stress the reasons for congruence using sides, angles, parallels and perpendiculars.

4.4.6 Construct cubes and prisms and describe their attributes.

Adventures in Problem Solving Book II – pp. 29-32

## Standard 5

### Measurement

4.5.3 Know and use formulas for finding the perimeters of rectangles and squares.

Juggle game;

Adventures in Problem Solving Book II – pp. 39-41, 53-54, 56;

Investigation Exercises Book II – pp. 3-4

4.5.4 Know and use formulas for finding the areas of rectangles and squares.

Juggle game;

Adventures in Problem Solving Book II – pp. 39-53, 55-56;

Investigation Exercises Book II – pp. 6-11

4.5.5 Estimate and calculate the area of rectangular shapes by using appropriate units, such as square centimeter (cm<sup>2</sup>), square meter (m<sup>2</sup>), square inch (in<sup>2</sup>), or square yard (yd<sup>2</sup>).

Juggle game;

Adventures in Problem Solving Book II – pp. 39-53, 55-56;

Investigation Exercises Book II – pp. 6-11

**Note:** Stress extending square centimeter measurement to square meters as well as square inches and yards.

## Measurement (continued)

4.5.6 Understand that rectangles with the same area can have different perimeters and that rectangles with the same perimeter can have different areas.

Adventures in Problem Solving Book II – pp. 39-41, 53 and 56

4.5.7 Find areas of shapes by dividing them into basic shapes such as rectangles.

Adventures in Problem Solving Book II – pp. 41-53

4.5.8 Use volume and capacity as different ways of measuring the space inside a shape.

Adventures in Problem Solving Book II – pp. 67-68

### Standard 6

## Data Analysis and Probability

4.6.2 Interpret data graphs to answer questions about a situation.

Contig 60 game;

Adventures in Problem Solving Book II – pp. 127-132, 134-135,

Investigation Exercises Book II – pp. 11-15

4.6.3 Summarize and display the results of probability experiments in a clear and organized way.

Contig 60 game;

Adventures in Problem Solving Book II – pp. 127-132, 134-135,

Investigation Exercises Book II – pp. 11-15

### Standard 7

## Problem Solving

4.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

## Problem Solving (continued)

### 4.7.2 Decide when and how to break a problem into simpler parts.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, adventures in Problem solving Book II and Investigation Exercises Book II provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

### 4.7.3 Apply strategies and results from simpler problems to solve more complex problems.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games; Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, adventures in Problem solving Book II and Investigation Exercises Book II provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

### 4.7.4 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, tools, and models to solve problems, justify arguments, and make conjectures.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

## Problem Solving (continued)

4.7.5 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

4.7.6 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

4.7.7 Know and use appropriate methods for estimating results of whole-number computations.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

## Problem Solving (continued)

4.7.8 Make precise calculations and check the validity of the results in the context of the problem.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

4.7.9 Decide whether a solution is reasonable in the context of the original situation.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

4.7.10 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

# Indiana Academic Standard & Mathematics Pentathlon

## GRADE 5 Alignment of Mathematics Pentathlon with the Indiana Academic Standards

### Standard 1

#### Number Sense

5.1.5 Explain different interpretations of fractions: as parts of a whole, parts of a set, and division of whole numbers by whole numbers.

FAB-A-DIFFY game;

Adventures in Problem Solving Book II – pp. 159-171

**Note:** Stress the division of whole fraction bars being equally divided. For example, take three whole bars and divide equally among 6 people. Take 5 whole bars and equally divide among 9 people.

5.1.6 Describe and identify prime and composite numbers.

Adventures in Problem Solving Book II – pp. 142-146

5.1.7 Identify on a number line the relative position of simple positive fractions, positive mixed numbers, and positive decimals.

FAB-A-DIFFY game;

Adventures in Problem Solving Book I – pp. 189-199;

Adventures in Problem Solving Book II – pp. 159-171

**Note 1:** Stress combining 2 like (equivalent) fractions greater than 1 whole using pattern blocks and converting to a mixed number. For example, ask students to build 2 whole and  $\frac{1}{2}$  hexagonal cakes using 2 hexagons to represent each whole. This problem would represent  $2\frac{1}{2}$ . This same concept could be represented using fraction bars, e.g. 3 whole bars and the  $\frac{4}{6}$  bar would equal  $3\frac{2}{3}$ .

**Note 2:** Connect these concepts to location on a number line.

## Standard 2

### Computation

- 5.2.1 Solve problems involving multiplication and division of any whole numbers.  
Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-136;  
Investigation Exercises Book II – pp. 3-15
- 5.2.2 Add and subtract fractions (including mixed numbers) with different denominators.  
FAB-A-DIFFY game;  
Adventures in Problem Solving Book II – pp. 159-180;  
Investigation Exercises Book II – pp. 3-12 (FAB Chapter) and pp. 3-9 (Frac Fact Chapter)  
**Note:** Stress mixed numbers.
- 5.2.3 Use models to show an understanding of multiplication and division of fractions.  
Adventures in Problem Solving Book II – pp. 180-183;  
Investigation Exercises Book II (Frac Fact Chapter) – pp. 10-17
- 5.2.4 Multiply and divide fractions to solve problems.  
Adventures in Problem Solving Book II – pp. 180-183;  
Investigation Exercises Book II (Frac Fact Chapter) – pp. 10-17  
**Note:** stress word problems.
- 5.2.6 Use estimation to decide whether answers are reasonable in addition, subtraction, multiplication, and division problems.  
Contig 60 game;  
Adventures in Problem Solving Book II – pp. 115-136;  
Investigation Exercises Book II – pp. 3-15

## Standard 3

### Algebra and Functions

- 5.3.3 Use the distributive property in numerical equations and expressions.  
Contig 60 game;  
Investigation Exercises Book II – pp. 3-12
- 5.3.4 Identify and graph ordered pairs of positive numbers.  
Adventures in Problem Solving Book II – pp. 75-79

## Standard 4

# Geometry

5.4.1 Measure, identify, and draw angles, perpendicular and parallel lines, rectangles, triangles, and circles by using appropriate tools (e.g., ruler, compass, protractor, appropriate technology, media tools).

Adventures in Problem Solving Book II – pp. 19-26

5.4.2 Identify, describe, draw, and classify triangles as equilateral, isosceles, scalene, right, acute, obtuse, and equiangular.

Adventures in Problem Solving Book II – pp. 19-26, 215, 219-222

**Note:** In addition to constructing the various types of triangles on geoboards, also have students draw with a ruler and protractor.

5.4.3 Identify congruent triangles and justify your decisions by referring to sides and angles.

Stars & Bars game

**Note:** Use the congruent triangles of the Stars & Bars cards and stress the reasons for congruence using sides, angles, parallels and perpendiculars.

5.4.4 Identify, describe, draw, and classify polygons, such as pentagons and hexagons.

Adventures in Problem Solving Book II – pp. 19-26, 53-56, 215, 219-222

5.4.6 Identify shapes that have reflectional and rotational symmetry.

Juggle 60 game;

Adventures in Problem Solving Book II – pp. 10-12, 14-28, 69-75;

Investigation Exercises Book II – pp. 3-17

5.4.7 Understand that  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$ , and  $360^\circ$  are associated with quarter, half, three-quarters, and full turns, respectively.

Juggle 60 game;

Adventures in Problem Solving Book II – pp. 10-12, 14-28, 69-75;

Investigation Exercises Book II – pp. 3-17

5.4.8 Construct prisms and pyramids using appropriate materials.

**Support from**

Adventures in Problem Solving Book II – pp. 29-32

## Standard 5

### Measurement

5.5.1 Understand and apply the formulas for the area of a triangle, parallelogram, and trapezoid.

Adventures in Problem Solving Book II – pp. 39-56, 65-66

5.5.2 Solve problems involving perimeters and areas of rectangles, triangles, parallelograms, and trapezoids, using appropriate units.

Adventures in Problem Solving Book II – pp. 39-56, 65-66

5.5.3 Use formulas for the areas of rectangles and triangles to find the area of complex shapes by dividing them into basic shapes.

Adventures in Problem Solving Book II – pp. 39-56, 65-66

5.5.4 Find the surface area and volume of rectangular solids using appropriate units.

Adventures in Problem Solving Book II – pp. 67-68

## Standard 6

### Data Analysis and Probability

5.6.2 Find the mean, median, mode, and range of a set of data and describe what each does and does not tell about the data set.

X BAR and related worksheets

5.6.3 Understand that probability can take any value between 0 and 1, events that are not going to occur have probability 0, events certain to occur have probability 1, and more likely events have a higher probability than less likely events.

X BAR and related worksheets

5.6.4 Express outcomes of experimental probability situations verbally and numerically (e.g., 3 out of 4,  $\frac{3}{4}$ ).

X BAR and related worksheets

## Standard 7

### Problem Solving

5.7.1 Analyze problems by identifying relationships, telling relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

5.7.2 Decide when and how to break a problem into simpler parts.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, adventures in Problem solving Book II and Investigation Exercises Book II provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

5.7.3 Apply strategies and results from simpler problems to solve more complex problems.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** Each of the Mathematics Pentathlon games break complex problems with a myriad of variables into simpler situations. For example, in the game of Par 55, adventures in Problem solving Book II and Investigation Exercises Book II provide a series of prerequisite activities that relate to pertinent skills for playing the nonroutine problem-solving game.

## Problem Solving (continued)

5.7.4 Express solutions clearly and logically by using the appropriate mathematical terms and notation. Support solutions with evidence in both verbal and symbolic work.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

5.7.5 Recognize the relative advantages of exact and approximate solutions to problems and give answers to a specified degree of accuracy.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

5.7.6 Know and apply appropriate methods for estimating results of rational-number computations.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

## Problem Solving (continued)

5.7.7 Make precise calculations and check the validity of the results in the context of the problem.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

5.7.8 Decide whether a solution is reasonable in the context of the original situation.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.

5.7.9 Note the method of finding the solution and show a conceptual understanding of the method by solving similar problems.

All Division III games (Contig 60, Juggle, FAB-A-DIFFY, Stars & Bars, and Queens & Guards);

Adventures in Problem Solving Book II – all pages that relate to each of the Division III games;

Investigation Exercises Book II – all pages that relate to each of the Division III games.

**Note:** All Mathematics Pentathlon games with the combined use of Adventures in Problem Solving and Investigation Exercises stress the use of a variety of strategies to solve problems as well as to explain their reasoning, justify procedures, and check the validity of results.