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 stu dents 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 repre sented 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 hexa gons to represent each whole. This problem would represent 2 1/2. This same concept could be represented using fraction bars, e.g. 3 whole bars and the 4/6 bar would equal 3 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 1/2 hexagonal cakes using 2 hexagons to represent each whole. This problem would represent 5/2. This same concept could be represented using fraction bars, e.g. 3 whole bars and the 4/6 bar would equal 11/3.

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 (cm2), square meter (m2), square inch (in2), or square yard (yd2).

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 Probablility

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 Adven tures 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 Investiga tion 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 Investiga tion 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 Adven tures 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 Adven tures 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 Adven tures 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 Adven tures 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 Adven tures 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 Adven tures 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 Adven tures 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.