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 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.
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 perpendicu lars.

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 °, 180 °, 270 °, and 360 ° 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, 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 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.

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 Investiga tion 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.

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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.

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

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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.

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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.

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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 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.

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;

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

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

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