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Indiana Department of Education

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INCC/IAS Instructional and Assessment Guidance 2013-14

The purpose of this guidance document is to assist classroom teachers in their transition to Indiana's Common Core (INCC) from the Indiana Academic Standards (IAS) and to be transparent in providing guidance regarding the 2014 ISTEP+ Assessments. This is not meant to be a simple "checklist" for teachers, but more for instructional planning to ensure that the standards are developed and assessed appropriately.

The information below contains critical information for math instruction and assessment guidance.

- INCC Standards are identified at the cluster level as either **Major**, **Supporting**, or **Additional Clusters**.
    - Major Clusters contain standards that should be the primary instructional focus. These standards take additional time to master and are important to future mathematics.
    - Supporting Clusters are designed to support and strengthen the work within the Major Clusters.
    - Additional Clusters contain standards that do not explicitly connect to the major work of the grade, but connect to content in previous and/or subsequent grades.
- **The Standards for Mathematical Practice** must be practiced daily in connection with the math content to provide opportunities for students to develop skills of sense-making, reasoning, arguing and critiquing, modeling, attending to precision, etc.
- The Indiana indicators that appear in **parentheses** after a Common Core Standard represent strong alignment between IAS and INCC; therefore, instruction of the INCC standard will include the Indiana indicator and will not need separate attention.
- The Indiana indicators that appear separately below INCC standards with the Indiana indicator text must be taught. These indicators do not align well with INCC standards, but may be assessed on ISTEP+. Therefore, it is critical that students have an opportunity to learn this material.
- The Indiana indicators that have an **asterisk mark (*)** may be assessed on the 2014 ISTEP+ Applied Skills Assessment in March and Multiple-Choice Assessment in April/May. Be sure to cover this material before March to give students an opportunity to learn the material that may be assessed on the Applied Skills Assessment.
- All of the Indiana indicators listed in this document may be assessed on the 2014 ISTEP+ Multiple-Choice Assessment in April/May. The Indiana indicators not listed in this document will not be assessed on ISTEP+, therefore, should not be taught in order to allow more time to focus on the most critical content.
- There is important information regarding **IMAST students** in Grades (5 – 7) on the grade level summary page.

Grade 5 Mathematics: INCC/IAS Instructional and Assessment Guidance 2013-14

Major Clusters | Supporting Clusters | Additional Clusters

Operations and Algebraic Thinking		***Write and interpret numerical expressions.***
	5.OA.1	Use parentheses, brackets, or braces in numerical expressions, and evaluate expressions with these symbols.
	5.OA.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. *For example, express the calculation "add 8 and 7, then multiply by 2" as 2 × (8 + 7). Recognize that 3 × (18932 + 921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.*
	***IAS 5.1.6**	Describe and identify prime and composite numbers.
	IAS 5.3.2	Write simple algebraic expressions in one or two variables and evaluate them by substitution.
		Analyze patterns and relationships.
	5.OA.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule "Add 3" and the starting number 0, and given the rule "Add 6" and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.*
	IAS 5.3.5	Find ordered pairs (positive numbers only) that fit a linear equation, graph the ordered pairs, and draw the line they determine.

Major Clusters Supporting Clusters Additional Clusters

Number and Operations in Base Ten

Understand the place value system.

5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole number exponents to denote powers of 10.

5.NBT.3 Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).

b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

5.NBT.4 Use place value understanding to round decimals to any place.

***IAS 5.1.1** Convert between numbers in words and numbers in figures, for numbers up to millions and decimals to thousandths.

***IAS 5.1.2** Round whole numbers and decimals to any place value.

***IAS 5.1.3** Arrange in numerical order and compare whole numbers or decimals to two decimal places by using the symbols for less than (<), equals (=), and greater than (>).

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

Perform operations with multi-digit whole numbers and with decimals to hundredths.

5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm.

5.NBT.6 Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

***IAS 5.2.1** Solve problems involving multiplication and division of any whole numbers.

***IAS 5.2.5** Add and subtract decimals to the thousandths place and verify the reasonableness of the results.

***IAS 5.5.7** Add and subtract with money in decimal notation.

Major Clusters | Supporting Clusters | Additional Clusters

Number and Operations - Fractions

Use equivalent fractions as a strategy to add and subtract fractions.

5.NF.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)* (*IAS 5.2.2)

5.NF.2 Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7 by observing that 3/7 < 1/2.*

***IAS 5.1.4** Interpret percents as part of a hundred. Find decimal and percent equivalents for common fractions and explain why they represent the same value.

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

5.NF.3 Interpret a fraction as division of the numerator by the denominator ($a/b = a \div b$). Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3 and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.

a. Interpret the product $(a/b) \times q$ as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations $a \times q \div b$. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)*

b. Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.

5.NF.5 Interpret multiplication as scaling (resizing) by:

a. Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication.

b. Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.

5.NF.6 Solve real world problems involving multiplication of fractions and mixed numbers, e.g., by using visual fraction models or equations to represent the problem. (*IAS 5.2.4)

Major Clusters | Supporting Clusters | Additional Clusters

Number and Operations - Fractions

5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. Note: Students able to multiply fractions in general can develop strategies to divide fractions in general, by reasoning about the relationship between multiplication and division. But division of a fraction by a fraction is not a requirement at this grade.

a. Interpret division of a unit fraction by a non-zero whole number, and compute such quotients. *For example, create a story context for (1/3) ÷ 4 and use a visual fraction model to show the quotient. Use the relationship between multiplication and division to explain that (1/3) ÷ 4 = 1/12 because (1/12) × 4 = 1/3.*

b. Interpret division of a whole number by a unit fraction, and compute such quotients. *For example, create a story context for 4 ÷ (1/5) and use a visual fraction model to show the quotient. Use the relationship between multiplication anddivision to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*

c. Solve real-world problems involving division of unit fractions by non-zero whole numbers and division of whole numbers by unit fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, how much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 1/3-cup servings are in 2 cups of raisins?*

Measurement and Data

Convert like measurement units within a given measurement system.

5.MD.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step real world problems.

***IAS 5.5.5** Understand and use the smaller and larger units for measuring weight (ounce, gram, and ton) and their relationship to pounds and kilograms.

Represent and interpret data.

5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. *For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.*

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

Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.

5.MD.3 Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

b. A solid figure which can be packed without gaps or overlaps using *n* unit cubes is said to have a volume of *n* cubic units.

5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.

5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume. (*IAS 5.5.4)

a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent three-fold whole-number products as volumes, e.g., to represent the associative property of multiplication.

b. Apply the formulas V = l × w × h and V = b × h for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.

c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

***IAS 5.5.2** Solve problems involving perimeter and area of rectangles, triangles, parallelograms, and trapezoids, using appropriate units.

Major Clusters Supporting Clusters Additional Clusters

Geometry		***Graph points on the coordinate plane to solve real-world and mathematical problems.***
	5.G.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., *x* -axis and *x* -coordinate, *y* -axis and *y* -coordinate).
	5.G.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation. (IAS 5.3.4)
	IAS 5.3.7	Use information taken from a graph or equation to answer questions about a problem situation.
		Classify two-dimensional figures into categories based on their properties.
	5.G.3	Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles.*
	5.G.4	Classify two-dimensional figures in a hierarchy based on properties.
	***IAS 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).
	***IAS 5.4.2**	Identify, describe, draw, and classify triangles as equilateral, isosceles, scalene, right, acute, obtuse, and equiangular.
	***IAS 5.4.3**	Identify congruent triangles and justify your decisions by referring to sides and angles.
	***IAS 5.4.4**	Identify, describe, draw, and classify polygons, such as pentagons and hexagons.
	***IAS 5.4.5**	Identify and draw the radius and diameter of a circle and understand the relationship between the radius and diameter.
	***IAS 5.4.6**	Identify shapes that have reflectional and rotational symmetry.
	***IAS 5.4.7**	Understand that 90°, 180°, 270°, and 360° are associated with quarter, half, three-quarters, and full turns, respectively.

Standards for Mathematical Practice

There are similarities among the Indiana Academic Problem Solving Standards and Indiana's Common Core Standards for Mathematical Practice (SMP). The SMPs should be included in daily instruction in connection with the content standards. These practices will be assessed during the Applied Skills portion of ISTEP+.

1. Make sense of problems and persever in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

Grade 5 Instruction and Assessment Summary

The Standards for Mathematical Practice (SMP)

The SMP should be taught in connection with the math content. The SMP are similar to Indiana's Problem Solving Standards which are assessed on ISTEP+. Please ensure sufficient practice with the SMP to ensure that students are prepared for ISTEP+.

1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Operations and Algebraic Thinking	Number and Operations in Base Ten	Number and Operations - Fractions	Measurement and Data	Geometry
5.OA.1	5.NBT.1	5.NF.1 (*IAS 5.2.2)	5.MD.1	5.G.1
5.OA.2	5.NBT.2	5.NF.2	5.MD.2	5.G.2 (IAS 5.3.4)
5.OA.3	5.NBT.3	5.NF.3	5.MD.3	5.G.3
	5.NBT.4	5.NF.4	5.MD.4	5.G.4
	5.NBT.5	5.NF.5	5.MD.5 (*IAS 5.5.4)	
	5.NBT.6	5.NF.6 (*IAS 5.2.4)		
	5.NBT.7	5.NF.7		
IAS not aligned to INCC (and assessed on ISTEP+)				
*IAS 5.1.6, 5.3.2, 5.3.5	*IAS (5.1.1 – 5.1.3), *5.1.7, *5.2.1, *5.2.5, *5.5.7	*IAS 5.1.4	*IAS 5.5.2, *5.5.5, 5.6.2	IAS 5.3.7, *IAS (5.4.1 – 5.4.7)

***** *Content that may be assessed on the 2014 ISTEP+ Applied Skills Assessment in March and Multiple-Choice Assessment in April/May.*

Note: All of the Indiana indicators listed in this document may be assessed on the 2014 ISTEP+ Multiple-Choice Assessment in April/May. Also note that the Multiple-Choice Assessment makes up approximately 70% of a student's scale score and the Applied Skills Assessment makes up approximately 30% of a student's scale score.

IMAST Only: *The following Indiana Indicators should be taught to IMAST students only as these indicators may be assessed on IMAST: IAS 5.6.3 and 5.6.4*