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

Major Clusters **Supporting Clusters** **Additional Clusters**

Operations and Algebraic Thinking

Represent and solve problems involving multiplication and division.

3.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7.*

3.OA.2 Interpret whole-number quotients of whole numbers, e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as 56 ÷ 8.*

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. (*IAS 3.2.4) *For example, determine the unknown number that makes the equation true in each of the equations 8 × ? = 48, 5 = __ ÷ 3, 6 × 6 = ?.*

***IAS 3.2.2** Represent the concept of multiplication as repeated addition.

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

Understand properties of multiplication and the relationship between multiplication and division.

3.OA.5 Apply properties of operations as strategies to multiply and divide. (IAS 3.3.4)

For example, If 6 × 4 = 24 is known, then 4 × 6 = 24 is also known. (Commutative property of multiplication.) 3 × 5 × 2 can be found by 3 × 5 = 15 then 15 × 2 = 30, or by 5 × 2 = 10 then 3 × 10 = 30. (Associative property of multiplication.) Knowing that 8 × 5 = 40 and 8 × 2 = 16, one can find 8 × 7 as 8 × (5 + 2) = (8 × 5) + (8 × 2) = 40 + 16 = 56. (Distributive property.) Students need not use formal terms for these properties.

3.OA.6 Understand division as an unknown-factor problem. *For example, divide 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*

Multiply and divide with 100.

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of one-digit numbers. (*IAS 3.2.5)

Solve problems involving the four operations, and identify and explain patterns in arithmetic.

3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. Note: This standard is limited to problems posed with whole numbers and having whole-number answers; students should know how to perform operations in the conventional order when there are no parentheses to specify a particular order (Order of Operations). (IAS 3.3.1, 3.3.2)

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

***IAS 3.1.7** Identify odd and even numbers up to 1,000 and describe their characteristics.

IAS 3.3.3 Choose appropriate symbols for operations and relations to make a number sentence true.

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

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

Major Clusters Supporting Clusters Additional Clusters

Number and Operations in Base Ten

Use place value understanding and properties of operations to perform multi-digit arithmetic.

3.NBT.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction. (*IAS 3.1.1, *3.2.1)

3.NBT.3 Multiply one-digit whole numbers by multiples of 10 in the range 10-90 (e.g., 9 x 80, 5 x 60) using strategies based on place value and properties of operations.

***IAS 3.1.2** Identify and interpret place value in whole numbers up to 1,000.

***IAS 3.1.3** Use words, models, and expanded form to represent numbers up to 1000.

***IAS 3.1.4** Identify any number up to 1,000 in various combinations of hundreds, tens, and ones.

***IAS 3.1.5** Compare whole numbers up to 1,000 and arrange them in numerical order.

***IAS 3.1.6** Round numbers less than 1,000 to the nearest ten and the nearest hundred.

Number and Operations - Fractions

Develop understanding of fractions as numbers.

Grade 3 expectations in this domain are limited to fractions with denominators 2,3,4,6 and 8.

3.NF.1 Understand a fraction 1/*b* as the quantity formed by 1 part when a whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by a parts of size 1/*b*.

3.NF.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram. (*IAS 3.1.10)

a. Represent a fraction 1/*b* on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into *b* equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.

b. Represent a fraction *a*/*b* on a number line diagram by marking off a lengths 1/*b* from 0. Recognize that the resulting interval has size *a*/*b* and that its endpoint locates the number *a*/*b* on the number line.

3.NF.3 Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size. (*IAS 3.1.8)

a. Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.

b. Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.

c. Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. *Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.*

d. Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.

Major Clusters Supporting Clusters Additional Clusters

Measurement and Data

Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects

3.MD.1 Tell and write time to the nearest minute and measure time intervals in minutes. Solve word problems involving addition and subtraction of time intervals in minutes, e.g., by representing the problem on a number line diagram.

3.MD.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Note: Excludes compound units such as cm^3 and finding the geometric volume of a container. Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem. Note: Excludes compound units such as cm^3 and finding the geometric volume of a container. Note: Excludes multiplicative comparison problems (problems involving notations of "times as much").

***IAS 3.5.9** Tell time to the nearest minute and find how much time has elapsed.

***IAS 3.5.10** Find the value of a collection of coins and dollars. Write amounts less than a dollar using the ¢ symbol and write larger amounts in decimal notation using the $ symbol.

***IAS 3.5.11** Use play or real money to decide whether there is enough money to make a purchase.

***IAS 3.5.12** Carry out simple unit conversions within a measurement system (e.g., centimeters to meters, hours to minutes).

Represent and interpret data

3.MD.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets.*

3.MD.4 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters. (IAS 3.3.7, *3.5.1)

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

3.MD.5 Recognize area as an attribute of plane figures and understand concepts of area measurement.

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

b. A plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* square units.

3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft., and improvised units).

3.MD.7 Relate area to the operations of multiplication and addition.

a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

c. Use tiling to show in a concrete case that the area of a rectangle with whole-number side lengths a and b + c is the sum of a × b and a × c. Use area models to represent the distributive property in mathematical reasoning.

d. Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

Major Clusters Supporting Clusters Additional Clusters

Measurement and Data	***Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.***	
	3.MD.8	Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different area or with the same area and different perimeter. (*IAS 3.5.3)
	***IAS 3.5.2**	Add units of length that may require regrouping of inches to feet or centimeters to meters.

Geometry	***Reason with shapes and their attributes.***	
	3.G.1	Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize rhombuses, rectangles, and squares as examples of quadrilaterals, and draw examples of quadrilaterals that do not belong to any of these subcategories. (*IAS 3.4.1)
	3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part is 1/4 of the area of the shape.
	***IAS 3.4.2**	Identify right angles in shapes and objects and decide whether other angles are greater or less than a right angle.
	***IAS 3.4.3**	Identify, describe, and classify: cube, sphere, prism, pyramid, cone, and cylinder.
	***IAS 3.4.5**	Draw a shape that is congruent to another shape.
	***IAS 3.4.6**	Use the terms *point, line,* and *segment* in describing two-dimensional shapes.
	***IAS 3.4.7**	Draw line segments and lines.
	***IAS 3.4.8**	Identify and draw lines of symmetry in geometric shapes (by hand or using technology).

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 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.

Grade 3 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
3.OA.1	3.NBT.1	3.NF.1	3.MD.1	3.G.1 (*IAS 3.4.1)
3.OA.2	3.NBT.2 (*IAS 3.1.1, *3.2.1)	3.NF.2 (*IAS 3.1.10)	3.MD.2	3.G.2
3.OA.3	3.NBT.3	3.NF.3 (*IAS 3.1.8)	3.MD.3	
3.OA.4 (*IAS 3.2.4)			3.MD.4 (IAS 3.3.7, *3.5.1)	
3.OA.5 (IAS 3.3.4)			3.MD.5	
3.OA.6			3.MD.6	
3.OA.7 (*IAS 3.2.5)			3.MD.7	
3.OA.8 (IAS 3.3.1, 3.3.2)			3.MD.8 (*IAS 3.5.3)	
3.OA.9				
IAS not aligned to INCC (and assessed on ISTEP+)				
*IAS 3.1.7, *3.2.2, *3.2.3, 3.3.3, 3.3.5, 3.3.6	*IAS (3.1.2 – 3.1.6)		*IAS 3.5.2, *(3.5.9 – 3.5.12)	*IAS 3.4.2, *3.4.3, *(3.4.5 – 3.4.8)

***** *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.