Mathematics Common Core State Standards and Indiana Academic Standards Analysis

This document can be used to assist educators in analyzing the commonalities and differences between the Common Core State Standards (CCSS) and the Indiana Academic Standards (IAS). In particular, for schools teaching the CCSS, this document can be used to help identify IAS that do not align or only partially align with the CCSS. Students must be given the opportunity to learn the IAS as they will be assessed on these standards through the 2013-14 school year.

The first column states the CCSS. The second column states the IAS that partially align to the CCSS. The third column provides notes, usually highlighting differences between the standards. Please note that in most cases there are not complete matches between the two sets of standards, and it should not be assumed that either the content or skills found in one set of standards will match completely with those of the other set.

At the end of this document, we have listed the IAS Grade 5 indicators that are not aligned to the Grade 5 CCSS. These are presented in two ways: (1) IAS Grade 5 indicators that align to CCSS at a different grade level, with the best match indicated in the first column; and (2) IAS Grade 5 indicators that do not match any CCSS.

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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.	**5.3.3** Use the distributive property in numerical equations and expressions.	CCSS 5.OA.1 is not limited to the distributive property; IAS 5.3.3 includes the term "distributive property."
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.*	**5.3.2** Write simple algebraic expressions in one or two variables and evaluate them by substitution. (Partial) **5.3.3** Use the distributive property in numerical equations and expressions. (Partial)	CCSS explicitly states to write simple expressions and interpret numerical expressions without evaluating them.
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. F*or 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.*	**5.3.5** Find ordered pairs (positive number only) that fit a linear equation, graph the ordered pairs, and draw the line they determine.	CCSS requires generation of numerical patterns using two rules to form and graph ordered pairs, and requires informal explanation

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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.	**5.1.3** 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 (>). (Partial)	CCSS defines place value in terms of digit placement to the right (10 times as much) or to the left (1/10 as much)
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.	*NEW*	
5.NBT.3 Read, write, and compare decimals to thousandths.	**5.1.1** Convert between numbers in words and numbers in figures, for numbers up to millions and decimals to thousandths.	CCSS 5.NBT3 focuses on decimals only.
	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 (>).	
5.NBT.3a 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).	**5.1.1** Convert between numbers in words and numbers in figures, for numbers up to millions and decimals to thousandths.	CCSS requires the use of base-ten numerals, number names and expanded form.

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.NBT.3b Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**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 (>).	CCSS focuses on the comparison of two decimals to the thousandths based on meaning of the digits in each place.
5.NBT.4 Use place value understanding to round decimals to any place.	**5.1.2** Round whole numbers and decimals to any place value.	CCSS focuses on decimals only.
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.	**5.2.1** Solve problems involving multiplication and division of any whole numbers.	CCSS indicates use of 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.	**5.2.1** Solve problems involving multiplication and division of any whole numbers.	CCSS 2011 requires using strategies based on place value and modeling of division calculations with whole numbers
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.	**5.2.5** Add and subtract decimals and verify the reasonableness of the results.	CCSS stresses the importance of using **concrete models,** drawings, and strategies based on place value to perform operations with decimals and requires explanation of reasoning. It **includes multiplication and division of decimals to the hundredths.**
	5.2.7 Use mental arithmetic to add or subtract simple decimals.	
	5.5.7 Add and subtract with money in decimal notation.	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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, $\frac{2}{3} + \frac{5}{4} = \frac{8}{12} + \frac{15}{12} = \frac{23}{12}$. (In general, $\frac{a}{b} + \frac{c}{d} = \frac{(ad + bc)}{bd}$.)*	**5.2.2** Add and subtract fractions (including mixed numbers) with different denominators.	
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 $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$ by observing that $\frac{3}{7} < \frac{1}{2}$.*	*NEW*	IAS 5.2.2 requires mastery of the basic skill. CCSS extends this concept further by using word problems, visual fraction models, and equations to represent the problem. CCSS also requires to students to estimate the reasonableness of answers.

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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?*	5.1.5 Explain different interpretations of fractions: as parts of a whole, parts of a set, and division of whole numbers by whole numbers.	CCSS interprets fractions as a division of numerator by denominator. Solving word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers is a requirement of this CCSS.
5.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.	5.2.3 Use models to show an understanding of multiplication and division of fractions. 5.2.4 Multiply and divide fractions to solve problems.	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.NF.4a 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 $(^2/_3) \times 4 = ^8/_3$, and create a story context for this equation. Do the same with $(^2/_3) \times (^4/_5) = ^8/_{15}$. (In general, $(^a/_b) \times (^c/_d) = ^{ac}/_{bd}$.)	*NEW*	Extension of IAS 5.2.3.
5.NF.4b 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.	*NEW*	Extension of IAS 5.5.2.
5.NF.5 Interpret multiplication as scaling (resizing) by:	*NEW*	
5.NF.5a 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.	*NEW*	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.NF.5b 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×a) / (n×b) to the effect of multiplying a/b by 1.	*NEW*	
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.	**5.2.4** Multiply and divide fractions to solve problems.	CCSS requires involving fractions in real world problems, Visual fraction models and equations are stated as ways to represent the problem.
5.NF.7 Apply and extend previous understandings of division to divide unit fractions by whole numbers and whole numbers by unit fractions. (Footnote: 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.)	**5.2.3** Use models to show an understanding of multiplication and division of fractions. **5.2.4** Multiply and divide fractions to solve problems.	CCSS does not require division of a fraction by a fraction at this grade.

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.NF.7a 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 = $^1/_3$.*	*NEW*	
5.NF.7b 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 and division to explain that 4 ÷ (1/5) = 20 because 20 × (1/5) = 4.*	*NEW*	
5.NF.7c 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?*	*NEW*	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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.	*NEW*	
Represent and interpret data.		
5.MD.2 Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). 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.*	NEW	
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.	**5.5.4** Find the surface area and volume of rectangular solids using appropriate units.	CCSS 5.MD.3 does not address surface area but requires a deeper understanding of the concept of volume.

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.MD.3a 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.	*NEW*	
5.MD.3b 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.	*NEW*	
5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units.	**5.5.4** Find the surface area and volume of rectangular solids using appropriate units.	CCSS specifies use of "unit cube"
5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.	*NEW*	
5.MD5a 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.	*NEW*	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
5.MD.5b Apply the formulas $V = l$ x w x h and $V = b$ x 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.	*NEW*	
5.MD.5c 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.	*NEW*	
3.MD.7d 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.	*NEW*	

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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).	**5.3.4** Identify and graph ordered pairs of positive numbers.	CCSS includes definition and requires understanding of the coordinate plane
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.	**5.3.4** Identify and graph ordered pairs of positive numbers.	CCSS requires interpretation of coordinate values of points in context

Grade 5 Common Core State Standards (CCSS)	Grade 5 Indiana Academic Standards (IAS)	Comment
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.*	**5.4.2** Identify, describe, draw, and classify triangles as equilateral, isosceles, scalene, right, acute, obtuse, and equiangular.	CCSS 5.G.3 requires students to classify based on categories and subcategories and to understand the hierarchical nature of the classification.
	5.4.4 Identify, describe, draw, and classify polygons, such as pentagons and hexagons.	
5.G.4 Classify two-dimensional figures in a hierarchy based on properties.	*NEW*	
IAS Grade 5 Standards Not Matched by CCSS		
No match in CCSS Grade 5.	5.1.6 Describe and identify prime and composite numbers.	CCSS Grade 4 (4. OA.4)
No match in CCSS Grade 5.	**5.1.7** Identify on a number line the relative position of simple positive fractions, positive mixed numbers, and positive decimals.	CCSS Grade 3 (3.NF.2)
CCSS Mathematical Practice	**5.2.6** Use estimation to decide whether answers are reasonable in addition, subtraction, multiplication, and division problems.	Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 5.	**5.3.1** Use a variable to represent an unknown number.	CCSS Grade 6 (6.EE.2)
No match in CCSS Grade 5.	**5.3.6** Understand that the length of a horizontal line segment on a coordinate plane equals the difference between the x-coordinates and that the length of a vertical line segment on a coordinate plane equals the difference between the y-coordinates.	CCSS Grade 6 (6.G.3)

IAS Grade 5 Standards Not Matched by CCSS		
CCSS Mathematical Practice	**5.3.7** Use information taken from a graph or equation to answer questions about a problem situation.	
No match in CCSS Grade 5.	**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).	CCSS Grade 4 (4.MD.5 a&b, 4.MD.6, 4.MD.7)
No match in CCSS Grade 5.	**5.4.3** Identify congruent triangles and justify your decisions by referring to sides and angles.	CCSS Grade 8
No match in CCSS Grade 5.	**5.4.5** Identify and draw the radius and diameter of a circle and understand the relationship between the radius and diameter.	Although the terms "radius and "diameter" do not appear in the CCSS until high school, the concepts are necessary in Grade 7 when students find the area and circumference of circles using a formula.
No match in CCSS Grade 5.	**5.4.6** Identify shapes that have reflectional and rotational symmetry.	Rotations, reflections, and translations are in 8th grade; rotational and reflectional symmetry in high school.
No match in CCSS Grade 5.	**5.4.7** Understand that 90°, 180°, 270°, and 360° are associated with quarter, half, three-quarters, and full turns, respectively.	Rotations are in 8th grade; angle measurement in 4th grade.
No match in CCSS Grade 5.	**5.4.8** Construct prisms and pyramids using appropriate materials.	Constructing right rectangular prism is in 1st grade. These skills are not part of the CCSS; however these skills will b useful for grade 7, when students find the surface area of prisms and pyramids. Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 5.	**5.4.9** Given a picture of a three-dimensional object, build the object with blocks.	Not part of the CCSS except for Grades K & 1. Assessed in the classroom, not on ISTEP+.

	IAS Grade 5 Standards Not Matched by CCSS	
No match in CCSS Grade 5.	**5.5.1** Understand and apply the formulas for the area of a triangle, parallelogram, and trapezoid.	CCSS Grade 6 (6.G.1)
No match in CCSS Grade 5.	**5.5.2** Solve problems involving perimeters and areas of rectangles, triangles, parallelograms, and trapezoids, using appropriate units.	Perimeter of polygons in Grade 3 (3.MD.8); Area & perimeter of rectangles in Grade 4 (4.MD.3); Other area in Grade 6 (6.G.1)
No match in CCSS Grade 5.	**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.	CCSS Grade 6 (6.G.1)
No match in CCSS Grade 5.	**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.	CCSS Grade 4 (4.MD.1)
No match in CCSS.	**5.5.6** Compare temperatures in Celsius and Fahrenheit, knowing that the freezing point of water is 0°C and 32°F and that the boiling point is 100°C and 212°F.	Assessed in the classroom, not on ISTEP+.
CCSS Mathematical Practice	**5.6.1** Explain which types of displays are appropriate for various sets of data.	
No match in CCSS Grade 5.	**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.	CCSS Grade 6 (6.SP.5)

IAS Grade 5 Standards Not Matched by CCSS		
No match in CCSS Grade 5.	**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.	CCSS Grade 7 (7.SP.5)
No match in CCSS Grade 5.	**5.6.4** Express outcomes of experimental probability situations verbally and numerically (e.g., 3 out of 4).	CCSS Grade 7 (7.SP.6)