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 4 indicators that are not aligned to the Grade 4 CCSS. These are presented in two ways: (1) IAS Grade 4 indicators that align to CCSS at a different grade level, with the best match indicated in the first column; and (2) IAS Grade 4 indicators that do not match any CCSS.

Grade 4 Common Core State Standards (CCSS)	Grade 4 Indiana Academic Standards (IAS)	Comment
Operations and Algebraic Thinking		
Use the four operations with whole numbers to solve problems.		
4.OA.1 Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	***NEW***	
4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. *(Footnote: See Glossary, Table 2.)*	**4.3.1** Use letters, boxes, or other symbols to represent any number in simple expressions, equations, or inequalities.	CCSS interprets multiplication as a comparison and requires students to distinguish multiplicative comparisons from additive comparisons (Glossary, Table 2)
	4.3.6 Recognize and apply the relationships between addition and multiplication, between subtraction and division, and the inverse relationship between multiplication and division to solve problems.	
	4.3.7 Relate problem situations to number sentences involving multiplication and division.	
4.OA.3 Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. 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.	**4.2.11** Know and use strategies for estimating results of any whole number computation.	CCSS explicitly requires multistep word problems using the four operations, including problems in which remainders must be interpreted.
	4.3.1 Use letters, boxes, or other symbols to represent any number in simple expressions, equations, or inequalities.	
	4.2.11 Know and use strategies for estimating results of any whole number computation.	
	4.2.12 Use mental arithmetic to add or subtract numbers rounded to hundreds or thousands.	

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Gain familiarity with factors and multiples.		
4.OA.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	***NEW***	
Generalize and analyze patterns.		
4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.	**4.3.4** Understand that an equation such as $y=3x+5$ is a rule for finding a second number when a first number is given. **4.3.5** Continue number patterns using multiplication and division.	CCSS requires students to generate number and shape patterns and informally explain the pattern of the rule.
Number and Operations in Base Ten		
Generalize place value understanding for multi-digit whole numbers.		
4.NBT.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*	**4.1.2** Identify and write whole numbers up to 1,000,000 given a place-value model. **4.1.4** Order and compare whole numbers using symbols for "less than" (<), "equal to" (=), and "greater than" (>).	CCSS specifies the recognition of a digit in one place representing ten times what it represents in the place to its right.
4.NBT.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.	**4.1.1** Read and write whole numbers up to 1,000,000. **4.1.4** Order and compare whole numbers using symbols for "less than" (<), "equal to" (=), and "greater than" (>).	CCSS specifies the use of expanded form and requires students to compare two multi-digit numbers up to 1,000,000.

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4.NBT.3 Use place value understanding to round multi-digit whole numbers to any place.	**4.1.3** Round whole numbers up to 10,00 to the nearest ten, hundred, and thousand.	CCSS requires students to round whole numbers to any place.
Use place value understanding and properties of operations to perform multi-digit arithmetic.		
4.NBT.4 Fluently add and subtract multi-digit whole numbers using the standard algorithm.	**4.2.1** Understand and use standard algorithms for addition and subtraction.	
4.NBT.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**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.	CCSS does not explicitly require the standard algorithm for multiplication. Equations, rectangular arrays, and/or area model are specified ways to illustrate and explain calculations.
4.NBT.6 Find whole-number quotients and remainders with up to four-digit dividends and one-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.	**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.	CCSS requires finding whole-number quotients with up to four-digit dividends and one-digit divisors. CCSS does not explicitly require the standard algorithm for division; but does require the use of remainders.. Equations, rectangular arrays, and/or area model are specified ways to illustrate and explain calculations.
Extend understanding of fraction equivalence and ordering.		
4.NF.1 Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	***NEW***	

Grade 4 Common Core State Standards (CCSS)	Grade 4 Indiana Academic Standards (IAS)	Comment
4.NF.2 Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	***NEW***	
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.		
4.NF.3 Understand a fraction $^{a}/_{b}$ with a > 1 as a sum of fractions 1/b.	***NEW***	
4.NF.3a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	**4.2.8** Add and subtract simple fractions with different denominators, using objects or pictures.	CCSS calls attention to the understanding of addition and subtraction of fractions as joining and separation parts of the same whole.
4.NF.3b Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.	***NEW***	
4.NF.3c Add and subtract mixed numbers with like denominators, e.g. by replacing each mixed number with an equivalent fraction and/or by using properties of operations and the relationship between addition and subtraction.	**4.1.6** Name and write mixed numbers, using objects or pictures. **4.1.7** Name and mixed numbers as improper fractions, using objects or pictures.	CCSS requires the addition and subtraction of mixed numbers.

Grade 4 Common Core State Standards (CCSS)	Grade 4 Indiana Academic Standards (IAS)	Comment
4.NF.3d Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	***NEW***	
4.NF.4 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	***NEW***	
4.NF.4a Understand a fraction a/b as a multiple of 1/b. *For example, use a visual fraction model to represent $^{5}/_{4}$ as the product $5 \times (^{1}/_{4})$, recording the conclusion by the equation $^{5}/_{4} = 5 \times (^{1}/_{4})$.*	***NEW***	
4.NF.4b Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. *For example, use a visual fraction model to express $3 \times (^{2}/_{5})$ as $6 \times (^{1}/_{5})$, recognizing this product as $^{6}/_{5}$. (In general, $n \times (^{a}/_{b}) = {}^{(n \times a)}/_{b}$.)*	***NEW***	
4.NF.4c Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. *For example, if each person at a party will eat $^{3}/_{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?*	***NEW***	

Grade 4 Common Core State Standards (CCSS)	Grade 4 Indiana Academic Standards (IAS)	Comment
Understand decimal notation for fractions, and compare decimal fractions.		
4.NF.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. *For example, express* $^{3}/_{10}$ *as* $^{30}/_{100}$ *and add* $^{3}/_{10} + {}^{4}/_{100} = {}^{34}/_{100}$. *(Footnote: Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)*	***NEW***	
4.NF.6 Use decimal notation for fractions with denominators 10 or 100. *For example, rewrite 0.62 as* $^{62}/_{100}$ *; describe a length as 0.62 meters; locate 0.62 on a number line diagram.*	**4.1.8** Write tenths and hundredths in decimal and fraction notations. Know that fraction and decimal equivalents for halves and fourths (e.g., 1/2 = 0.5 = 0.50, 7/4 = 1 3/4 = 1.75).	CCSS includes locating decimals on the number line and connecting decimals to metric system measurement.
4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.	***NEW***	

Grade 4 Common Core State Standards (CCSS)	Grade 4 Indiana Academic Standards (IAS)	Comment
Measurement and Data		
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.		
4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. *For example: Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), ….*	**4.5.2** Subtract units of length that may require renaming of feet to inches or meters to centimeters.	CCSS requires the expression of larger units in terms of smaller units in the form of a table.
4.MD.2 Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	***NEW***	IAS 4.5.9 and IAS 4.5.10 are addressed in this CCSS.
4.MD.3 Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*	**4.5.3** Know and use formulas for finding the perimeters of rectangles and squares.	CCSS focuses on real world contexts.
	4.5.4 Know and use formulas for finding the areas of rectangles and squares.	
	4.5.5 Estimate and calculate the area of rectangular shapes using appropriate units, such as square centimeter, square meter, square inch, or square yard.	
	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.	

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Represent and interpret data.		
4.MD.4 Make a line plot to display a data set of measurements in fractions of a unit ($^1/_2$, $^1/_4$, $^1/_8$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.*	**4.3.8** Plot and label whole numbers on a number line up to 100. Estimate positions on the number line.	CCSS requires solving data problems using addition and subtraction of data represented fractionally
	4.6.1 Represent data on a number line and tables, including frequency tables.	
	4.6.2 Interpret data graphs to answer questions about a situation.	
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.		
4.MD.5 Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:	***NEW***	
4.MD.5a An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	***NEW***	
4.MD.5b An angle that turns through *n* one-degree angles is said to have an angle measure of *n* degrees.	***NEW***	
4.MD.6 Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	***NEW***	
Grade 4 Common Core State Standards (CCSS)	**Grade 4 Indiana Academic Standards (IAS)**	**Comment**

4.MD.7 Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	***NEW***	
Geometry		
Draw and indentify lines and angles, and classify shapes by properties of their lines and angles.		
4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	**4.4.1** Identify, describe, and draw rays, right angles, acute angles, obtuse angles, and straight angles using appropriate mathematical tools and technology.	CCSS includes line segments.
	4.4.2 Identify, describe, and draw parallel, perpendicular, and oblique lines using appropriate mathematical tools and technology.	
4.G.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	***NEW***	
4.G.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	**4.4.5** Identify and draw lines of symmetry.	

IAS Grade 4 Standards Not Matched by CCSS		
No match in CCSS Grade 4.	**4.1.5** Rename and rewrite whole numbers as fractions.	CCSS Grade 3 (3.NF.3c)
No match in CCSS Grade 4.	**4.1.9** Round two-place decimals to tenths or to the nearest whole number.	CCSS Grade 5 (5.NBT.4)
No match in CCSS Grade 4.	**4.2.2** Represent as multiplication any situation involving repeated addition.	CCSS Grade 3 (3.MD.7)
No match in CCSS Grade 4.	**4.2.3** Represent as division any situation involving the sharing of objects or the number of groups of shared objects.	CCSS Grade 3 (3.OA.2)
No match in CCSS Grade 4.	**4.2.4** Demonstrate mastery of the multiplication tables for numbers between 1 and 10 and of the corresponding division facts.	CCSS Grade 3 (3.OA.7)
No match in CCSS Grade 4.	**4.2.7** Understand the special properties of 0 and 1 in multiplication and division.	CCSS Grade 3 (3. OA.5) Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 4.	**4.2.9** Add and subtract decimals (to hundredths), using objects or pictures.	CCSS Grade 5 (5.NBT.7) Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 4.	**4.2.10** Use a standard algorithm to add and subtract decimals (to hundredths).	CCSS Grade 5 (5.NBT.7)
No match in CCSS Grade 4.	**4.3.3** Understand that multiplication and division are performed before addition and subtraction in expressions without parentheses.	CCSS Grade 3 (3.OA.8)
No match in CCSS Grade 4.	**4.4.3** Identify, describe, and draw parallelograms, rhombuses, and trapezoids, using appropriate mathematical tools and technology.	CCSS Grade 3 (3.G.1) and CCSS Grade 1 (1.G.2)

No match in CCSS Grade 4.	**4.4.4** Identify congruent quadrilaterals and give reasons for congruence using sides, angles, parallels, and perpendiculars.	CCSS Grade 8 (8.G.2)
No match in CCSS Grade 4.	**4.4.6** Construct cubes and prisms and describe their attributes.	CCSS Grade 1 (1.G.2) and CCSS Grade 2 (2.G.1) Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 4.	**4.5.1** Measure length to the nearest quarter-inch, eighth-inch, and millimeter.	CCSS Grade 3 (3.MD.4)
No match in CCSS Grade 4.	**4.5.7** Find areas of shapes by dividing them into basic shapes such as rectangles.	CCSS Grade 3 (3.MD.7d)
No match in CCSS.	**4.5.8** Use volume and capacity as different ways of measuring the space inside a shape.	Assessed in the classroom, not on ISTEP+.
No match in CCSS Grade 4.	**4.6.3** Summarize and display the results of probability experiments in a clear and organized way.	These concepts are moved to Grade 6 at a more complex level.