Transitioning from the Indiana Academic Standards (IAS) to the Common Core State Standards (CCSS): Instructional and Assessment Guidance (Mathematics – Updated April 2012)

Opportunity to Learn

Since the adoption of the Common Core State Standards, Indiana educators have been transitioning to the CCSS. From an assessment perspective, transitioning to the CCSS necessitates a focus on "Opportunity to Learn" for students. Opportunity to Learn (OTL) refers to equitable conditions or circumstances within the school or classroom that promote learning for all students. OTL includes curricula, learning materials and instructional experiences. In short, OTL supports student success by ensuring student access to both content and instruction.

Opportunity to Learn is both a **moral imperative** and an **ethical responsibility** on the part of educators. "Using OTL standards as a guide, students can measure whether they have a realistic shot at learning the subjects the state requires and whether they will have a fair chance to compete for college," (UCLA's Institute for Democracy, Education, & Access, 2003).

Indiana teachers have a two-fold obligation with regard to OTL. First, teachers must provide students with OTL for Indiana Academic Standards and Indicators that are assessed in the classroom and on ISTEP+. Second, and just as important, teachers must provide OTL in terms of the CCSS content that students must learn in preparation for college and careers, as measured by the new CCSS assessments. In considering the latter, teachers must acknowledge that important consideration must be given to specific indicators over the course of the next few years that might otherwise go untaught unless consciously integrated into instruction.

Assessing Student Learning

In an effort to empower teachers and assist with the transition to CCSS, the Office of Student Assessment has created "Assessment Guidance" documents for grades 3-8. All of the Indiana Academic Standards and Indicators represent valuable content, and a number of those Indicators are assessed on ISTEP+. Other Indicators are best assessed in the classroom through a variety of assessment methods, including teacher observation, student presentations, and teacher-developed quizzes and tests. The Indicators assessed on ISTEP+ are identified on the documents with a "✓+"and a "✓"; those assessed in the classroom are acknowledged with a clipboard symbol (📋).

Emphasis on Instruction

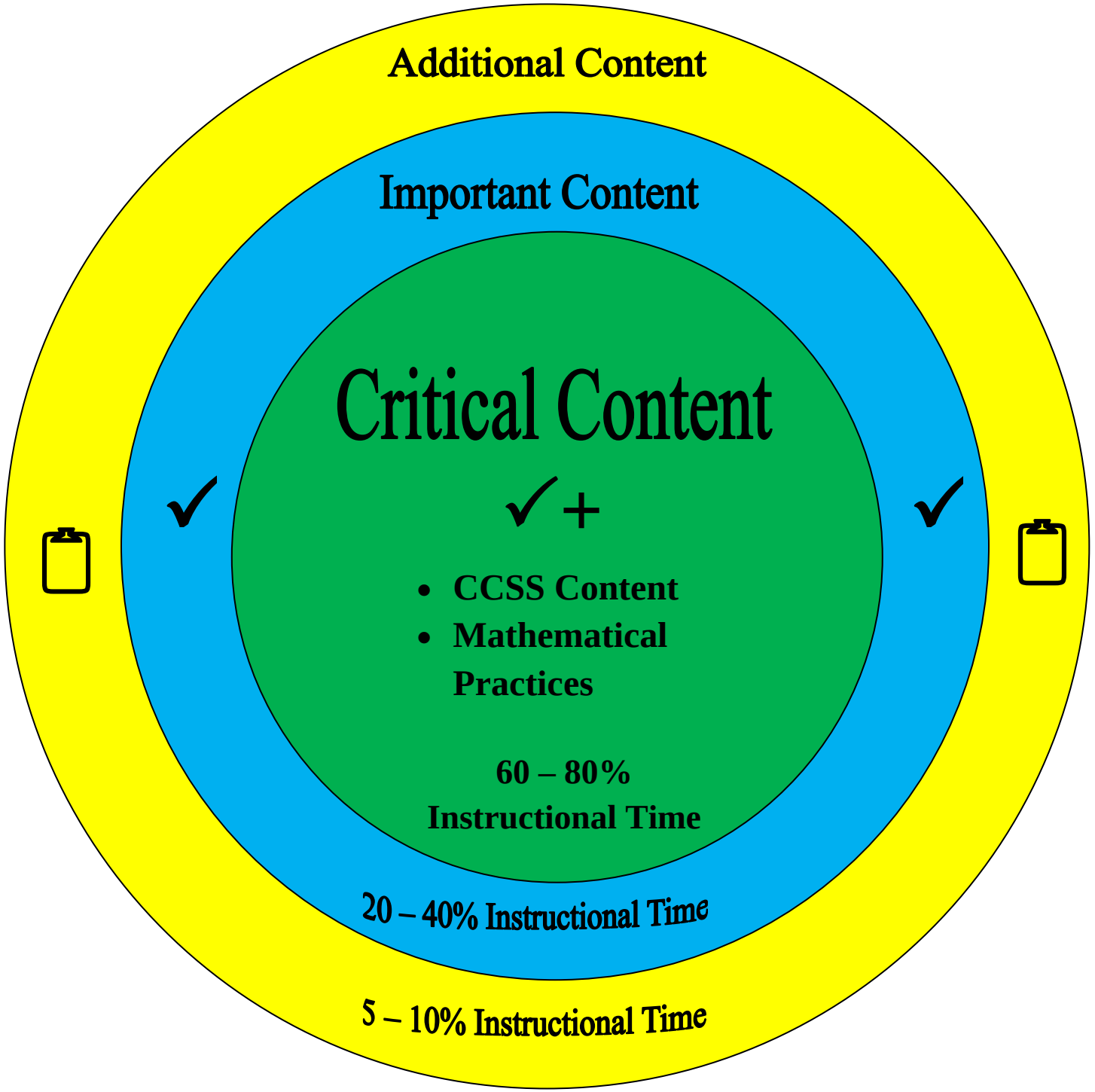
The Assessment Guidance also communicates instructional priorities with regard to the CCSS. Specific content that has been identified as *essential* for building the foundational skills required in the CCSS is incorporated at each grade level. The OTL for this essential content only exists at the particular grade level in the school year designated. If essential content is not taught,

students will experience a gap in learning. As there is risk to future learning if essential content is not taught and learned, it is important to note that **mastery of essential content is critical**. The instructional priorities play a key role in student success on the CCSS accountability assessments, known as the **Partnership for Assessment of College and Career Readiness (PARCC) Assessments**, which begin in 2014-15.

New for 2012-13

To assist teachers even more, the concentric circle graphic (similar to a bull's-eye) was created. This graphic displays the three levels of instructional priority. The highest priority, entitled ***Critical Content***, is indicated by the "✓+" symbol and ideally represents approximately 60-80% of instructional time. The middle priority, entitled ***Important Content***, is indicated by the "✓" symbol and represents approximately 20-40% of instructional time. The lowest priority, entitled ***Additional Content***, is indicated by the (📋) symbol and ideally represents approximately 5-10% of instructional time.

Instructional priorities related specifically to the CCSS have also been updated for 2012-13. This guidance focuses on CCSS foundational skills and Mathematical Practices. The guidance also includes "grayed-out sections" that are part of the major clusters in the PARCC *Model Content Frameworks*. These sections help to highlight the CCSS principles of focus and coherence. Teachers may choose to include this content in their curriculum either completely, by means of differentiation, or not at all. At a minimum, teachers are expected to become familiar with these major clusters as Indiana transitions to the CCSS.


Additional Content
Important Content
Critical Content
✓+
• CCSS Content
• Mathematical Practices
60 – 80%
Instructional Time
20 – 40% Instructional Time
5 – 10% Instructional Time

Instructional and Assessment Guidance 2012-13

Mathematics – Grade 8

Symbol	Content Priority	Approximate Instructional Time	Possible Test Questions	
			ISTEP+	Acuity
✓+	Critical	60 – 80%	Yes	Yes
✓	Important	20 – 40%	Yes	Yes
☐	Additional	5 – 10%	Assessed Locally	

Standard 1 Number Sense		Standard 2 Computation		Standard 3 Alg. & Functions		Standard 4 Geometry		Standard 5 Measurement		Standard 6 Data & Prob.	
8.1.1	✓+	8.2.1	✓	8.3.1	✓+	8.4.1	✓	8.5.1	✓	8.6.1	✓
8.1.2	✓	8.2.2	✓	8.3.2	✓+	8.4.2	☐	8.5.2	✓+	8.6.2	✓
8.1.3	☐	8.2.3	☐	8.3.3	✓+	8.4.3	☐	8.5.3	✓	8.6.3	✓
8.1.4	✓+	8.2.4	☐	8.3.4	✓+	8.4.4	✓	8.5.4	✓+	8.6.4	✓
8.1.5	✓+			8.3.5	✓+	8.4.5	✓+	8.5.5	✓	8.6.5	✓
8.1.6	✓+			8.3.6	✓+					8.6.6	✓
8.1.7	✓+			8.3.7	✓+					8.6.7	✓
				8.3.8	✓+						
				8.3.9	✓						
				8.3.10	☐						

There are similarities among the Indiana Academic Problem Solving Standards and Common Core State Standards for Mathematical Practice. These standards should be taught on a regular basis in connection with the content standards.

Common Core State Standards (CCSS)
2012-13 Instructional Priorities – Grade 8

- *The following content is essential for building the foundational skills required in the CCSS. Mastery of this content is critical to avoid gaps in student learning. In addition, a focus on the* ***Mathematical Practices*** *is imperative to ensure student success.*
- ***** *The* ***grayed-out sections*** *are part of the major clusters in the PARCC Model Content Frameworks. They help to highlight the CCSS principles of focus and coherence.* ***Teachers may choose to include this content in their curriculum either completely, by means of differentiation, or not at all. However, our expectation is that teachers at least become familiar with these major clusters as we transition to the CCSS.***

CCSS	CCSS Text	Notes
8.EE.1	Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example,* $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.	This aligns well with IAS 8.1.4, 8.1.5, and 8.3.3.
8.EE.2	Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.	This aligns partially with IAS 8.1.6, 8.1.7 and 7.1.3. The CCSS includes cube roots and this concept represented with equations.
8.EE.3	Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. *For example, estimate the population of the United States as* 3×10^8 *and the population of the world as* 7×10^9*, and determine that the world population is more than 20 times larger.*	*
8.EE.4	Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.	*
8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*	This aligns partially with IAS 8.3.5, 8.3.6, 8.3.7, and 8.3.8. The CCSS includes interpreting unit rates (slope) and comparing two different proportional relationships.
8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b.	This is a **NEW** concept. See Pg 12: http://commoncoretools.files.wordpress.com/2011/04/ccss_progression_ee_2011_04_25.pdf

8.EE.7	Solve linear equations in one variable. a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	This aligns partially with IAS 8.3.1. The CCSS includes solving equations that include the use of the distributive property and equations that have infinite solutions and no solutions. In 7th Grade, students should have attained fluency with solving one-variable equations of the form $px + q = r$ and $p(x + q) = r$.
8.EE.8ab	Analyze and solve pairs of simultaneous linear equations. a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. *For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.*	*
8.EE.8c	Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.*	This aligns partially with IAS 8.3.2. The CCSS includes solving real-world problems involving pairs of equations.
8.F.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.	*
8.F.2	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.*	This aligns partially with IAS 8.3.8. The CCSS includes comparing properties of two functions.
8.F.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. *For example, the function $A = s^2$ giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.*	*
8.G.1	Verify experimentally the properties of rotations, reflections, and translations: a. Lines are taken to lines, and line segments to line segments of the same length. b. Angles are taken to angles of the same measure. c. Parallel lines are taken to parallel lines.	This aligns partially with IAS 8.4.4, 7.4.1 and 7.4.2.
8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	This aligns partially with IAS 8.4.4, 7.4.1 and 7.4.2.
8.G.3	Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	This aligns partially with IAS 8.4.4, 7.4.1 and 7.4.2.

8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two dimensional figures, describe a sequence that exhibits the similarity between them.	This aligns partially with IAS 8.4.4 and 7.5.2.
8.G.5	Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*	*
8.G.6	Explain a proof of the Pythagorean Theorem and its converse.	This aligns partially with IAS 8.4.5. The CCSS requires a proof.
8.G.7	Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.	*
8.G.8	Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	This aligns partially with IAS 8.4.5. The CCSS includes finding the distance between points in a coordinate system using the Pythagorean Theorem.
8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	* This aligns well with IAS 8.5.4. "This content along with other grade 7 content, such as, angle measure, area, surface area, volume (7.G.4–6), proportional reasoning (7.RP), and multistep numerical problem solving (7.EE.3), can be combined and used in flexible ways as part of modeling during high school — not to mention after high school for college and careers." *PARCC Model Content Frameworks*