INDIANA DEPARTMENT of EDUCATION

2024 INDIANA CONTENT CONNECTORS

MATHEMATICS

GRADE 4

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Indiana Content Connectors Context and Purpose

Introduction

The Indiana Content Connectors for Grade 4 Mathematics are the result of a process designed to identify, evaluate, synthesize, and create high-quality learning expectations for Indiana students with significant cognitive disabilities.

The Indiana Department of Education (IDOE) convened stakeholder committees to review proposed revisions to Indiana's Alternative Standards, known as content connectors. The content connectors are designed to measure the knowledge and skills of students with the most significant cognitive disabilities and are assessed with the state's alternate assessment. The content connectors are designed to ensure that all Indiana students in this population are prepared with essential knowledge and skills needed to access employment, enrollment, or enlistment leading to service.

What are the Content Connectors and how should they be used?

The Indiana Content Connectors are designed to help educators, parents, students, and community members understand the necessary content for each grade level, and within each content area domain, to access employment, enrollment, or enlistment leading to service. These content connectors should form the basis for strong core instruction for all students at each grade level and content area. The content connectors identify the minimum academic content or skills to which Indiana students need access in order to be prepared for success after graduation, but they are not an exhaustive list.

While the Indiana Content Connectors establish key expectations for knowledge and skills and should be used as the basis for curriculum, the content connectors by themselves do not constitute a curriculum. It is the responsibility of the local school corporation to select and formally adopt curricular tools, including textbooks and any other supplementary materials, that align with Indiana Content Connectors. Additionally, corporation and school leaders should consider the appropriate instructional sequence of the content connectors as well as the length of time needed to teach each one. Every content connector has a unique place in the continuum of learning, but each content connector will not require the same amount of time and attention. A deep understanding of the vertical articulation of the standards will enable educators to make the best instructional decisions. These content connectors must also be complemented by robust, evidence-based instructional practices to support overall student development. By utilizing strategic and intentional instructional practices, other areas such as STEM and employability skills can be integrated with the content connectors.

Acknowledgments

IDOE appreciates the time, dedication, and expertise offered by Indiana's K-12 general and special educators, higher education professors, representatives from business and industry, families, and other stakeholders who contributed to the development of the Indiana Content Connectors. We wish to specially acknowledge the committee members, as well as participants in the public comment period, who dedicated many hours to the review and evaluation of these content connectors designed to prepare Indiana students for success after graduation.

Grade 4 Mathematics

Standards and content connectors identified as essential for mastery by the end of the grade level are indicated with gray shading and an "E."

Indiana Academic Standards	Content Connectors
Number Sense	
4.NS.1: Read and write whole numbers up to 1,000,000. Use words, models, standard form, and expanded form to represent and show equivalent forms of whole numbers up to 1,000,000.	**4.NS.1a:** Read and write whole numbers up to 500. Use words, models, standard form, or expanded form to represent whole numbers up to 500. (E)
4.NS.2: Model mixed numbers and improper fractions using visual fraction models such as number lines and area models. Use a visual fraction model to show the equivalency between whole numbers and whole numbers as fractions.	**4.NS.2a:** Model mixed numbers and improper fractions using visual fraction models such as number lines and area models. Limit denominators of fractions to 2, 3, 4, 5, 6, 8, and 10.
4.NS.3: Use fraction models to represent two equivalent fractions with attention to how the number and size of the parts differ even though the fractions themselves are the same size. Use this principle to generate equivalent fractions. [In grade 4, limit denominators of fractions to 2, 3, 4, 5, 6, 8, 10, 25, 100.] (E)	**4.NS.3a:** Use fraction models to represent two equivalent fractions. Limit denominators to 2, 3, and 4 including fractions greater than 1. (E)
4.NS.4: Compare two fractions with different numerators and different denominators (e.g., by creating common denominators or numerators, or by comparing to a benchmark, such as 0, 1/2, and 1). Explain why 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). (E)	**4.NS.4a:** Compare two fractions with different denominators. Limit denominators to 2, 3, 4, 5, 6, 8, and 10 and the value of the fraction between 0 and 1. Justify the conclusions using visual models and record the results using words and symbols >, <, =. (E)
4.NS.5: Write tenths and hundredths in decimal and fraction notations. Use words, models, standard form, and expanded form to represent decimal numbers to hundredths. Mentally calculate fraction and decimal equivalents for halves and fourths (e.g., 1/2 = 0.5 = 0.50, 7/4 = 1 3/4 = 1.75). (E)	**4.NS.5a:** Write tenths and hundredths in decimal and fraction notations using words, models, standard form, or expanded form to represent the number.

4.NS.6: Compare two decimals to hundredths by reasoning about their size based on the same whole. Record the results of comparisons with the symbols > , = , or < , and justify the conclusions (e.g., by using a visual model). (E)	**4.NS.6a:** Compare two decimals to the tenths with a value less than 1. Justify the conclusions using visual models and record the results using words and symbols >, <, =.
4.NS.7: Use place value understanding to round multi-digit whole numbers to any given place value.	**4.NS.7a:** Use visual models such as number lines, place value charts, and/or hundreds charts to round three-digit whole numbers up to 500 to the nearest 10 and 100.
Computation and Algebraic Thinking	
4.CA.1: 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. Describe the strategy and explain the reasoning. (E)	**4.CA.1a:** Multiply a one-digit whole number by a two-digit whole number using any strategy (e.g., strategies based on place value, manipulatives and/or models). (E)
4.CA.2: 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. Describe the strategy and explain the reasoning. (E)	**4.CA.2a:** Find whole-number quotients without remainders up to 50 with two-digit dividends and one-digit divisors using any strategy. Describe the strategy used. (E)
4.CA.3: Show how the order in which two numbers are multiplied (commutative property) and how numbers are grouped in multiplication (associative property) will not change the product. Use these properties to show that numbers can be multiplied in any order. Investigate and apply the distributive property. (E)	**4.CA.3a:** Show how the order in which one-digit numbers and two-digit whole numbers are multiplied (commutative property) and how one-digit numbers are grouped in multiplication (associative property) will not change the product. Use these properties to show that numbers can be multiplied in any order.
4.CA.4: Investigate the mathematical relationship between factors and multiples for whole numbers from 1-100, including the set of factors and multiples for given numbers. Identify sets of factors and multiples for any given whole number up to 100.	**4.CA.4a:** Investigate the mathematical relationship between factors and multiples for whole numbers from 1-50, including the set of factors and multiples for given numbers. Identify sets of factors and multiples for any given whole number up to 50.
4.CA.5: Solve real-world problems with whole numbers involving multiplicative comparison (e.g., by using drawings and equations with	**4.CA.5a:** Solve real-world problems with one-digit and two-digit whole numbers involving multiplicative comparison with products unknown

a symbol for the unknown number to represent the problem), distinguishing multiplicative comparison from additive comparison. [In grade 4, division problems should not include a remainder.] (E)	(e.g., by using drawings and equations with a symbol for the unknown number to represent the problem). (E)
4.CA.6: Add and subtract fractions with common denominators using visual fraction models. Decompose non-unit fractions to represent them as iterations of unit fractions. (E)	**4.CA.6a:** Add and subtract fractions with common denominators using visual fraction models. Limit denominators to 2, 3, 4, 5, 6, 8, and 10. (E)
4.CA.7: Add and subtract mixed numbers with common 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.CA.7a:** Add and subtract mixed numbers with common denominators using visual fraction models. Limit denominators to 2, 3, 4, 5, 6, 8, and 10.
4.CA.8: Solve real-world problems involving addition and subtraction of fractions referring to the same whole and having common denominators (e.g., by using visual fraction models and equations to represent the problem). (E)	**4.CA.8a:** Solve real-world problems involving addition and subtraction of fractions with common denominators using visual fraction models. Limit denominators to 2, 3, 4, 5, 6, 8, and 10. (E)
4.CA.9: Describe the relationship between two terms and use it to find a second number when a first number is given. Generate a number pattern that follows a given rule.	**4.CA.9a:** Describe the relationship among terms in a pattern. Generate a number pattern that follows a given rule. (E)
Geometry	
4.G.1: Identify, describe, and draw parallelograms, rhombuses, and trapezoids using appropriate tools (e.g., ruler, straightedge, and technology).	**4.G.1a:** Identify parallelograms, rhombuses, and trapezoids.
4.G.2: Identify, describe, and draw rays, angles (right, acute, obtuse), and perpendicular and parallel lines using appropriate tools (e.g., ruler, straightedge, and technology). Identify these in two-dimensional figures.	**4.G.2a:** Identify rays, angles (right, acute, obtuse) and perpendicular and parallel lines in isolation and in two-dimensional figures.
4.G.3: Classify triangles and quadrilaterals based on the presence or absence of parallel or perpendicular lines, or right, acute, or obtuse angles.	**4.G.3a:** Classify quadrilaterals based on the presence of parallel or perpendicular lines. Classify triangles based on acute, obtuse, or right angles.

Measurement	
4.M.1: Measure length to the nearest quarter-inch, eighth-inch, and millimeter. (E)	**4.M.1a:** Measure length to the nearest quarter-inch and centimeter. (E)
4.M.2: Within given measurement systems, convert larger units to smaller units, including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec., and use these conversions to solve real-world problems. (E)	**4.M.2a:** Identify the appropriate units of measurement needed to solve real-world problems involving kilometers (km), meters (m), centimeters (cm); kilograms (kg), grams (g); pounds (lb), ounces (oz); liters (L), milliliters (mL); hour (hr), minute (min), second (sec). (E)
4.M.3: Use the four operations to solve real-world problems involving distances, intervals of time, volumes, masses of objects, and money. Include addition and subtraction problems involving simple fractions and problems that require expressing measurements given in a larger unit in terms of a smaller unit. (E)	**4.M.3a:** Solve real-world problems involving addition, subtraction, multiplication, or division of whole unit measurements of distance, time, volume, mass, and money. (E)
4.M.4: Apply the area and perimeter formulas for rectangles to solve real-world and other mathematical problems. Investigate the area of complex shapes composed of rectangles by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts; apply this technique to solve real-world problems and other mathematical problems. (E)	**4.M.4a:** Solve real-world problems to find the area and perimeter of rectangles with whole number side lengths when given the formula. Solve real-world and mathematical problems to find the area of composite shapes consisting of rectangles. (E)
Data Analysis	
4.DA.1: Formulate questions that can be addressed with data. Collect, organize, and graph data from observations, surveys, and experiments using line plots with whole number intervals, single- and scaled bar graphs, and frequency tables. Solve real-world problems by analyzing and interpreting the data using grade-level computation and comparison strategies. (E)	**4.DA.1a:** Solve real-world problems by analyzing and interpreting the data from a line plot with whole number intervals and single- and scaled bar graphs, and frequency tables. (E)

4.DA.2: 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 data displayed in line plots.	**4.DA.2a:** Solve problems involving addition and subtraction of fractions with common denominators by using data displayed in line plots. Limit denominators to 2, 3, 4, 5, 6, 8, and 10.