INDIANA DEPARTMENT of EDUCATION

2024 INDIANA CONTENT CONNECTORS

MATHEMATICS

GRADE 8

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Indiana Content Connectors Context and Purpose

Introduction

The Indiana Content Connectors for Grade 8 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

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Grade 8 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	
8.NS.1: Give examples of rational and irrational numbers, and explain the difference between them. State decimal equivalents for any number. For rational numbers, show that the decimal equivalent terminates or repeats, and convert a repeating decimal into a rational number.	**8.NS.1a:** Identify numbers as rational or irrational and explain the difference between them. (E)
8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers.	**8.NS.2a:** Compare the value of two irrational numbers by plotting the rational approximate location on a number line.
8.NS.3: Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions. (E)	**8.NS.3a:** Use the property of exponents to create equivalent expressions with common integer bases and integer exponents limited to 5.
8.NS.4: Solve real-world problems with rational numbers by using multiple operations. (E)	**8.NS.4a:** Solve two-step real-world problems with positive rational numbers.(E)
Algebra and Functions	
8.AF.1: Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems. (E)	**8.AF.1a:** Solve two- or three-step one-variable linear equations and inequalities. Limit to combining like terms or variables on both sides (e.g., *4x+3=2x+11 or 2x+4x+5=23*).

8.AF.2: Generate linear equations in one variable with one solution, infinitely many solutions, or no solutions. Justify the classification given.	**8.AF.2a:** Identify when the solution set to a linear equation has one solution, infinitely many solutions, or no solutions.
8.AF.3: Understand that a function assigns to each *x-value* (independent variable) exactly one *y-value* (dependent variable), and that the graph of a function is the set of ordered pairs *(x,y)*.	**8.AF.3a:** Identify if a relation represented in a table or graph is a function or not a function based on the independent (*x-values*) and dependent (*y-values*) variables.
8.AF.4: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. (E)	**8.AF.4a:** Given a graph of a function, identify where the function is increasing or decreasing, if it is linear or nonlinear, and identify a maximum or minimum value. Given a verbal description of a situation, sketch the graph that could represent the situation.
8.AF.5: 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. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations.	**8.AF.5a:** Given a table or a graph identify a situation as linear or nonlinear. Describe similarities and differences between linear and nonlinear graphs. (E)
8.AF.6: Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept) in $y = mx + b$. (E)	**8.AF.6a:** Identify the slope (rate of change) and y-intercept (initial value), and the linear equation in the form of $y = mx + b$ from a graph of a realistic situation. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept). (E)
8.AF.7: Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed).	**8.AF.7a:** Given a table, graph, or equation compare two linear functions by using the slope (rate of change). (E)
8.AF.8: Approximate the solution of a system of equations by graphing and interpreting the reasonableness of the approximation. (E)	**8.AF.8a:** Identify the solution to a system of linear equations by graphing. (E)

Geometry and Measurement	
8.GM.1: Explore dilations, translations, rotations, and reflections on two-dimensional figures in the coordinate plane. (E)	**8.GM.1a**: Given a graph of a two-dimensional figure that has undergone a single transformation in the coordinate plane, identify if the transformation is an example of a dilation, rotation, translation, and/or reflection.
8.GM.2: Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres. (E)	**8.GM.2a:** Find the volume of cones, spheres, and pyramids given the formulas for volume, a model, and all required measurements. (E)
8.GM.3: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions. (E)	**8.GM.3a:** Apply the Pythagorean Theorem to find the hypotenuse of a right triangle. (E)
Data Analysis, Statistics, and Probability	
8.DSP.1: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**8.DSP.1a:** Graph bivariate data using a scatter plot. Given a scatter plot identify a positive or negative association, clustering and points that are outliers.
8.DSP.2: Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data. Interpret the slope and y-intercept in context. (E)	**8.DSP.2a:** Make predictions in real-world situations involving bivariate data when provided the line of best fit. (E)
8.DSP.3: Represent sample spaces and find probabilities of compound events (independent and dependent) using organized lists, tables, and tree diagrams.(E)	**8.DSP.3a:** Determine the theoretical probability of a two-stage compound event (e.g., one roll of a die, one spin of a spinner).

8.DSP.4: Define the probability of a compound event, just as with simple events, as the fraction of outcomes in the sample space for which the compound event occurs. Use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events. (E)	**8.DSP.4a:** Determine if a compound probability event is dependent or independent. (E)
8.DSP.5: For events with a large number of outcomes, understand the use of the multiplication counting principle. Develop the multiplication counting principle, and apply it to situations with a large number of outcomes.	**8.DSP.5a:** Determine the total number of outcomes by using the multiplication counting principle. (E)