Grade 3 Math Content Connectors

Grade 3

PROCESS STANDARDS FOR MATHEMATICS

The Process Standards demonstrate the ways in which students should develop conceptual understanding of mathematical content, and the ways in which students should synthesize and apply mathematical skills.

PROCESS STANDARDS FOR MATHEMATICS	
PS.1: Make sense of problems and persevere in solving them.	Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway, rather than simply jumping into a solution attempt. They consider analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” and "Is my answer reasonable?" They understand the approaches of others to solving complex problems and identify correspondences between different approaches. Mathematically proficient students understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
PS.2: Reason abstractly and quantitatively.	Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.
PS.3: Construct viable arguments and critique the reasoning of others.	Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They analyze situations by breaking them into cases and recognize and use counterexamples. They organize their mathematical thinking, justify their conclusions and communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. They justify whether a given statement is true always, sometimes, or never. Mathematically proficient students participate and collaborate in a mathematics

	community. They listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

PROCESS STANDARDS FOR MATHEMATICS	
PS.4: Model with mathematics.	Mathematically proficient students apply the mathematics they know to solve problems arising in everyday life, society, and the workplace using a variety of appropriate strategies. They create and use a variety of representations to solve problems and to organize and communicate mathematical ideas. Mathematically proficient students apply what they know and are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.
PS.5: Use appropriate tools strategically.	Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Mathematically proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. Mathematically proficient students identify relevant external mathematical resources, such as digital content, and use them to pose or solve problems. They use technological tools to explore and deepen their understanding of concepts and to support the development of learning mathematics. They use technology to contribute to concept development, simulation, representation, reasoning, communication and problem solving.

PS.6: Attend to precision.	Mathematically proficient students communicate precisely to others. They use clear definitions, including correct mathematical language, in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They express solutions clearly and logically by using the appropriate mathematical terms and notation. They specify units of measure and label axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently and check the validity of their results in the context of the problem. They express numerical answers with a degree of precision appropriate for the problem context.
PS.7: Look for and make use of structure.	Mathematically proficient students look closely to discern a pattern or structure. They step back for an overview and shift perspective. They recognize and use properties of operations and equality. They organize and classify geometric shapes based on their attributes. They see expressions, equations, and geometric figures as single objects or as being composed of several objects.
PS.8: Look for and express regularity in repeated reasoning.	Mathematically proficient students notice if calculations are repeated and look for general methods and shortcuts. They notice regularity in mathematical problems and their work to create a rule or formula. Mathematically proficient students maintain oversight of the process, while attending to the details as they solve a problem. They continually evaluate the reasonableness of their intermediate results.

MATHEMATICS: GRADE 3

The Mathematics standards for grade 3 are supplemented by the Process Standards for Mathematics.

The Mathematics standards for grade 3 are made up of five strands: Number Sense; Computation; Algebraic Thinking; Geometry; Measurement; and Data Analysis. The skills listed in each strand indicate what students in grade 3 should know and be able to do in Mathematics.

NUMBER SENSE

Indiana Academic Standards	Content Connectors
MA.3.NS.1: Read and write whole numbers up to 10,000. Use words, models, standard form and expanded form to represent and show equivalent forms of whole numbers up to 10,000.	**MA.3.NS.1.a.1**: Read, demonstrate, and write whole numbers up to 200, in standard and word form.
MA.3.NS.2: Compare two whole numbers up to 10,000 using >, =, and < symbols.	**MA.3.NS.2.a.1**: Compare two whole numbers up to 200 using >, =, and < symbols and words.
MA.3.NS.3: Understand a fraction, 1/b, as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction, a/b, as the quantity formed by a parts of size 1/b. [In grade 3, limit denominators of fractions to 2, 3, 4, 6, 8.]	**MA.3.NS.3.a.1**: Identify the numerator of a fraction.
	MA.3.NS.3.a.2: Identify the denominator of fractions to halves, thirds, and fourths.
	MA.3.NS.3.a.3: Identify halves, thirds, fourths of a whole.

MA.3.NS.4: Represent a fraction, 1/b, on a number line by defining the interval from 0 to 1 as the whole, and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.	**MA.3.NS.4.a.1**: Locate given common unit fractions (i.e., ½, ¼) on a number line that has a value between 0 and 1.
MA.3.NS.5: Represent a fraction, a/b, on a number line by marking off lengths 1/b from 0. Recognize that the resulting interval has size a/b, and that its endpoint locates the number a/b on the number line.	**MA.3.NS.5.a.1**: Represent halves and fourths between 0 and 1 on a number line.
MA.3.NS.6: Understand two fractions as equivalent (equal) if they are the same size, based on the same whole or the same point on a number line.	**MA.3.NS.6**: Understand two fractions as equivalent (equal).
MA.3.NS.7: Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent (e.g., by using a visual fraction model).	**MA.3.NS.7.a.1**: Recognize simple equivalent fractions using models to show equivalence.
MA.3.NS.8: Compare two fractions with the same numerator or the same denominator 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 fraction model).	**MA.3.NS.8.a.1:** Use =, <, or > and/or words to compare two fractions with the same denominator using a model.
MA.3.NS.9: Use place value understanding to round 2- and 3-digit whole numbers to the nearest 10 or 100.	**MA.3.NS.9.a.1**: Use place value to round two-digit numbers to the nearest 10.

COMPUTATION

Indiana Academic Standards	Content Connectors
MA.3.C.1: Add and subtract whole numbers fluently within 1000.	**MA.3.C.1.a.1**: Add and subtract whole numbers with sums up to 100.
MA.3.C.2: Represent the concept of multiplication of whole numbers with the following models: equal-sized groups, arrays, area models, and equal "jumps" on a number line. Understand the properties of 0 and 1 in multiplication.	**MA.3.C.2.a.1**: Represent the concept of multiplication with manipulatives and arrays with numbers 1, 5, and 10.
MA.3.C.3: Represent the concept of division of whole numbers with the following models: partitioning, sharing, and an inverse of multiplication. Understand the properties of 0 and 1 in division.	**MA.3.C.3.a.1**: Represent division by sorting a set number of objects into a set number of groups. Up to 20 objects into up to 5 groups.
MA.3.C.4: Interpret whole-number quotients of whole numbers (e.g., interpret 56 ÷ 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each).	**MA.3.C.4.a.1**: Use representations of division (by sorting a set number of objects into a set number of groups) to find how many in one group. Up to 20 objects into up to 5 groups.

MA.3.C.5: Multiply and divide within 100 using strategies, such as the relationship between multiplication and division (e.g., knowing that 8 x 5 = 40, one knows 40 ÷ 5 = 8), or properties of operations.	**MA.3.C.5.a.1**: Apply strategies of multiplication, including zero property of multiplication and identity property multiplication.
MA.3.C.6: Demonstrate fluency with multiplication facts and corresponding division facts of 0 to 10.	**MA.3.C.6.a.1:** Solve multiplication facts up to 10.

ALGEBRAIC THINKING

Indiana Academic Standards	Content Connectors
MA.3.AT.1: Solve real-world problems involving addition and subtraction of whole numbers within 1000 (e.g., by using drawings and equations with a symbol for the unknown number).	**MA.3.AT.1.a.1**: Use pictures and/or manipulatives to solve real-world addition and subtraction word problems with sums up to 100.
MA.3.AT.2: Solve real-world problems involving whole number multiplication and division within 100 in situations involving equal groups, arrays, and measurement quantities (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem).	**MA.3.AT.2.a.1**: Use pictures, manipulatives, and/or arrays to solve real-world one-step multiplication and division word problems within 100.
MA.3.AT.3: Solve two-step real-world problems using the four operations of addition, subtraction, multiplication and division (e.g., by using drawings and equations with a symbol for the unknown number to represent the problem).	**MA.3.AT.3.a.1**: Use pictures, manipulatives, and/or tables to solve real-world two-step addition and subtraction word problems up to 100.
MA.3.AT.4: Interpret a multiplication equation as equal groups (e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each). Represent verbal statements of equal groups as multiplication equations.	**MA.3.AT.4.a.1**: Create a model to represent a multiplication problem.
Indiana Academic Standards	**Content Connectors**
MA.3.AT.5: Determine the unknown whole number in a multiplication or division equation relating three whole numbers.	**MA.3.AT.5.a.**1: Apply properties of operations as strategies to multiplication or division.
MA.3.AT.6: Create, extend, and give an appropriate rule for number patterns using multiplication within 1000.	**MA.3.AT.6.a.1**: Identify number patterns using multiplication within 100.

GEOMETRY

Indiana Academic Standards	Content Connectors

MA.3.G.1: Identify and describe the following: cube, sphere, prism, pyramid, cone, and cylinder.	**MA.3.G.1.a.1**: Identify the following: cube, sphere, cylinder, and cone.
MA.3.G.2: Understand that shapes (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides), and that the shared attributes can define a larger category (e.g., quadrilaterals). Recognize and draw rhombuses, rectangles, and squares as examples of quadrilaterals. Recognize and draw examples of quadrilaterals that do not belong to any of these subcategories.	**MA.3.G.2.a.1**: Identify shared attributes of shapes based on the models provided.
MA.3.G.3: Identify, describe and draw points, lines and line segments using appropriate tools (e.g., ruler, straightedge, and technology), and use these terms when describing two-dimensional shapes.	**MA.3.G.3.a.1**: Use points to create a straight line with a ruler, straight edge, or technology.
MA.3.G.4: Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole (1/2, 1/3, 1/4, 1/6, 1/8).	**MA.3.G.4.a.1**: Partition shapes into equal parts (halves, thirds, fourths) with equal area.

MEASUREMENT

Indiana Academic Standards	Content Connectors
MA.3.M.1: Estimate and measure the mass of objects in grams (g) and kilograms (kg) and the volume of objects in quarts (qt), gallons (gal), and liters (l). Add, subtract, multiply, or divide to solve one-step real-world problems involving masses or volumes that are given in the same units (e.g., by using drawings, such as a beaker with a measurement scale, to represent the problem).	**MA.3.M.1.a.1**: Measure volume using gallons, quarts, and liters.
MA.3.M.2: Choose and use appropriate units and tools to estimate and measure length, weight, and temperature. Estimate and measure length to a quarter-inch, weight in pounds, and temperature in degrees Celsius and Fahrenheit.	**MA.3.M.2.a.1**: Select appropriate tool for measuring length, weight, and temperature.
MA.3.M.3: Tell and write time to the nearest minute from analog clocks, using a.m. and p.m., and measure time intervals in minutes. Solve real-world problems involving addition and subtraction of time intervals in minutes.	**MA.3.M.3.a.1**: Tell and write time to the nearest quarter hour. Solve real-world word problems involving the addition and subtraction of time intervals to whole hours or within an hour (e.g., whole hours: 5:00 to 8:00, within hours: 7:15 to 7:45) using manipulatives or pictures of a clock.
Indiana Academic Standards	**Content Connectors**

MA.3.M.4: Find the value of any collection of coins and bills. Write amounts less than a dollar using the ¢ symbol and write larger amounts using the $ symbol in the form of dollars and cents (e.g., $4.59). Solve real-world problems to determine whether there is enough money to make a purchase.	**MA.3.M.4.a.1**: Solve real-world problems to determine whether there is enough money to make a purchase using the next dollar strategy (round up to the next whole dollar).
MA.3.M.5: Find the area of a rectangle with whole-number side lengths by modeling with unit squares, and show that the area is the same as would be found by multiplying the side lengths. Identify and draw rectangles with the same perimeter and different areas or with the same area and different perimeters.	**MA.3.M.5.a.1**: Find the area of rectangles by modeling with unit squares.
MA.3.M.6: Multiply side lengths to find areas of rectangles with whole-number side lengths to solve real-world problems and other mathematical problems involving shapes, and represent whole-number products as rectangular areas in mathematical reasoning.	**MA.3.M.6.a.1**: Use tiling and addition to determine area of a rectangle.
MA.3.M.7: Find perimeters of polygons given the side lengths or by finding an unknown side length.	**MA.3.M.7.a.1**: Identify a figure as getting larger or smaller when the dimensions of the figure change.
	MA.3.M.7.a.2: Use addition to find the perimeter of a polygon.

DATA ANALYSIS

Indiana Academic Standards	Content Connectors
MA.3.DA.1: Create scaled picture graphs, scaled bar graphs, and frequency tables to represent a data set—including data collected through observations, surveys, and experiments—with several categories. Solve one- and two-step "how many more" and "how many less" problems regarding the data and make predictions based on the data.	**MA.3.DA.1.a.1**: Organize given data into a graph.
	MA.3.DA.1.a.2: Select the appropriate statement that describes the data representations based on a given bar graph or picture graph.
MA.3.DA.2: Generate measurement data by measuring lengths with rulers to the nearest quarter of an inch. Display the data by making a line plot, where the horizontal scale is marked off in appropriate units, such as whole numbers, halves, or quarters.	**MA.3.DA.2.a.1**: Organize measurement data into a line plot.