

Mathematics at Work 10-12 and Related Mathematics 7-9 Outcomes

- This document is intended to support Mathematics at Work teachers with planning by situating their current outcomes within the learning progression for that concept. The background section of the [curriculum document](#) will provide teachers with greater detail. The [outcomes at a glance](#) document, and pacing guide (available in Moodle) and the full [Mathematics Outcomes Progression 6-9](#) should be referenced by teachers.
- This document does not include all Mathematics 7- 9 outcomes, only those that lead directly into Mathematics at Work 10-12.
- Outcomes with a strikethrough have been removed from curriculum, but included in this document to provide a frame of reference.
- [HRCE Teaching and Learning Site](#) also has access to additional resources to support development of learning outcomes

Unit	Mathematics 7	Mathematics 8	Mathematics 9	Mathematics 10 at Work	Mathematics 11 at Work	Mathematics 12 at Work
				<u>Note:</u> It is intended that outcome G01 be integrated throughout units) Parts of A01 (Students will be expected to solve problems that require the manipulation and application of formulas related to perimeter, area, the Pythagorean theorem, primary trigonometric ratios, and income.) are covered in different units.	<u>Note:</u> Parts of A01 (volume and capacity, surface area, simple interest, finance charges, slope and rate of change) are covered in different units.	<u>Note:</u> It is intended that outcome N01 be integrated throughout units) Parts of A01 (recognizing patterns and trends, graphing, creating tables of values, writing equations, interpolating and extrapolating, solving problems) are covered in different units.
<u>Measurement</u>	M02 Students will be expected to develop and apply a formula for determining the area of triangles, parallelograms,	M01 Students will be expected to develop and apply the Pythagorean theorem to solve problems.	M01 Students will be expected to solve problems and justify the solution strategy using circle properties	M01 Students will be expected to demonstrate an understanding of the International System of Units (SI) by:	M01 Students will be expected to solve problems that involve SI and imperial units in surface area	M01 Students will be expected to demonstrate an understanding of the limitations of measuring instruments including,

	and circles.	M03 Students will be expected to determine the surface area of right rectangular prisms, right triangular prisms, and right cylinders to solve problems.	including the following: The perpendicular from the center of a circle to a chord bisects the chord. The measure of the central angle is equal to twice the measure of the inscribed angle subtended by the same arc. The inscribed angles subtended by the same arc are congruent. A tangent to a circle is perpendicular to the radius at the point of tangency	- describing the relationships of the units for length, area, volume, capacity, mass, and temperature - applying strategies to convert SI units to imperial units M02 Students will be expected to demonstrate an understanding of the imperial system by: - describing the relationships of the units for length, area, volume, capacity, mass, and temperature - comparing the American and British imperial units for capacity - applying strategies to convert imperial units to SI units M03 Students will be expected to solve and verify problems that involve SI and imperial linear measurements, including decimal and fractional measurements M04 Students will be expected to solve problems that involve SI and imperial area measurements of regular, composite, and irregular	measurements and verify the solutions. M02 Students will be expected to solve problems that involve SI and imperial units in volume and capacity measurements A01 Students will be expected to solve problems that require the manipulation and application of formulas related to: - volume and capacity - surface area G02 Students will be expected to solve problems that involve scale.	precision, accuracy, uncertainty, and tolerance, and solve problems.
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				2-D shapes and 3-D objects, including decimal and fractional measurements, and verify the solutions. A01 Students will be expected to solve problems that require the manipulation and application of formulas related to: - perimeter - area. G01 Students will be expected to analyze puzzles and games that involve <i>spatial reasoning</i>, using problem solving strategies.		
<u>Geometry</u>	G03 Students will be expected to perform and describe transformations (translations, rotations, or reflections) of a 2-D shape in all four quadrants of a Cartesian plane (limited to integral number vertices)	G01 Students will be expected to draw and interpret top, front, and side views of 3-D objects composed of right rectangular prisms.	G01 Students will be expected to determine the surface area of composite 3-D objects to solve problems. G02 Students will be expected to demonstrate an understanding of similarity of polygons. G03 Students will be expected to draw and interpret scale diagrams of 2-D shapes.	G01 Students will be expected to analyze puzzles and games that involve spatial reasoning, using problem solving strategies. G02 Students will be expected to demonstrate an understanding of the Pythagorean theorem by identifying situations that involve right triangles, verifying the formula, applying the formula, and	G01 Students will be expected to solve problems that involve two and three right triangles. G03 Students will be expected to model and draw 3-D objects and their views. G04 Students will be expected to draw and describe exploded views, component parts, and scale diagrams of simple	G01 Students will be expected to solve problems by using the sine law and cosine law, excluding the ambiguous case. G02 Students will be expected to solve problems that involve triangles, quadrilaterals, and regular polygons. G03 Students will be expected to demonstrate an understanding of

				solving problems. G03 Students will be expected to demonstrate an understanding of similarity of convex polygons, including regular and irregular polygons. G04 Students will be expected to demonstrate an understanding of primary trigonometric ratios (sine, cosine, tangent) by applying similarity to right triangles, generalizing patterns from similar right triangles, applying the primary trigonometric ratios, and solving problems. G05 Students will be expected to solve problems that involve parallel, perpendicular, and transversal lines, and pairs of angles formed between them. G06 Students will be expected to demonstrate an understanding of angles, including acute, right, obtuse, straight, and reflex, by drawing, replicating and	3-D objects	transformations on a 2-D shape or a 3-D object, including translations, rotations, reflections, and dilations. A01 Students will be expected to demonstrate an understanding of linear relations by: - recognizing patterns and trends - graphing - creating tables of values - writing equations - interpolating and extrapolating - solving problems
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				constructing, bisecting, and solving problems. A01 Students will be expected to solve problems that require the manipulation and application of formulas related to the Pythagorean theorem, and primary trigonometric ratios. <i>G01 Students will be expected to analyze puzzles and games that involve spatial reasoning, using problem solving strategies.</i>		
<u>Number</u>	N03 Students will be expected to solve problems involving percents from 1% to 100% (limited to whole numbers). N05 Students will be expected to demonstrate an understanding of adding and subtracting positive fractions and mixed numbers, with like and unlike denominators, concretely, pictorially, and symbolically (limited to positive sums and differences).	N04 Students will be expected to demonstrate an understanding of ratio and rate. N05 Students will be expected to solve problems that involve rates, ratios, and proportional reasoning. N06 Students will be expected to demonstrate an understanding of multiplying and dividing positive fractions and mixed numbers, concretely, pictorially,	N03 Students will be expected to demonstrate an understanding of rational numbers by comparing and ordering rational numbers, and solving problems that involve arithmetic operations on rational numbers N04 Students will be expected to explain and apply the order of operations, including exponents, with and without technology.	N01 Students will be expected to solve problems that involve unit pricing and currency exchange, using proportional reasoning. N02 Students will be expected to demonstrate an understanding of income to calculate gross pay and net pay, including wages, salary, contracts, commissions, and piecework. A01 Students will be expected to solve	N01 Students will be expected to analyze puzzles and games that involve numerical reasoning, using problem-solving strategies. N02 Students will be expected to solve problems that involve personal budgets. N03 Students will be expected to demonstrate an understanding of compound interest.	N01 Students will be expected to analyze puzzles and games that involve logical reasoning, using problem-solving strategies. N02 Students will be expected to solve problems that involve the acquisition of a vehicle by buying, leasing, or leasing to buy. N03 Students will be expected to critique the viability of small business

	N06 Students will be expected to demonstrate an understanding of addition and subtraction of integers, concretely, pictorially, and symbolically.	and symbolically. N07 Students will be expected to demonstrate an understanding of multiplication and division of integers, concretely, pictorially, and symbolically.		problems that require the manipulation and application of formulas related to income. <i>G01 Students will be expected to analyze puzzles and games that involve spatial reasoning, using problem solving strategies.</i>	N04 Students will be expected to demonstrate an understanding of financial institution services used to access and manage finances. N05 Students will be expected to demonstrate an understanding of credit options, including credit cards and loans. A01 Students will be expected to solve problems that require the manipulation and application of formulas related to: - simple interest - finance charges	options by considering expenses, sales, and profit or loss. A01 Students will be expected to demonstrate an understanding of linear relations by: - recognizing patterns and trends - graphing - creating tables of values - writing equations - interpolating and extrapolating - solving problems
Algebra	PR06 Students will be expected to model and solve, concretely, pictorially, and symbolically, problems that can be represented by one-step linear equations of the form $x + a = b$, where a and b are integers. PR07 Students will be expected to model and solve, concretely, pictorially, and symbolically, where a, b, and c are whole	PR02 Students will be expected to model and solve problems, concretely, pictorially, and symbolically, where a, b, and c are integers, using linear equations of the form $ax = b$ $\frac{x}{a} = b, a \neq 0$ $ax + b = c$ $\frac{x}{a} + b = c, a \neq 0$ $a(x + b) = c$	PR03 Students will be expected to model and solve problems using linear equations of the form: $ax = b$ $\frac{x}{a} = b, a \neq 0$ $ax + b = c$ $\frac{x}{a} + b = c, a \neq 0$ $ax = b + cx$ $a(x + b) = c$ $ax + b = cx + d$ $a(bx + c) = d(ex + f)$ $\frac{a}{x} = b, b \neq 0$	<i>A01 Students will be expected to solve problems that require the manipulation and application of formulas related to perimeter, area, the Pythagorean theorem, primary trigonometric ratios, and income.</i> <i>G01 Students will be expected to analyze puzzles and games that involve spatial reasoning, using problem solving</i>	A01 Students will be expected to solve problems that require the manipulation and application of formulas related to: - slope and rate of change A02 Students will be expected to demonstrate an understanding of slope: - as rise over run - as rate of change - by solving problems	A01 Students will be expected to demonstrate an understanding of linear relations by: - recognizing patterns and trends - graphing - creating tables of values - writing equations - interpolating and extrapolating - solving problems N01 Students will be expected to analyze puzzles and games that

	numbers, problems that can be represented by linear equations of the form $ax + b = c$; $ax = b$; $x \div a = b$, $a \neq 0$		Where a , b , c , d , e , f are rational numbers.	<i>strategies.</i>	A03 Students will be expected to solve problems by applying proportional reasoning and unit analysis	involve logical reasoning , using problem-solving strategies.
<u>Statistics</u>	SP03 Students will be expected to construct, label, and interpret circle graphs to solve problems	SP01 Students will be expected to critique ways in which data is presented.	SP01 Students will be expected to describe the effect on the collection of data of bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity. SP02 Students will be expected to select and defend the choice of using either a population or a sample of a population to answer a question. SP03 Students will be expected to develop and implement a project plan for the collection, display, and analysis of data by formulating a question for investigation choosing a data collection method that includes social considerations selecting a population or a sample collecting the data displaying the collected data in an appropriate manner drawing		S01 Students will be expected to solve problems that involve creating and interpreting graphs, including bar graphs, histograms, line graphs, and circle graphs.	S01 Students will be expected to solve problems that involve measures of central tendency, including mean, median, mode, weighted mean, and trimmed mean. S02 Students will be expected to analyze and describe percentiles. A01 Students will be expected to demonstrate an understanding of linear relations by: - recognizing patterns and trends - interpolating and extrapolating N01 Students will be expected to analyze puzzles and games that involve logical reasoning, using problem-solving strategies.

			conclusions to answer the question.			
<u>Probability</u>	SP04 Students will be expected to express probabilities as ratios, fractions and percents. SP06 Students will be expected to conduct a probability experiment to compare the theoretical probability (determined using a tree diagram, table, or other graphic organizer) and experimental probability of two independent events.	SP02 Students will be expected to solve problems involving the probability of independent events.	SP04 Students will be expected to demonstrate an understanding of the role of probability in society.			P01 Students will be expected to analyze and interpret problems that involve probability. N01 Students will be expected to analyze puzzles and games that involve logical reasoning, using problem-solving strategies.