

**Mathematics
Learning Outcomes
Grade 6**

Students will

Standard #

NUMBER SENSE AND OPERATIONS

- 6.N.1** Represent value of numbers with exponents.
Represent quantities in other base systems.
- 6.N.2, 3** Represent, read, and write decimals through billions/billionths in expanded and decimal notation.
Represent decimal numbers in scientific notation.
- 6.N.8** Identify factors and multiples, including greatest common factor and least common multiple using multiple strategies; determine the prime factorization of a number and identify numbers as relatively prime.
- 6.N.4** Recognize fractions as part to whole, ratios, and division problems and represent remainders as both fractions and decimals.
- 6.N.5** Convert among all three representations for $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{25}$; make equivalent fractions by using multiples or common factors; articulate when a fraction is in lowest terms.
- 6.N.7** Use several strategies to order and compare fractions including unit fractions, logic, common denominators, and cross products; compare and order decimals.
- 6.N.12, 13** Perform all operations with fractions and decimals.
Use a spreadsheet to organize data, write formulas, and explore what-if scenarios.

PATTERNS, RELATIONS, AND ALGEBRA

- 6.P.1** Analyze patterns and determine rules using words and symbolic language.
- 6.P.3** Use properties of equality and inverse relationships to solve problems.
- 6.P.4** Represent real situations and mathematics relationships with concrete models, tables, graphs, and rules in words and symbolic language.
Use ratio and proportion to solve problems.

Learning Outcomes **Grade 6 *Continued***

Students will

Standard #

GEOMETRY

- 6.G.3** Identify relationships among points, lines, and planes.
- 8.G.3** Identify corresponding, vertical, complementary, and supplementary angles.
- 6.G.4** Identify and graph points in a coordinate plane.
- 6.G. 6, 7** Identify the characteristics of rotations, translations, or reflections; rotate, flip, or slide objects.
- 6.G.8** Identify congruent and similar polygons.
- 8.G.4*** Use ratio and proportion to find missing sides of similar polygons.
- 6.G.9** Represent various views (perspective drawing) of a three-dimensional object.

MEASUREMENT

- 6.M.2** Identify characteristics of polygons; identify or draw the height of triangles and parallelograms.
- 6.M.4** Calculate area and perimeter of circles, triangles, and parallelograms.
- 6.M.5** Identify parts of a circle.

*This standard may not be met entirely.

**Mathematics
Learning Outcomes
Grade 7**

Students will

Standard #

NUMBER SENSE AND OPERATIONS

- 8.N.1** Represent, read, and write numbers through quadrillions/quadrillionths in expanded notation, decimal notation, and scientific notation; convert among fractions, decimals, and percents; compare and order rational numbers.
- 8.N.2** Define, compare, order, and apply frequently used irrational numbers ($\sqrt{2}$, π).
- 8.N.3** Use proportional reasoning to solve problems on a variety of topics.
- 8.N.4** Represent numbers in scientific notation and use them in calculations; use scientific notation key on calculator correctly; articulate the functional difference between the scientific notation key and the exponent key.
- 8.N.7*** Extend the order of operations to include exponents and square roots.
- 8.N.9** Use inverse relationships to solve problems and equations.
- 8.N.10-12** Select appropriate operation, estimate, and compute to solve problems with rational numbers.
- Choose appropriate tools from among mental math, paper and pencil, calculator, or spreadsheet; use function keys of scientific calculator appropriately; use spreadsheet to organize data, write formulas, perform repetitive calculations, and generate graphs.

PATTERNS, RELATIONS, AND ALGEBRA

- 8.P.1** Extend, represent, analyze, and generalize a pattern.
- 8. P.2** Evaluate simple algebraic expressions.
- 8. P.7*** Set up and solve linear equations and inequalities with one variable.
- 8.P.8
(10.M.3)** Explain and analyze how a change in one dimension of a polygon/polyhedron results in a change in area/volume.

Learning Outcomes **Grade 7 *Continued***

Students will

Standard #

GEOMETRY

- 8.G.1** Analyze, apply, and explain the relationship between the number of sides and the sums of the interior and exterior angles in polygons.
- 8.G.3** Identify congruent angles in parallel lines -- alternate interior/exterior; vertical, corresponding.
- 8.G.4** Use the Pythagorean theorem to solve problems.
- 8.G.7** Identify characteristics of polygons and polyhedrons.
- 8.G.8** Draw nets and prospective drawings of three-dimensional objects.

MEASUREMENT

- 8.M.1** Select and use appropriate units of measurement or scale; convert within system.
- 8.M.3** Calculate the area of parallelograms, trapezoids, circles, and combinations/parts of these; calculate the volume and surface area of prisms, cylinders, pyramids, cones, and spheres.
- 8.M.4** Use ratio and proportion to solve problems involving similar figures and indirect measurement.

DATA ANALYSIS, STATISTICS, AND PROBABILITY

- 6.D.1** Determine mean, median, mode, range, quartiles.
- 6.D.2**
8.D.2 Select and construct an appropriate data display from among bar (single, stacked, multiple), line (single, multiple), circle, stem and leaf, and box and whiskers representations.
- 8.D.3** Interpret the meaning of and use mean, median, mode, range, quartiles to support a position.
- 6.D.4+** Articulate the meaning of probability and odds and the difference between experimental and theoretical probability; calculate the probability of a single event, independent, and dependent events.

Learning Outcomes
Grade 7 *Continued*

Students will

Standard #

DATA ANALYSIS, STATISTICS, AND PROBABILITY *Continued*

8.D.4 Calculate the number of combinations/permutations using diagrams, lists, or the Fundamental Counting Principle.

Apply probability and combination concepts to solve problems.

Access data from the Internet.

*This standard may not be met entirely.

+This goes beyond the stated standard.

Mathematics
Learning Outcomes
Grade 8

By the end of their eighth grade year, students who take algebra as eighth graders will

Standard #

NUMBER SENSE AND OPERATIONS

- 8.N.6** Demonstrate an understanding of absolute value.
- 8.N.7** Apply the rules of powers and roots to the solution of problems.
- 8.N.8** Demonstrate an understanding of the properties of arithmetic and rational numbers.
- AI.N.1** Identify and use the properties of operations on real numbers.
- AI.N.2** Simplify expressions including integer exponents and absolute value.

PATTERNS, RELATIONS, AND ALGEBRA

- AI.P.1** Define, extend, analyze, generalize, and create a wide variety of patterns including iterative, recursive, linear, quadratic, and exponential.
- AI.P.3** Demonstrate an understanding of relations and functions. Identify the domain, range, dependent, and independent variables of the function.
- AI.P.4** Translate among different representations of functions: graphs, tables, equations, and STELLA models.
- AI.P.5** Demonstrate an understanding of the relationship between various representations of a line; determine slope; write and graph linear equations.
- AI.P.6** Determine equations of lines parallel or perpendicular to a given line.
- AI.P.7*** Add, subtract, and multiply polynomials.
- AI.P.8*** Manipulate polynomial expressions by rearranging terms, combining like terms, and factoring; simplify simple rational expressions; apply properties of integer exponents.
- AI.P.9*** Find the solutions to quadratic equations using graphs, factoring, or the quadratic formula.
- AI.P.11*** Solve everyday problems that can be modeled using linear, quadratic, or exponential functions.

Learning Outcomes Grade 8 *Continued*

By the end of their eighth grade year, students who take algebra as eighth graders will

Standard

PATTERNS, RELATIONS, AND, ALGEBRA *Continued*

AI.P.12* Solve everyday problems that can be modeled using systems of linear equations.

AI.D.2 Approximate a line of best fit.

MEASUREMENT

8.M.5 Use models, graphs, and equations to solve simple problems involving rates; use STELLA to model a variety of rate problems.

*The standard may not be met entirely. The description of the outcome reflects what the student is able to do. The standard may involve more.

