Grade Level Expectations for the Sunshine State Standards

Mathematics
Seventh Grade

FLORIDA DEPARTMENT OF EDUCATION
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Sunshine State Standards

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Mathematics
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The seventh grade student:

Number Sense, Concepts, and Operations

- knows word names and standard numerals for integers, fractions, decimals, ratios, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, and numbers expressed using the square root radical.
- reads and writes whole numbers and decimals in expanded form, including exponential notation.
- compares and orders integers, fractions, decimals, numbers with exponents, and numbers expressed as percents or in scientific notation, including ordering on a number line.
- knows examples of rational and irrational numbers in real-world situations, including the irrational numbers π and $\sqrt{2}$.
- describes the meanings of rational and irrational numbers using physical or graphical displays.
- knows the relationships among fractions, decimals, and percents.
- expresses a given quantity in a variety of ways (for example, integers, fractions, decimals, numbers expressed as a percent, numbers expressed in scientific notation, ratios).
- expresses whole numbers in exponential notation (for example, $36 = 6^2$) and evaluates numerical expressions that contain exponential notation.
- expresses numbers greater than one in scientific notation.
- applies knowledge of the decimal number system and of non-place-value systems.
- knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals.
- uses models or pictures to show the effects of addition, subtraction, multiplication, and division on whole numbers, decimals, fractions, mixed numbers, and integers.
- applies the properties of rational numbers to solve problems (commutative, associative, distributive, identity, equality, inverse).
- knows the inverse relationship of positive and negative numbers.
- knows the appropriate operation to solve real-world problems involving fractions, decimals, and integers.
- solves real-world problems involving decimals and fractions using two- or three-step problems.
- solves real-world problems involving percents (for example, discounts, simple interest, taxes, tips).
- applies order of operations to solve problems (parentheses, exponents, multiplication, division, addition, and subtraction).
- knows proportional relationships and uses tables, graphs, or “constant ratio” relationships to solve and explain problems.

- solves one- or two-step real-world problems involving whole numbers, fractions, or decimals using appropriate methods of computation, such as mental computation, paper and pencil, and calculator.
- knows an appropriate estimation technique for a given situation using whole numbers and fractions.
- estimates to predict results and check reasonableness of results.
- determines whether an exact answer is needed or an estimate would be sufficient.
- knows if numbers are prime or composite and determines the prime factorization of a composite number.
- finds the greatest common factor and least common multiple of two or more numbers.
- applies number theory concepts to determine the terms in a sequence.
- applies number theory concepts, including divisibility rules, to solve real-world or mathematical problems.

Measurement

- uses concrete or graphic models to create formulas for finding volumes and surface areas of solids (prisms and cylinders).
- solves and explains problems involving perimeter, area, or circumference or the surface area or volume of prisms and cylinders.
- finds the measure of an angle by measuring with a protractor or applying angle relationships (for example, corresponding, complementary, supplementary, interior, exterior).
- develops and uses the distance formula in solving real-world problems (d = rt).
- given a two- or three-dimensional figure, creates a new figure by increasing or decreasing the original dimensions.
- knows the relationships between the perimeters, areas, surface areas, or volumes of the original figure and those of the newly created figure.
- knows an appropriate scale needed to produce a proportional drawing or model.
- knows proportional relationships used in scale drawings and produces a scale drawing.
- measures length, weight or mass, and capacity or volume using customary or metric units.
- knows relationships between metric units of mass and capacity (for example, one cubic centimeter of water weighs one gram).
- finds measures of length, weight or mass, and capacity or volume using proportional relationships and properties of similar geometric figures (for example, using shadow measurement and properties of similar triangles to find the height of a flag pole).
- compares units of measurement within a system (metric or customary).

- performs operations on measurements within either the metric or customary system (for example, finds three times 27 inches and expresses the answer in yards).
- selects the appropriate unit of measurement when solving real-world problems (for example linear, square, and cubic units).
- solves problems using the metric or customary system involving conversions within the same system.
- knows whether an exact answer is needed or if an estimate is sufficient.
- estimates solutions to real-world problems involving estimations of measurements.
- selects appropriate units of measurement in a real-world context.
- knows that measurements are always approximate and that the degree of accuracy of a measurement depends upon the precision of the instrument.
- knows the precision of different measuring instruments and determines the appropriate precision unit for a given situation.
- selects a measurement tool (for example, scales, rulers, thermometers, measuring cups, protractors, gauges) appropriate to a given situation.
- measures accurately with the measurement tools to the specified degree of accuracy for the task and in keeping with the precision of the measurement tool.

Geometry and Spatial Sense

- identifies, draws, and uses symbolic notation to denote the basic properties of geometric terms including lines (intersecting, skew, parallel, perpendicular), two-dimensional figures, and congruent figures.
- determines the measure of various types of angles using a protractor or angle relationships (including complementary, supplementary, and vertical angles).
- compares and describes the attributes of regular and irregular polygons (for example, parallelogram, trapezoid, pentagon, hexagon).
- identifies and classifies triangles and quadrilaterals.
- knows the attributes of and draws three-dimensional figures (pyramid, cone, sphere, hemisphere).
- uses manipulatives and drawings to solve problems requiring spatial visualization.
- describes and applies the properties of parallelism, perpendicularity, and symmetry in real-world contexts.
- recognizes, draws, and describes congruent and similar figures.
- creates and describes the attributes of a figure either congruent or similar to a given figure.
- identifies and performs the various transformations (reflection, translation, rotation) of a given figure on a coordinate plane.

- observes, explains, and makes conjectures regarding geometric properties and relationships (among angles, lines, regular and irregular polygons).
- creates and solves angle measurement problems for triangles.
- demonstrates the Pythagorean relationship in right triangles using models or diagrams (for example, manipulatives, dot, graph, or isometric paper).
- given two sides of a right triangle, uses the Pythagorean Theorem to find the length of the third side.
- identifies each quadrant and the characteristics of points in each quadrant (positive and negative).
- identifies and plots ordered pairs in all four quadrants of the coordinate system.

Algebraic Thinking

- uses manipulatives and graphic materials to generate tables and charts (for example, input, output) to develop algebraic expressions, equations, or formulas.
- given instances of a pattern, expresses a generalization of the pattern using algebraic expressions.
- given an algebraic expression of a relationship or pattern, supplies specific instances of the relationship or pattern.
- predicts outcomes based on a generalization of a pattern or relationship.
- interprets and creates tables, function tables, and graphs (all four quadrants).
- writes expressions and equations to describe relationships.
- graphs equations to explain cause-and-effect relationships.
- translates verbal expressions and sentences into algebraic expressions and equations.
- translates algebraic expressions, equations, or formulas representing real-world relationships into verbal expressions or sentences.
- given an algebraic equation or expression of a real-world application, substitutes integral values for variables and simplifies the results.
- graphs solutions to equations and inequalities on a number line.
- graphs linear equations on the coordinate plane from a table of values.
- knows how to solve one-step and simple multi-step linear equations and inequalities representing real-world situations, using pictures, models, manipulatives (such as algebra tiles), or other strategies.
- simplifies algebraic expressions with one variable.

Data Analysis and Probability

- generates and collects data for analysis.

- interprets and analyzes data presented in a variety of forms, including box-and-whisker graphs and scatter plots.
- constructs, interprets, and explains displays of data, such as tables and graphs (circle graphs, single- and multiple-bar graphs, and single- and multiple-line graphs) and explains how different displays of data lead to different interpretations.
- finds the range, mean, median, and mode of data from a table, chart, or graph.
- draws conclusions from an analysis of range and central tendency of a set of real-world data.
- applies and analyzes appropriate measures of central tendency (mode, mean, median, range) for a set of data.
- uses technology, such as graphing calculators and computer spreadsheets, to analyze data and create graphs.
- obtains experimental results using manipulatives and explains observed difference between mathematical and experimental results.
- calculates simple mathematical probabilities for independent and dependent events.
- computes the mathematical odds for and against a specified outcome in given real-world experiments.

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