

**Seventh Grade (Advanced) Math Curriculum Map (2006-
2007)**

First Quarter:

Chunk #1: Computation with Real Numbers

- 8N2: Recognize that natural numbers, whole numbers, integers, rational numbers and irrational numbers are subsets of the real number system
- N3: Describe differences between rational and irrational numbers; e.g., use technology to show that some numbers (rational) can be expressed as terminating or repeating decimals and others (irrational) as non-terminating and non-repeating decimals.
- N4: Use order of operations and properties to simplify numerical expressions involving integers, fractions, and decimals.
- N5: Explain the meaning and effect of adding, subtracting, multiplying and dividing integers; e.g., how adding two integers can result in a lesser value.
- 8N3: Apply order of operations to simplify expressions and perform computations involving integer exponents and radicals.
- N6: Simplify numerical expressions involving integers and use integers to solve real-life problems.
- N1: Demonstrate an understanding of place value using powers of 10 and write large numbers in scientific notation.
- N2: Explain the meaning of exponents that are negative or 0.
- 8N1: Use scientific notation to express large numbers and small numbers between 0 and 1.
- 8N8: Add, subtract, multiply, divide and compare numbers written in scientific notation.
- N9: Represent and solve problem situations that can be modeled by and solved using concepts of absolute value, exponents, and square roots (for perfect squares).

Chunk #2: Algebra

- A9: Recognize a variety of uses for variables; e.g., placeholder for an unknown quantity in an equation, generalization for a pattern, formula.
- A7: Justify that two forms of an algebraic expression are equivalent, and recognize when an expression is simplified; e.g., $4m = m + m + m + m$ or $a \cdot 5 + 4 = 5a + 4$
- A4: Create visual representations of equation-solving processes that model the use of inverse operations.

8N4: Explain and use the inverse and identity properties and use inverse relationships (addition/subtraction, multiplication/division, squaring/square roots) in problem solving situations

A1: Represent and analyze patterns, rules and functions with words, tables, graphs, and simple variable expressions.

A2: Generalize patterns by describing in words how to find the next term.

Chunk #3: Graphing

A5: Represent linear equations by plotting points in the coordinate plane.

A6: Represent inequalities on a number line or a coordinate plane.

A10: Analyze linear and simple nonlinear relationships to explain how a change in one variable results in the change of another.

A3: Recognize and explain when numerical patterns are linear or nonlinear progressions; e.g., 1, 3, 5, 7 ... is linear and 1, 3, 4, 8, 16 ... is nonlinear.

A11: Use graphing calculators or computers to analyze change; e.g., distance-time relationships.

Second Quarter:

Chunk #4: Proportional Reasoning

N7: Solve problems using the appropriate form of a rational number (fraction, decimal or percent)

N8: Develop and analyze algorithms for computing with percents and integers, and demonstrate fluency in their use.

M4: Solve problems involving proportional relationships and scale factors; e.g., scale models that require unit conversions within the same measurement system.

Chunk #5: Triangles

G1: Use proportional reasoning to describe and express relationships between parts and attributes of similar and congruent figures.

G4: Determine necessary conditions for congruence of triangles.

G5: Apply properties of congruent or similar triangles to solve problems involving missing lengths and angle measures.

8G3: Use proportions in several forms to solve problems involving similar figures (part-to-part,

part-to-whole, corresponding sides between figures.)

- G3: Use and demonstrate understanding of the properties of triangles. For example:
 - a. Use Pythagorean Theorem to solve problems involving right triangles.
 - b. Use triangle angle sum relationships to solve problems.
- G6: Determine and use scale factors for similar figures to solve problems involving proportional reasoning.

Chunk #6: Geometry

- G2: Determine sufficient (not necessarily minimal) properties that define a specific two-dimensional figure or three-dimensional object. For example:
 - a. Determine when one set of figures is a subset of another; e.g., all squares are rectangles.
 - b. Develop a set of properties that eliminates all but the desired figure; e.g., only squares are quadrilaterals with all sides congruent and all angles congruent.
- 8G1: Make and test conjectures about characteristics and properties (e.g., sides, angles, symmetry) of two-dimensional figures and three-dimensional objects.
- 8G2: Recognize the angles formed and the relationship between the angles when two lines intersect and when parallel lines are cut by a transversal.
- 8M8: Find the sum of the interior and exterior angles of regular convex polygons with and without measuring the angles with a protractor.

Third Quarter:

Chunk #7: Transformations

- G7: Identify the line and rotation symmetries of two-dimensional figures to solve problems.

8G5: Draw the results of translations, reflections, rotations and dilations of objects in the coordinate plane, and determine properties that remain fixed; e.g., lengths of sides remain the same under translations

G8: Perform translations, reflections, rotations and dilations of two-dimensional figures using a variety of methods (paper folding, tracing, **graph paper**)

Chunk #8: Measurement

M1: Select appropriate units for measuring derived measurements; e.g., miles per hour, revolutions per minute.

M3: Estimate a measurement to a greater degree of precision than the tool provides.

M5: Analyze problem situations involving measurement concepts, select appropriate strategies, and use an organized approach to solve narrative and increasingly complex problems.

8N5: Determine when an estimate is sufficient and when an exact answer is needed in problem situations, and evaluate estimates in relation to actual answers; e.g., very close, less than, greater than.

Chunk #9: Perimeter, Area, Volume

M2: Convert units of area and volume within the same measurement system using proportional reasoning and a reference table when appropriate; e.g., square feet to square yards, cubic meters to cubic centimeters.

M8: Understand the difference between surface area and volume and demonstrate that two objects may have the same surface area, but different volumes or may have the same volume, but different surface areas.

M6: Use strategies to develop formulas for finding area of trapezoids and volume of cylinders and prisms.

M9: Describe what happens to the surface area and volume of a three-dimensional object when the measurements of the object are changed; e.g., length of sides are doubled.

M7: Develop strategies to find the area of composite shapes using the areas of triangles, parallelograms, circles, and sectors.

A8: Use formulas in problem-solving situations.

G9: Draw representations of three-dimensional geometric objects from different views.

Fourth Quarter:

Chunk #10: Probability

DA7: Compute probabilities of compound events; e.g., multiple coin tosses or multiple rolls of number cubes, using such methods as organized lists, tree diagrams, and area models.

DA8: Make predictions based on theoretical probabilities, design and conduct an experiment to test the predictions, compare actual results to predicted results, and explain differences.

8DA10: Calculate the number of possible outcomes for a situation, recognizing and accounting for when items may occur more than once or when order is important.

8DA11: Demonstrate an understanding that the probability of either of two disjoint events occurring can be found by adding the probabilities for each and that the probability of one independent event following another can be found by multiplying the probabilities.

Chunk #11: Statistics

DA3: Analyze a set of data by using and comparing combinations of measures of center (mean, mode, median) and measures of spread (range, quartile, inter-quartile range), and describe how the inclusion or exclusion of outliers affects those measures.

DA1: Read, create and interpret box-and-whisker plots, stem-and-leaf plots, and other types of graphs, when appropriate.

DA2: Analyze how decisions about graphing affect the graphical representations; e.g., scale, size of classes in a histogram, number of categories in a circle graph.

DA6: Identify misuses of statistical data in articles, advertisements, and other media.

8DA7: Identify different ways of selecting samples, such as survey response, random sample, representative sample and convenience sample

DA5: Compare data from two or more samples to determine how sample selection can influence results.

DA4: Construct opposing arguments based on analysis of the same data, using different graphical representations.

In Blue are additional eighth grade indicators for seventh grade advanced level only.

In Red are the state indicators that are MOST important to cover thoroughly.