7th Grade Curriculum

Unit #1
Number Systems

1.1 Number Systems

- Distinguish between the various subsets of real numbers (Counting/natural numbers, whole numbers, integers, rational numbers, and irrational numbers.)
- Recognize the difference between rational and irrational numbers.
- Place rational and irrational numbers (approximations) on a number line and justify the placement of the numbers.

1.2 Laws of Exponents

- Develop the laws of exponents for multiplication and division.

1.3 Scientific Notation

- Write numbers in scientific notation.
- Translate numbers from scientific notation into standard form.
- Compare numbers written in scientific notation.

Unit #2
Number Theory

2.1 Numbers

2.2 Prime Factorization

- Determine the prime factorization of a given number and write in exponential form.

2.3 Greatest Common Factor

- Find the common factors and the Greatest Common Factor of two or more numbers.

2.4 Least Common Multiple

- Determine multiples and least common multiple of two or more numbers.

Unit #3
Operations

3.1 Absolute Value

- Simplify expressions using order of operations. Expressions may include absolute value and/or integral exponents greater than 0.

3.2 Order of operations

- Simplify expressions using order of operations. Expressions may include absolute value and/or integral exponents greater than 0.

3.3 Integer Operations

- Add, subtract, multiply and divide integers.
- Add and subtract two integers(with and without a number line).

3.4 Exponents with Base Ten Relating to Fractions and Decimals

- Develop a conceptual understanding of negative and zero exponents with a base of ten and relate to fractions and decimals.
- Classify irrational numbers as non-repeating/non-terminating decimals.

Unit #4
Algebra

4.1 Changing Verbal Expressions into Algebraic Expressions

- Translate two-step verbal expressions into algebraic expressions.

4.2 Changing Verbal Sentences into Algebraic Equations

- Translate two-step verbal sentences into two-step algebraic equations.

4.3 Evaluating Algebraic Expressions

- Use substitution to evaluate algebraic expressions(may include exponents of one, two and three).

4.4 Solving Two-step Equations

- Solve and explain two-step equations involving whole numbers using inverse operations.

4.5 Simple Proportions

- Solve simple proportions within context.

4.6 Solving One-step Inequalities

- Solve One-step inequalities(positive coefficients only).

4.7 Evaluating Formulas

- Evaluate formulas for given input values(surface area, rate, and density problems).

Unit #5
Geometric Shapes and Relationships

5.1 Circumference and Area of a Circle

- Calculate the radius or diameter, given the circumference or are of a circle.

5.2 Volume of Prisms and Cylinders

- Calculate the volume of prisms and cylinders, using a given formula and a calculator.

5.3 Identifying Solids and Nets

- Identify the two-dimensional shapes that make up the faces and basesof three dimensional shapes(prisms, cylinders, cones, and pyramids).

5.4 Surface Area of Prisms and Cylinders

- Determine the surface area of prisms and cylinders, using a calculator and a variety of methods.

5.5 Missing Angles of a Quadrilateral

- Find a missing angle when given angles of a quadrilateral.

Unit #6
Coordinate Geometry

6.1 Coordinate Plane

- Identify and plot points in all four quadrants.
- Calculate the area of basic polygons drawn on a coordinate plane(rectangles and shapes composed of rectangles having sides with integer shapes).

6.2 Graphing Inequalities

- Graph the solution set of an inequality(positive coefficients only) on a number line.

Unit #7
Measurement

7.1 Systems of Measurement

- Convert capacities and volumes within a given system.
- Identify customary and metric units of measure.
- Convert mass within a given system.

7.2 Making Circle Graphs

- Draw central angles in a given circle using a protractor(circle graphs).

7.3 Tools of Measurement

- Determine the tool and technique to measure with an appropriate level of precision: mass.
- Determine personal references for customary/metric units of mass.

7.4 Relative Error and Magnitude

- Identify the relationship between relative error and magnitude when dealing with large numbers.

7.5 Estimating Surface Area

- Estimate surface area.

7.6 Mass and Weight

- Justify the reasonableness of the mass of an object.

Unit #8
Collection and Analysis of Data

8.1 Random Samples and Surveys

- Develop the concept of sampling when collecting data from a population and decide the best method to collect data for a particular question.
- Identify and collect data using a variety of methods.

8.2 Measures of Central Tendency

- Calculate the range for a given set of data.

8.3 Determine the Best Measure of Central Tendency

- Select the appropriate measure of central tendency.

8.4 Reading and Interpreting Graphs

- Read and interpret data represented graphically (pictograph, bar graph, histogram, line graph, double line/bar graphs, or circle graph).

8.5 Misleading Statistics

- Identify and explain misleading statistics and graphs

Unit #9
Frequency Tables

9.1 Frequency Tables

- Record data in a frequency table.

9.2 Venn Diagrams

- Construct Venn diagrams to sort data.
- Display data in a circle graph.

9.3 Double Bar and Double Line Graphs

- Convert raw material into double bar graphs and double line graphs.

9.4 Choosing the Appropriate Graph

- Determine and justify the most appropriate graph to display a given set of data (pictograph, bar graph, line graph, histogram, or circle graph).
- Recognize, compare, and use an array of representational forms.

Unit #10
Probability

10.1 Introduction to Probability

10.2 Compound Events and Dependent Events

- List possible outcomes for compound events.
- Determine the probability of dependent events.

10.3 Independent Events

- Determine the number of possible outcomes for a compound event by using the fundamental counting principle and use this to determine the probabilities of events when the outcomes have equal probability.

10.4 Experimental Probability

- Interpret data to provide the basis for predictions and to establish experimental probabilities.
- Determine the validity of sampling methods to predict outcomes.
- Predict the outcome of an experiment.
- Design and conduct and experiment to test predictions.
- Compare actual results to predicted results.

Unit #11
Post March Algebra

11.1 Understanding Variables and Algebraic Expressions

- Add and subtract monomials with exponents of one.
- Identify a polynomial as an algebraic expression containing one or more terms.

11.2 Solving Equations

- Solving multi-step equations by combining like terms, using the distributive property, or moving variables to one side of the equation.

11.3 Identify Patterns in Equations

- Draw the graphic representation of a pattern from an equation or from a table of data.

11.4 Creating Algebraic Patterns

- Create algebraic patterns using charts/tables, graphs, equations, and expressions.

11.5 Identifying Patterns in Polygons

- Build a pattern to develop a rule for determining the sum of the interior angles of polygons.

11.6 Relating Functions and Equations

- Write an equation to represent a function from a table of values.

Unit #12
Post March Geometry

12.1 Exploring Right Triangles

- Identify the right angle, hypotenuse, and legs of a right triangle.
- Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean Theorem.

12.2 Applying the Pythagorean Theorem

- Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle.
- Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and Using a calculator.

Unit #13
Post March Measurement

13.1 Finding Distance On a Map

- Calculate distances using a map scale.

13.2 Finding Unit Price

- Calculate unit price using proportions.

13.3 Comparing Unit Prices

- Compare unit price.

13.4 Converting Money

- Convert money between different currencies with the use of an exchange rate table and a calculator.

8th Grade Curriculum

Unit #1
Decimals, Fractions, Proportions, and Percent

- Review prerequisite skills:
  - The four arithmetic operations for decimals and fractions.
  - Equivalent fractions.
  - Convert between decimals, fractions and percents.
  - Find the % of a number.
  - Write and solve proportions.
  - Real world problems with proportions.
- Calculate distance using a scale map.
- Calculate unit price using proportions.
- Comparing unit prices.
- Convert money between different currencies with the use of an exchange rate table and a calculator.
- Read, write, and identify percents less that 1% and greater than 100%.
- Apply percents to: tax, percent increase/decrease, simple interest, sale price, commission, interest rates, and gratuities.
- Estimate a percent of a quantity, given an application.
- Solve equations/proportions to convert to equivalent measurements within metric and customary measurement systems. (including Fahrenheit to Celsius).

Unit #2
Equations/Graphing Linear Equations

- Solve multi-step equations by combining like terms, suing the distributive property, or moving variables to one side of the equation.
- Draw the graphic representation of a pattern form an equation or from a table of data.
- Create algebraic patterns using charts/tables, graphs, equations, and expressions.
- Write an equation to represent a function from a table of values.
- Translate verbal sentences into algebraic inequalities.
- Write verbal expressions that match given mathematical expressions.
- Describe a situation involving relationships that matches a given graph.
- Create a graph given a description or an expression for a situation involving a linear or nonlinear relationship.

- Find a set of ordered pairs to satisfy a given linear numerical pattern (expressed algebraically); then plot the ordered pairs and draw the line.

Unit # 3
Right Triangles and Pythagorean Theorem

- Review properties of triangles
- Identify the right angle, hypotenuse, and legs of a right triangle.
- Explore the relationship between the lengths of the three sides of a right triangle to develop the Pythagorean Theorem.
- Use the Pythagorean Theorem to determine the unknown length of a side of a right triangle.
- Determine whether a given triangle is a right triangle by applying the Pythagorean Theorem and using a calculator.

Unit #4
Polynomial Operations

- Review exponents
- Add and subtract monomials with exponents of one.
- Identify a polynomial as an algebraic expression containing one or more terms.
- Evaluate expressions with integral exponents.
- Develop and apply the laws of exponents for multiplication and division.
- Multiply and divide monomials.
- Add and subtract polynomials.
- Multiply a binomial by a monomial or binomial.
- Divide a polynomial by a monomial (integer coefficients).
- Factor algebraic expressions using GCF.
- Factor a trinomial in the form ax2 + bx + c; a = 1 and c having no more than 3 sets of factors.
- Use physical models to perform operations with polynomials.

Unit #5
Polygons, Parallel Lines, Transversals

- Review Polygon characteristics and properties.
- Build a pattern to develop a rule for determining the sum of the interior angles of polygons.
- Apply algebra to determine the measure of angles formed by or contained in parallel lines cut by a transversal and by intersecting lines.

- Identify pairs of vertical angles as congruent.
- Identify pairs of supplementary and complementary angles.
- Calculate the missing angle in a supplementary or complementary pair.
- Determine angle pair relationship when given two parallel lines cut by a transversal.
- Calculate the missing angle measurements when given two parallel lines cut by a transversal.
- Calculate the missing angle measurements when given two intersecting lines and an angle.

Unit # 6
Transformational Geometry

- Describe and identify transformations in the plane, using proper function.
- Draw the image of a figure under rotations of 90 and 180 degrees.
- Draw the image of a figure under a reflection over a given line.
- Draw the image of a figure under a translation.
- Draw the image of a figure under a dilation.
- Identify the properties preserved and not preserved under transformations.

Unit # 7
Graphing Lines and Inequalities

- Solve multi-step inequalities and graph the solution set on a number line.
- Solve linear inequalities by combining like terms, using the distributive property, or moving variables to one side of the inequality (include multiplication or division of inequalities by a negative number).
- Determine the slope of a line from a graph and explain the meaning of slope as a constant rate of change.
- Determine the y-intercept of a line from a graph and be able to explain the y- intercept.
- Graph a line using a table of values.
- Determine the equation of a line given the slope and the y-intercept.
- Graph a line from an equation in slope-intercept form ($y = mx + b$).
- Solve systems of equations graphically (only linear, integral solutions, $y = mx + b$).
- Graph the solution set of an inequality on a number line.

Unit #8
Patterns, Relations and Functions

- Define and use correct terminology when referring to function (domain and range).
- Determine if a relation is a function.

Unit #9
Geometric Constructions

- Construct the following using a straight edge and compass: Segment congruent to a segment, angle congruent to an angle; perpendicular bisector; and angle bisector.