Math 7B

SCOPE OF COURSE

This course is divided into two semesters of study (A & B) comprised of five units each. The second-semester (B) is a study of algebra; algebraic patterns and coordinate geometry; geometric figures; geometric solids; and transformational geometry.

SEQUENCE OF SKILLS

UNIT 1 – Algebra

Variables and substitution
- Understand that letters can be used to represent numbers
- Substitute a given value to simplify an algebraic expression   More substitution
- Substitute for two or more variables in an expression
- Substitute for multiple variables to verify the equality of two expressions

Polynomials
- Recognize monomials and polynomials
- Write polynomials in descending order

Translating words to algebraic expressions
- Translate word phrases into algebraic expressions
- Solve word problems by translating sentences into algebraic expressions

Adding and subtracting polynomials
- Simplify polynomials by combining like terms
- Add and subtract polynomials

Properties of equality
- Determine whether quantities are equal
- Begin solving equations using rules of equality

Solving equations; Part One
- Given an equation, solve for a variable
- Check answer using substitution

Solving equations; Part Two
- Perform more than one operation to solve for a variable
- Check answer using substitution

Translating sentences to algebraic equations
- Translate a sentence into an algebraic equation, solve for an unknown, and check using substitution

Inequalities: Part One
- Determine what an inequality is
- Solve inequalities using steps for equations
- Solve inequalities with variables on both sides of the inequality sign

Inequalities: Part Two
- Solve inequalities involving negative numbers.

Graphing inequalities
- Graph inequalities on a number line using the method of testing values
- Solve and graph the solution of an inequality

Translating inequalities
- Translate sentences into algebraic inequalities
- Solve inequality word problems by translating them into algebraic inequalities and graphing

Review and Problem Solving
- Solve word problems using algebraic equations
- Solve word problems using algebraic inequalities

Math 7B

SEQUENCE OF SKILLS

UNIT 2 – Algebraic Patterns and Coordinate Geometry

Introduction to proportions
- Understand what a proportion is
- Find missing values in a proportion using equivalent fractions or cross multiplying

Proportion word problems
- Solve word problems using proportional thinking

Proportions with maps
- Solve word problems using proportional thinking

Proportions with similar triangles
- Understand the concept of similar triangles
- Use proportions to find one missing side in a pair of similar triangles

Proportions: scale drawings
- Use proportions to find dimensions in scale models
- Use proportional thinking to find the actual dimensions of objects

Proportions: percents
- Use proportions to solve percent problems

Patterns and sequences
- Use a table to complete a sequence of numbers
- Create a rule for finding numbers in a sequence
- Create a sequence based on a list of rules

Exploring visual patterns
- Use a table to continue a pattern
- Analyze a table to create a rule for finding any step of a pattern

Introduction to functions
- Given a function, generate a sequence using an input-output table
- Given an input-output table, generate a function

Graphing lines
- Use a table to plot points
- Graph a linear function by creating a table of values

Investigating the graph of a line
- Find the slope and y-intercept of a line given a graph
- Apply the slope formula to find the slope of a line given two points
- Find the y-intercept of a line given the equation

Slope-intercept form of a line
- Find the equation of a line given its graph
- Determine what happens to a line graph if you change the slope or the y-intercept

Systems of linear equations
- Solve a system of equations graphically and algebraically
- Model a situation using a system of linear equations
- Determine the number of solutions to a system of linear equations

Review and Problem Solving
- Solve word problems involving rates and proportions
- Solve problems involving sequences and linear functions

Math 7B

SEQUENCE OF SKILLS

UNIT 3 – Geometric Figures

Classifying angles
- Understand the concept of angles and the different classifications of angles
- Identify the type of angle based on its measurement
- Understand and identify parallel and perpendicular lines

Properties of parallel lines
- Understand the property of parallel lines being cut by a transversal

Polygons
- Distinguish between different types of polygons
- Understand the concept of a regular polygon

Triangles
- Distinguish between different types of triangles
- Use the angle sum of a triangle to find missing values

Pythagorean theorem
- Use the Pythagorean Theorem to find missing sides in a right triangle
- Determine if a set of numbers is a Pythagorean triple

Quadrilaterals
- Understand what a quadrilateral is
- Distinguish between different types of quadrilaterals

Angle properties of polygons
- Determine the interior angle sum for a polygon
- Determine the measure of each interior and exterior angle in a regular polygon

Perimeter and area of quadrilaterals
- Understand the concepts of area and perimeter
- Derive formulas for, and be able to compute area and perimeter of a square, rectangle, and parallelogram

Perimeter and area of triangles
- Understand how to find the perimeter of different types of triangles
- Understand how to find the area of different types of triangles

Perimeter and area of polygons
- Find the perimeter of regular and irregular polygons
- Find the area of regular and irregular polygons

Congruence and similarity
- Determine which polygons are congruent
- Determine which polygons are similar

Introduction to circles
- Understand the concepts of radius and diameter
- Determine what percent of a circle a central angle takes up

Area and circumference of circles
- Determine the area of a circle based on the diameter and radius
- Determine the circumference of a circle based on the diameter and radius

Review and Problem Solving
- Solve word problems involving area, circumference, and perimeter
- Develop problem solving skills by drawing pictures

Math 7B

SEQUENCE OF SKILLS

UNIT 4 – Geometric Solids and Constructions

Introduction to 3-dimensional solids
- Classify different 3-dimensional solids

Properties of solids
- Understand the parts that make a 3-dimensional solid

Volume of prisms
- Calculate the volume of rectangular and triangular prisms
- **http://www.learner.org/interactives/geometry/3d_prisms.html**

Volume of pyramids
- Calculate the volume of rectangular and triangular pyramids

Surface and lateral area of prisms
- Calculate the surface and lateral area of rectangular and triangular prisms using nets and perspective drawing
- **http://www.learner.org/interactives/geometry/3d_prisms.html**

Surface and lateral area of pyramids
- Calculate the surface and lateral area of rectangular and triangular pyramids using nets and perspective drawing
- **http://www.learner.org/interactives/geometry/3d_pyramids.html**

Dimensions of a solid
- Use algebraic equations to find missing dimensions of a solid

Slicing 3-dimensional solids
- Describe plane sections
- **http://www.learner.org/courses/learningmath/geometry/session9/part_c/**

Constructing geometric shapes
- Use a protractor to draw and measure angles
- Draw geometric shapes with given conditions
- **http://www.mathsisfun.com/geometry/protractor-using.html**

Technology and geometric solids
- Use technology to investigate geometric solids
- **http://illuminations.nctm.org/Activity.aspx?id=3521**

Applications of area
- Solve real-world problems involving area of 2-dimensional figures

Applications of volume
- Solve real-world problems involving volume of 3-dimensional solids

Applications of surface and lateral area
- Solve real-world problems involving surface and lateral area of 3-dimensional solids

Review and Problem Solving
- Solve applications involving 3-dimensional solids

Math 7B

SEQUENCE OF SKILLS

UNIT 5 – Transformations and Economic Applications of Proportions

Similar figures
- Identify and describe similarity of two-dimensional shapes using side and angle measurements

Lines of symmetry
- Identify lines of symmetry for a reflection

Transformations
- Use technology to investigate transformations on a coordinate plane
- **http://www.shodor.org/interactivate/activities/Transmographer/**

Reflections
- Perform reflections on a given preimage in the coordinate plane
- Use reflection notation
- **http://www.mathwarehouse.com/transformations/reflections-in-math.php**

Translations
- Perform translations on a given preimage in the coordinate plane
- Use translation notation
- **http://www.mathwarehouse.com/transformations/translations-in-math.php**

Rotations
- Perform rotations on a given preimage in the coordinate plane
- Use rotation notation
- **http://www.mathwarehouse.com/transformations/rotations-in-math.php**

Compositions of transformations
- Perform multiple transformations on a given preimage in the coordinate plane

Sales and income tax
- Calculate the sales tax for a given purchase and income tax for earned wages

Budgets
- Identify the components of a personal budget, including income, savings, taxes, and expenses
- Calculate the percentage of each category

Financial assets
- Create and organize a financial assets and liabilities record
- Construct a net worth statement

Family budget estimator
- Determine the minimum household budget and average hourly wage
- Family budget calculator: **http://www.epi.org/resources/budget/**

Simple and compound interest
- Calculate and compare simple and compound interest earnings

Monetary incentives
- Analyze and compare sales, rebates, and coupons

Review and Problem Solving
- Solve applications involving proportions, taxes, budgets, interest, and monetary incentives