

# Algebra 1/2, Pre-Algebra

**Time on Task:** 3.5 hours per week

## Course Philosophy

Mathematics demonstrates God’s order even in an abstract world, gradually building a base of knowledge and skills beginning with the simplest concepts to the more complex. In mathematics, the student will see the order and truth that God created. Just as the Bible says, “precept upon precept, line upon line....” (Isaiah 23:10) The sequential mastery of mathematical concepts is the primary objective.

## Course Description

Within a well-balanced mathematics curriculum, the primary focal points at Grade 8 are using basic principles of algebra to analyze and represent both proportional and non-proportional linear relationships and using probability to describe data and make predictions.

| <b>Goals and Objectives</b><br><b>Texas Essential Knowledge and Skills (TEKS)</b>   | <b>Scope and Sequence</b>  | <b>Spiritual Goals</b><br><b>God’s intended purpose for mathematics:</b>   |
|---|--|--|
| <p><b>111.24. Mathematics, Grade 8.</b></p> <p><b>(a) Introduction.</b></p> <p>(1) Within a well-balanced mathematics curriculum, the primary focal points at Grade 8 are using basic principles of algebra to analyze and represent both proportional and non-proportional linear relationships and using probability to describe data and make predictions.</p> <p>(2) Throughout mathematics in Grades 6-8, students build a foundation of basic understandings in number, operation, and quantitative reasoning; patterns, relationships, and algebraic thinking; geometry and spatial reasoning; measurement; and probability and statistics. Students use concepts, algorithms, and properties of rational numbers to explore mathematical relationships and to describe increasingly complex situations. Students use algebraic thinking to describe how a change in one quantity in a relationship results in a change in the other; and they connect verbal, numeric, graphic, and symbolic representations of relationships. Students use geometric properties and relationships, as well as spatial reasoning, to model and analyze situations and solve problems. Students communicate information about geometric figures or</p> | <p><b>Arithmetic</b></p> <p>Whole Numbers</p> <ul style="list-style-type: none"><li>• Know place values through hundred trillions</li><li>• Read and write whole numbers in words and digits</li><li>• Write whole numbers in expanded notation</li><li>• Round whole numbers</li><li>• Order whole numbers on a number line</li></ul> <p>Operations with Whole Numbers</p> <ul style="list-style-type: none"><li>• Add whole numbers</li><li>• Subtract whole numbers</li><li>• Multiply whole numbers</li><li>• Divide whole numbers</li></ul> <p>Fractions</p> <ul style="list-style-type: none"><li>• Understand fractions</li><li>• Convert fractions to decimal numbers</li><li>• Convert fractions to</li></ul> | <ol style="list-style-type: none"><li>1. To teach the child that there is logic and order in arithmetic and that there is logic and order in God’s plan.</li><li>2. To teach that God cares for numbers and has recorded many for our information.</li><li>3. To teach that God commanded men to count, measure, and record information.</li><li>4. To teach the child that God is concerned that we be accurate and orderly in our use of weights, measure, and numbers.</li><li>5. To teach the child not to place too much confidence in the size.</li><li>6. To teach the child the concept of measurement to express men’s failure and His plans for man.</li><li>7. To develop skills in reasoning which reveal truth.</li></ol> |

|  |  |  |
|--|--|--|
| <p>situations by quantifying attributes, generalize procedures from measurement experiences, and use the procedures to solve problems. Students use appropriate statistics, representations of data, reasoning, and concepts of probability to draw conclusions, evaluate arguments, and make recommendations.</p> <p>(3) Problem solving in meaningful contexts, language and communication, connections within and outside mathematics, and formal and informal reasoning underlie all content areas in mathematics. Throughout mathematics in Grades 6-8, students use these processes together with graphing technology and other mathematical tools such as manipulative materials to develop conceptual understanding and solve problems as they do mathematics.</p> | <p>percents</p> <ul style="list-style-type: none"> <li>• Add fractions</li> <li>• Add mixed numbers</li> <li>• Subtract fractions</li> <li>• Subtract mixed numbers</li> <li>• Multiply fractions</li> <li>• Multiply fractions by whole numbers</li> <li>• Find fractional parts of numbers</li> <li>• Multiply mixed numbers</li> <li>• Solve mixed number problems</li> <li>• Divide fractions</li> <li>• Divide mixed numbers</li> <li>• Reduce and expand fractions</li> </ul> <p>Decimal Numbers</p> <ul style="list-style-type: none"> <li>• Understand decimal numbers <ul style="list-style-type: none"> <li>• Read decimal numbers through millionths</li> <li>• Order decimal numbers on the number line</li> <li>• Understand repeating decimal numbers</li> <li>• Round decimal numbers</li> <li>• Round repeating decimal numbers</li> </ul> </li> <li>• Convert decimal numbers to fractions</li> <li>• Convert decimal number to percents</li> <li>• Add and subtract decimal numbers</li> </ul> | <ol style="list-style-type: none"> <li>8. To understand that God has given man the ability to observe reality.</li> <li>9. To understand that God has given man the ability to explore and to formulate relationships.</li> <li>10. To understand that human reasoning is a reflection of the divine.</li> <li>11. To appreciate the structure, form, and beauty of God’s creation.</li> <li>12. To appreciate the complexity and precision of God’s creation</li> <li>13. To improve the student’s reasoning skills to help hi think less like the world and more like God.</li> <li>14. To cultivate preciseness in Calculations and reasoning powers.</li> <li>15. To develop an appreciation for correctness of procedure and accuracy in dealing with facts.</li> <li>16. To make him aware of his own limitations and need to depend upon the Lord for understanding.</li> <li>17. To develop skills in thrift and good stewardship to prepare him for successful living in the world.</li> </ol> <p><b>Biblical Integration Truth Statements</b></p> <ol style="list-style-type: none"> <li>1. <i>What is prime reality, the really real?</i><br/> God exists and is the ultimate reality. (Psalm 90:2, Revelation 22:13) <ol style="list-style-type: none"> <li>a. God designed, created, and</li> </ol> </li> </ol> |
|--|--|--|

|  |   |   |
|--|---|---|
|  | <ul style="list-style-type: none"> <li>• Multiply and divide decimal numbers</li> <li>• Estimate with decimal numbers</li> <li>• Understand and use scientific notation <ul style="list-style-type: none"> <li>• For large and small numbers</li> <li>• With addition of exponents</li> <li>• In multiplication</li> </ul> </li> </ul> <p>Roman Numerals</p> <ul style="list-style-type: none"> <li>• Know Roman numerals through thousands</li> </ul> <p><b>Graphs</b></p> <p>Graphs of Data</p> <ul style="list-style-type: none"> <li>• Interpret and construct bar graphs</li> <li>• Interpret and construct broken-line graphs</li> <li>• Interpret and construct pie graphs</li> </ul> <p>Graphs on the Coordinate Plane</p> <ul style="list-style-type: none"> <li>• Define <i>axes</i>, <i>coordinates</i>, <i>quadrants</i>, and <i>origin</i></li> <li>• Recognize and plot ordered pairs</li> <li>• Graph linear equations <ul style="list-style-type: none"> <li>• Equation of a line</li> <li>• By substitution</li> <li>• Finding slopes</li> <li>• Slope formula</li> <li>• Vertical and horizontal lines</li> </ul> </li> <li>• Graph circles, ellipses, hyperbolas, and parabolas</li> </ul> <p><b>Number Sets</b></p> <p>Sets</p> | <p>sustains His creation. (Genesis 1:1-31)</p> <ol style="list-style-type: none"> <li>b. God is good, holy, and loving. (Luke 18:19, 1 John 4:16, 1 Peter 1:16, Psalm 145:12)</li> <li>c. God is omniscient – all knowing. (Romans 11:33-36, Psalm 147:5)</li> <li>d. God is sovereign – nothing is beyond His ultimate interest, control, and authority. (Daniel 4:25)</li> <li>e. God is personal and also triune- He is coequally and coeternally God the Father, God the Son, Jesus, and God the Holy Spirit. (Hebrews 1:3)</li> </ol> <p><b>2. <i>What is the nature of external reality, that is, the world around us?</i></b></p> <ol style="list-style-type: none"> <li>a. God is the source of everything and created the universe out of nothing. (Genesis 1:1)</li> <li>b. The universe was created by God to be orderly. (Isaiah 45:18, Psalm 147:4)</li> <li>c. God is constantly involved in the unfolding pattern of the ongoing operation of the universe. (Psalm 24:1-2, Psalm 32:13-15)</li> <li>d. The universe reflects His glory. (Psalm 8:1, Psalm 19:1)</li> </ol> <p><b>3. <i>What is a human being?</i></b></p> <ol style="list-style-type: none"> <li>a. God created humans to know Him intimately and to have a loving relationship with Him.</li> </ol> |
|--|---|---|

|  |   |  |
|--|---|--|
|  | <ul style="list-style-type: none"> <li>• Use set notation</li> <li>• Identify subsets</li> </ul> <p>Real Numbers</p> <ul style="list-style-type: none"> <li>• Classify the real numbers <ul style="list-style-type: none"> <li>• Natural (counting) numbers and whole numbers</li> <li>• Integers, rational numbers, and irrational numbers</li> <li>• Prime and composite numbers</li> <li>• On the line</li> </ul> </li> <li>• Compute sums, products, differences, and quotients of decimal numbers</li> <li>• Perform operations with integers <ul style="list-style-type: none"> <li>• Addition</li> <li>• Subtraction</li> <li>• Multiplication</li> <li>• Division</li> <li>• Symbols of inclusion <ul style="list-style-type: none"> <li>• Absolute value</li> <li>• Identifying negative numbers</li> <li>• Opposites with multiple signs</li> <li>• Within order of operations</li> <li>• Parentheses</li> <li>• Parentheses, braces, and brackets</li> </ul> </li> </ul> </li> <li>• Understand elementary number theory <ul style="list-style-type: none"> <li>• Divisibility rules</li> <li>• Prime and composite</li> </ul> </li> </ul> | <p>(Psalm 100:3)</p> <ul style="list-style-type: none"> <li>b. Human beings are created in the image of God with the capacity to choose. (Genesis 1:27, Proverbs 8:10)</li> <li>c. Adam and Eve chose disobedience and brought death to themselves and sin entered the world. (Romans 5:12)</li> <li>d. All human beings have a choice and all have chosen sin that brings separation from God. (Romans 3:23)</li> <li>e. Sin is rebellion against God's wishes and ways and this destroys our relationship with God. (Romans 8:7-8)</li> <li>f. God provides a way back to Himself through the death of His son Jesus (the second person of the Trinity), on the cross. (John 3:16, Romans 6:23)</li> <li>g. Human beings must respond to God with repentance of our sins, receiving forgiveness, and accepting Jesus as our Savior. (Romans 10:9-10)</li> </ul> <p><b>4. <i>What happens to a person at death?</i></b></p> <ul style="list-style-type: none"> <li>a. For each person death is either the gate to life with God and His people or the gate to eternal separation from God. (1 Corinthians 50:52)</li> <li>b. After death, your soul will continue to exist in an eternal</li> </ul> |
|--|---|--|

|  |  |   |
|--|--|---|
|  | <p>numbers</p> <ul style="list-style-type: none"> <li>• Multiples</li> <li>• Find least common multiples</li> <li>• Find reciprocals</li> <li>• Find greatest common factors</li> <li>• Understand inverse operations</li> <li>• Use base 2 <ul style="list-style-type: none"> <li>• Conversion between base 2 and base 10</li> <li>• Addition in base 2 and base 10</li> </ul> </li> <li>• Know the properties of real numbers <ul style="list-style-type: none"> <li>• Commutative property of addition and multiplication</li> <li>• Associative property of addition and multiplication</li> <li>• Distributive property</li> <li>• Additive inverse</li> <li>• Multiplicative inverse</li> <li>• Multiplicative identity</li> <li>• Multiplicative property <ul style="list-style-type: none"> <li>• Of -1</li> <li>• Of 1</li> <li>• Of equality</li> </ul> </li> <li>• Additive property <ul style="list-style-type: none"> <li>• Of equality</li> </ul> </li> </ul> </li> </ul> <p><b>Measurement</b></p> <p>English Measurement</p> <ul style="list-style-type: none"> <li>• Know U.S. Customary units of length</li> <li>• Read rulers to nearest</li> </ul> | <p>way and there is a final judgment by God. (Revelation 20:12)</p> <ul style="list-style-type: none"> <li>c. Everyone chooses to honor and love Him by accepting Jesus as our Lord and Savior or makes a choice to reject Jesus and grasp for self-fulfillment and personal glory. (Romans 6:23)</li> <li>d. Those who received Jesus as Savior will spend eternity in Heaven with God. (Philippians 4:10-21)</li> <li>e. Those who rejected Jesus as Savior will spend eternity in Hell without God. (Hebrews 10:26-27)</li> </ul> <p><b>5. <i>Why is it possible to know anything at all?</i></b></p> <ul style="list-style-type: none"> <li>a. Human beings can both know the world around them and God Himself because God has built within them the capacity to do so and because He takes an active role in communicating with them. (John 16:13)</li> <li>b. God's own intelligence is the basis of human intelligence. Knowledge is possible because there is something to be known (God and His creation) and someone to know (God and human beings made in His image). (Genesis 1:27)</li> <li>c. God reveals, Himself to us in</li> </ul> |
|--|--|---|

|  |  |  |
|--|--|--|
|  | <p>1/16 of an inch</p> <p>Metric Measurement</p> <ul style="list-style-type: none"> <li>• Know the metric units of length</li> <li>• Read metric rulers</li> <li>• Know the metric units of volume</li> </ul> <p>Conversion by Unit Multipliers</p> <ul style="list-style-type: none"> <li>• Convert within English system <ul style="list-style-type: none"> <li>• In./ft, ft/yd, ft/mi</li> <li>• Multiple unit multipliers</li> <li>• Volume</li> <li>• Area</li> </ul> </li> <li>• Convert within metric system <ul style="list-style-type: none"> <li>• Cm/m, km/m</li> <li>• Multiple unit multipliers</li> <li>• Volume</li> </ul> </li> </ul> <p><b>Ratio, Proportion, Percent, and Rate</b></p> <p>Ratio</p> <ul style="list-style-type: none"> <li>• Solve ratio word problems</li> <li>• Express rates as ratios</li> <li>• Compare unit prices</li> <li>• Recognize implied ratios</li> <li>• Solve rate problems</li> <li>• Solve advanced ratio problems involving totals</li> </ul> <p>Proportion</p> <ul style="list-style-type: none"> <li>• Cross multiply to solve proportions</li> </ul> <p>Percent</p> <ul style="list-style-type: none"> <li>• Find percents of numbers</li> <li>• Change percents to</li> </ul> | <p>two basic ways: by general revelation and by special revelation. (Exodus 3:2, Psalm 19:1-4)</p> <p>d. In general revelation, God speaks through the creation of the universe and through His word, the Bible. (2 Samuel 22:31, Psalm 19:1)</p> <ul style="list-style-type: none"> <li>➤ The Bible is internally consistent and unified in its principles and claims.</li> <li>➤ There is tremendous coherence across the many authors and centuries during which the various books were written and in which its stories unfold.</li> <li>➤ It is relevant to all the cultures of the world</li> </ul> <p>e. Special revelation is God revealing Himself through supernatural ways. Jesus Christ is the ultimate special revelation. He showed us what God is like more fully than any other form of revelation can. Because Jesus was also completely human, he spoke more clearly to us than any other form of revelation can. (John 14:7)</p> <p><b>6. How do we know what is right and wrong?</b></p> <p>a. Ethics or the knowledge of right and wrong is based on the character of God as good</p> |
|--|--|--|

|  |  |   |
|--|--|---|
|  | <p>decimal numbers and to fractions</p> <ul style="list-style-type: none"> <li>• Use the percent word problems</li> <li>• Solve percent word problems</li> <li>• Use fractional percents</li> <li>• Visualize percents using diagrams</li> <li>• Use percents greater than one hundred</li> <li>• Solve percent increase/decrease problems</li> </ul> <p>Exponents</p> <ul style="list-style-type: none"> <li>• Know order of operations with exponents</li> <li>• Evaluate expressions with exponents</li> <li>• Simplify powers of fractions</li> <li>• Simplify powers of signed numbers</li> <li>• Know the product theorem for exponents</li> <li>• Evaluate powers of negative bases</li> <li>• Use negative exponents</li> <li>• Solve equations with exponents</li> <li>• Use zero as an exponent</li> <li>• Use variables as exponents</li> </ul> <p>Roots</p> <ul style="list-style-type: none"> <li>• Find square roots, cube roots, and fourth roots</li> <li>• Know order of operations with roots</li> </ul> | <p>(holy and loving). (Psalm 33:4)</p> <ul style="list-style-type: none"> <li>b. There is an absolute standard by which all moral judgments are measured and God Himself – His character of goodness (holiness and love) – is the standard. (1 Samuel 2:3)</li> <li>c. As a result of sin, morally, we have become less able to discern good and evil and less able to know God as He truly is. (Proverbs 1:7)</li> <li>d. God has revealed His standard in the various laws and principles expressed in the Bible. (Psalm 111:10) <ul style="list-style-type: none"> <li>➤ He has dictated absolute moral truth to us.</li> <li>➤ Every truth must conform to Biblical principles.</li> <li>➤ Every choice must reflect God’s moral truth.</li> <li>➤ We must promote, defend, and teach these truths to others.</li> </ul> </li> </ul> <p>7. <b><i>What is the meaning of human history?</i></b></p> <ul style="list-style-type: none"> <li>a. History is a meaningful sequence of events leading to the fulfillment of God’s purposes for humanity. (Psalm 22:27-28, Psalm 47:3)</li> <li>b. History is going somewhere, directed toward a known end.</li> </ul> |
|--|--|---|

|  |  |  |
|--|--|--|
|  | <ul style="list-style-type: none"> <li>• Evaluate expressions with roots</li> <li>• Take roots of fractions</li> <li>• Estimate higher-order roots</li> <li>• Take roots of negative numbers</li> </ul> <p><b>Statistics and Probability</b></p> <p>Probability</p> <ul style="list-style-type: none"> <li>• Use counting techniques to compute probability <ul style="list-style-type: none"> <li>• Simple probability</li> <li>• Independent events</li> <li>• Product of probabilities</li> </ul> </li> </ul> <p>Statistics</p> <ul style="list-style-type: none"> <li>• Use and construct stem-and-leaf plots</li> <li>• Use and construct histograms</li> <li>• Use and construct ox-and-whisker plots</li> <li>• Compute measures of central tendency</li> <li>• Find averages <ul style="list-style-type: none"> <li>• Of several numbers</li> <li>• Overall</li> </ul> </li> </ul> <p><b>Expressions</b></p> <p>Simplifying Expressions</p> <ul style="list-style-type: none"> <li>• Combine like terms <ul style="list-style-type: none"> <li>• Simple</li> <li>• With exponents</li> </ul> </li> <li>• Simplify exponential expressions <ul style="list-style-type: none"> <li>• With exponentials and radicals/power rule</li> <li>• With variable exponents</li> </ul> </li> </ul> | <p>(Matthew 25:34)</p> <p>c. History is a form of revelation, not only does God reveal Himself in history, but the very sequence of events is revelation. (Psalm 33:13-14, Psalm 47:9)</p> <p>d. History has meaning because God is behind all events, not only sustaining all things by His powerful word but also in all things working for the good of those who love Him. (Psalm 40:5, Romans 8:28)</p> <p><b><i>What should our response be to God?<br/>What were we made for?</i></b></p> <p><b>We were made to</b><br/> <b>Love</b> – Matthew 22:37,<br/> <b>Worship</b> – Romans 12:1,<br/> <b>Obey</b> – 2 John 6, and<br/> <b>Give Glory</b> – Psalm 96:3.</p> |
|--|--|--|

|  |   |  |
|--|---|--|
|  | <ul style="list-style-type: none"><li>• With fractional base</li><li>• With signed numbers<ul style="list-style-type: none"><li>• Explanation</li><li>• Evaluation with signed numbers</li><li>• With negative signs/positive or negative exponents</li></ul></li><li>• Evaluate expressions with substitution<ul style="list-style-type: none"><li>• For variables</li><li>• With signed numbers</li></ul></li><li>• Simplify expressions using<ul style="list-style-type: none"><li>• Distributive property</li><li>• Order of operations<ul style="list-style-type: none"><li>• With fractions</li><li>• With symbols of inclusion</li></ul></li></ul></li><li>• Reduce expressions by common factor</li><li>• Simplify polynomial expressions<ul style="list-style-type: none"><li>• Monomials</li><li>• Binomials</li><li>• Trinomials</li><li>• Degrees of polynomials</li><li>• Addition of polynomials</li><li>• Multiplication of polynomials</li><li>• Division of polynomials<ul style="list-style-type: none"><li>• Simple</li></ul></li></ul></li><li>• Simplify complex fractions</li></ul> |  |
|--|---|--|

## Equations

### Simplifying and Solving Equations

- Define equations and basic rules
  - Simple
  - Conditional
  - Equivalent
  - Addition and subtraction rules
  - Multiplication and division rules
- Use the fractional-part-of-a-number equation
- Use the decimal-part-of-a-number equation
- Solve equations with mixed numbers
- Use the percent equation
- Solve multiple-step equations
  - Using two rules
  - Format
  - Variables on each side of equals sign
  - Two-step
  - Multiple terms
- Solve equations that have negative coefficients
- Translate word phrases into algebraic equations
- Solve rational equations

### Linear Equations

- Find equations of lines
  - Slope formula
- Graph linear equations
  - Simple

### Quadratic Equations

|  |   |  |
|--|---|--|
|  | <ul style="list-style-type: none"> <li>• Solve by factoring</li> </ul> <p>Other Types of Equations</p> <ul style="list-style-type: none"> <li>• Solve equations with applications <ul style="list-style-type: none"> <li>• Simple and compound interest</li> <li>• Markup and markdown</li> <li>• Commission and profit</li> </ul> </li> <li>• Explore nonlinear equations <ul style="list-style-type: none"> <li>• Parabolas</li> </ul> </li> </ul> <p><b>Algebraic Skills</b></p> <p>Understanding Functions</p> <ul style="list-style-type: none"> <li>• Use function notation</li> </ul> <p>Manipulating and Evaluating Functions</p> <ul style="list-style-type: none"> <li>• Evaluate trigonometric functions</li> </ul> <p><b>Trigonometry and Logarithms</b></p> <p>Trigonometry</p> <ul style="list-style-type: none"> <li>• Define and use <i>sine</i>, <i>cosine</i>, and <i>tangent</i></li> </ul> <p>Lines, Points, Segments, and Planes</p> <ul style="list-style-type: none"> <li>• Identify lines <ul style="list-style-type: none"> <li>• Parallel</li> <li>• Transversals</li> <li>• Perpendicular bisectors</li> </ul> </li> <li>• Identify points and find distances between points</li> <li>• Identify segments <ul style="list-style-type: none"> <li>• Bisectors</li> </ul> </li> <li>• Identify planes and planes in space</li> </ul> <p>Angles</p> |  |
|--|---|--|

- Identify vertices of angles
- Identify kinds of angles
  - Right, acute, straight, and obtuse angles
  - Complementary and supplementary angles
  - Adjacent angles
  - Corresponding interior and exterior angles
  - Alternate interior and exterior angles
- Measure angles with a protractor
- Construct angle bisectors
- Use angles in circles to form major and minor arcs

#### Polygons

- Classify polygons
  - Convex and concave
  - Equilateral and equiangular
  - By number of sides
    - Triangles
    - Quadrilaterals
      - Squares
      - Trapezoids
      - Parallelograms
      - Rhombuses
      - Rectangles
    - Pentagons
    - Hexagons
  - Understand congruence of polygons
  - Understand regularity of polygons

- Translate, rotate, and reflect polygons
- Recognize symmetry of polygons
- Identify vertices of polygons
- Draw diagonals of polygons

#### Circles

- Identify parts of circles
  - Radii and diameters
  - Chords
  - Arcs, sectors, and central angles
- Use degree measures

#### Triangles

- Classify triangles
  - Right, obtuse, acute, scalene, isosceles, and equilateral
  - $30^\circ$ - $60^\circ$ - $90^\circ$
  - $45^\circ$ - $45^\circ$ - $90^\circ$
- Prove congruence of triangles
- Find measures of angles
- Solve similar triangle problems
  - Two triangles

#### Geometric Solids

- Identify cylinders and prism
- Identify circular and right circular cones
- Identify rectangular and square pyramids
- Identify spheres
  - Convex and concave

|  |  |  |
|--|--|--|
|  | <ul style="list-style-type: none"> <li>• Equilateral and equiangular</li> <li>• By number of sides <ul style="list-style-type: none"> <li>• Triangles</li> <li>• Quadrilaterals <ul style="list-style-type: none"> <li>• Squares</li> </ul> </li> </ul> </li> </ul> <p>Perimeter and Circumference</p> <ul style="list-style-type: none"> <li>• Compute perimeters of shapes</li> <li>• Define <math>\pi</math></li> <li>• Compute circumferences <ul style="list-style-type: none"> <li>• Circles</li> <li>• Semicircles</li> </ul> </li> </ul> <p>Area</p> <ul style="list-style-type: none"> <li>• Find areas of polygons <ul style="list-style-type: none"> <li>• Rectangles and squares</li> <li>• Triangles</li> <li>• Parallelograms and trapezoids</li> </ul> </li> <li>• Find areas of complex shapes <ul style="list-style-type: none"> <li>• Made of two or more polygons</li> <li>• Made of polygons and semicircles</li> <li>• As differences</li> </ul> </li> <li>• Find areas of circles, sectors, and semicircles</li> </ul> <p>Surface Area and Volume</p> <ul style="list-style-type: none"> <li>• Find surface areas of geometric solids <ul style="list-style-type: none"> <li>• Right circular cylinders</li> <li>• Triangular prisms and rectangular pyramids</li> <li>• By number of sides</li> </ul> </li> </ul> |  |
|--|--|--|

|  |  |  |
|--|--|--|
| <p><b>(b) Knowledge and skills.</b><br/> <b>(8.1) Number, operation, and quantitative reasoning.</b> The student understands that different forms of numbers are appropriate for different situations.<br/> <i>The student is expected to:</i></p> | <ul style="list-style-type: none"> <li>• Circular cones</li> <li>• Complex shapes as the base</li> <li>• Find volumes of geometric solids <ul style="list-style-type: none"> <li>• Right cylinders and prisms</li> <li>• Complex shapes as the base</li> <li>• Cones, pyramids, and spheres</li> </ul> </li> </ul> <p>Constructions</p> <ul style="list-style-type: none"> <li>• Copy angles using compass and straight edge</li> <li>• Construct perpendicular bisectors</li> <li>• Construct triangles and rectangles</li> <li>• Construct angle bisectors</li> <li>• Copy line segments</li> </ul> <p>Pythagorean Theorem</p> <ul style="list-style-type: none"> <li>• Find side lengths</li> <li>• Prove the Pythagorean theorem</li> </ul> <p><b>Correlation with TEKS</b><br/> <u><b>Algebra 1/2</b></u><br/> Saxon/Houghton Mifflin Harcourt Company<br/> Student ISBN<br/> 1-56577-1131<br/> Teacher ISBN<br/> 1-56577-129-X</p> |  |
|--|--|--|

|  |   |  |
|--|---|--|
| <p>(A) compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals;</p> <p>(B) select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships;</p> <p>(C) approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (such as <math>\pi</math>, <math>\sqrt{2}</math>); and</p> <p>(D) express numbers in scientific notation, including negative exponents, in appropriate problem situations.</p> | <p>Lessons 2, 8, 15, 53, 55</p> <p>Lessons 15, 62, 58, 57, 55, 53, 48, 28, 83, 109</p> <p>Lesson 54, 106, 44</p> <p>Lessons 50</p>                        |  |
| <p><b>(8.2) Number, operation, and quantitative reasoning.</b> The student selects and uses appropriate operations to solve problems and justify solutions.<br/><i>The student is expected to:</i></p> <p>(A) select appropriate operations to solve problems involving rational numbers and justify the selections;</p> <p>(B) use appropriate operations to solve problems involving rational numbers in problem situations;</p> <p>(C) evaluate a solution for reasonableness; and</p> <p>(D) use multiplication by a constant factor (unit rate) to represent proportional relationships.</p>        | <p>Lesson 11, 36, 49, 58, 61, 63, 64, 73, 83, 88</p> <p>Lesson 11, 36, 49, 58, 61, 63, 64, 73, 83, 88</p> <p>Daily in class</p> <p>Lessons 36, 63, 83</p> |  |
| <p><b>(8.3) Patterns, relationships, and algebraic thinking.</b> The student identifies proportional or nonproportional linear relationships in problem situations and solves problems.<br/><i>The student is expected to:</i></p> <p>(A) compare and contrast proportional and non-proportional linear relationships; and</p> <p>(B) estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates.</p>  | <p>Lessons 66, 67, 83</p> <p>Lesson 36, 63, 83, 53, 80, 54</p>  |  |
| <p><b>(8.4) Patterns, relationships, and algebraic thinking.</b> The student makes connections among various representations of a numerical relationship.<br/><i>The student is expected to generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description).</i></p>  | <p>Lessons 29, 85, 97</p>   |  |
| <p><b>(8.5) Patterns, relationships, and algebraic thinking.</b> The</p>   |   |  |

|   |   |  |
|---|---|--|
| <p>student uses graphs, tables, and algebraic representations to make predictions and solve problems.<br/> <i>The student is expected to:</i></p> <p>(A) predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations; and</p> <p>(B) find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change).</p> <p><b>(8.6) Geometry and spatial reasoning.</b> The student uses transformational geometry to develop spatial sense.<br/> <i>The student is expected to:</i></p> <p>(A) generate similar figures using dilations including enlargements and reductions; and</p> <p>(B) graph dilations, reflections, and translations on a coordinate plane.</p> <p><b>(8.7) Geometry and spatial reasoning.</b> The student uses geometry to model and describe the physical world.<br/> <i>The student is expected to:</i></p> <p>(A) draw three-dimensional figures from different perspectives;</p> <p>(B) use geometric concepts and properties to solve problems in fields such as art and architecture;</p> <p>(C) use pictures or models to demonstrate the Pythagorean Theorem; and</p> <p>(D) locate and name points on a coordinate plane using ordered pairs of rational numbers.</p> <p><b>(8.8) Measurement.</b> The student uses procedures to determine measures of three-dimensional figures.<br/> <i>The student is expected to:</i></p> <p>(A) find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models);</p> <p>(B) connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects; and</p> <p>(C) estimate measurements and use formulas to solve application problems involving lateral and total</p> | <p>Lessons 24, 85, 97</p> <p>Lesson 34, 66, 63</p> <p>Lessons 115, 122</p> <p>Lessons 115, 122</p> <p>Lesson 88, 119, 73, 121</p> <p>Lesson 88, 119, 73, 121</p> <p>Lesson 117</p> <p>Lesson 38</p> <p>Lesson 88, 120</p> <p>Lesson 120, 118</p> <p>Lesson 88, 120, 118</p> |  |
|---|---|--|

|  |  |  |
|--|--|--|
| <p>surface area and volume.</p> <p><b>(8.9) Measurement.</b> The student uses indirect measurement to solve problems.<br/> <i>The student is expected to:</i></p> <p>(A) use the Pythagorean Theorem to solve real-life problems; and</p> <p>(B) use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements.</p> <p><b>(8.10) Measurement.</b> The student describes how changes in dimensions affect linear, area, and volume measures.<br/> <i>The student is expected to:</i></p> <p>(A) describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally; and</p> <p>(B) describe the resulting effect on volume when dimensions of a solid are changed proportionally.</p> <p><b>(8.11) Probability and statistics.</b> The student applies concepts of theoretical and experimental probability to make predictions. <i>The student is expected to:</i></p> <p>(A) find the probabilities of dependent and independent events;</p> <p>(B) use theoretical probabilities and experimental results to make predictions and decisions; and</p> <p>(C) select and use different models to simulate an event.</p> <p><b>(8.12) Probability and statistics.</b> The student uses statistical procedures to describe data.<br/> <i>The student is expected to:</i></p> <p>(A) select the appropriate measure of central tendency or range to describe a set of data and justify the choice for a particular situation;</p> <p>(B) draw conclusions and make predictions by analyzing trends in scatterplots; and</p> <p>(C) select and use an appropriate representation for presenting and displaying relationships among collected data, including line plots, line graphs, stem and leaf plots, circle graphs, bar graphs, box and whisker plots, histograms, and Venn diagrams, with</p> | <p>Lesson 117</p> <p>Lessons 65, 120</p> <p>Lesson 65</p> <p>Lesson 119</p> <p>Lessons 112, 114</p> <p>Lessons 112, 114</p> <p>Lessons 112, 114</p> <p>Lesson 26</p> <p>Done in 7<sup>th</sup> grade</p> <p>Lesson 29 and 7<sup>th</sup> grade</p> |  |
|--|--|--|

|  |  |  |
|--|--|--|
| <p>and without the use of technology.</p> <p><b>(8.13) Probability and statistics.</b> The student evaluates predictions and conclusions based on statistical data. <i>The student is expected to:</i></p> <p>(A) evaluate methods of sampling to determine validity of an inference made from a set of data; and</p> <p>(B) recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis.</p> <p><b>(8.14) Underlying processes and mathematical tools.</b> The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. <i>The student is expected to:</i></p> <p>(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;</p> <p>(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;</p> <p>(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem; and</p> <p>(D) select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.</p> <p><b>(8.15) Underlying processes and mathematical tools.</b> The student communicates about Grade 8 mathematics through informal and mathematical language, representations, and models. <i>The student is expected to:</i></p> <p>(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical,</p> | <p>Lessons 112, 114</p> <p>Lessons 112, 114</p> <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> |  |
|--|--|--|

|   |   |  |
|---|---|--|
| <p>numerical, physical, or algebraic mathematical models; and</p> <p>(B) evaluate the effectiveness of different representations to communicate ideas.</p> <p><b>(8.16) Underlying processes and mathematical tools.</b> The student uses logical reasoning to make conjectures and verify conclusions.</p> <p><i>The student is expected to:</i></p> <p>(A) make conjectures from patterns or sets of examples and nonexamples; and</p> <p>(B) validate his/her conclusions using mathematical properties and relationships.</p> | <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> <p>Lesson 1 to end of book</p> <p><b>Student Activities</b><br/> Cooperative Learning<br/> Graphic Organizers<br/> Small Groups<br/> Drawing<br/> Manipulatives</p> <p><b>Teaching Strategies</b><br/> Direct Instruction<br/> Open-ended Questions<br/> Discussion<br/> Demonstration<br/> Brainstorming<br/> Problem Solving<br/> Read Aloud<br/> Facilitating<br/> Cooperative Learning</p> <p><b>Evaluation Procedures</b><br/> Observation<br/> Class Participation<br/> Quizzes/Tests</p> <p><b>Other Resources and</b></p> |  |
|---|---|--|

|  |                     |  |
|--|---------------------|--|
|  | <b>Bibliography</b> |  |
|--|---------------------|--|

Overhead Transparency Set