

# 7th Grade Advanced Math Curriculum

*The Seventh Grade Math Program is designed to allow students to master computational math and begin working with abstract concepts involving algebra. All concepts introduced in this course will be done incrementally and continually practiced throughout the school year. A combination of daily lessons, practice problems, cooperative learning exercises and problem solving activities are incorporated in this program.*

## Algebra and Number Theory

Students will:

- Rewrite numbers from standard form to scientific notation.
- Know the relationship of scientific notation to place value using positive and negative exponents.
- Define the absolute value of a given rational number and an integer.
- Find the origin,  $x$ - and  $y$ - axes , and the four quadrants.
- Read, write, and graph ordered pairs from real-life situations.
- Use prime factorization of a composite number in order to find GCF and LCM.
- Relate proportions and ratios.
- Identify squares and cubes of a number.
- Create, recognize and explain numerical patterns that include decimals and fractions.
- Find the value of numbers written in exponential form.
- Multiply and divide using scientific notation.
- Find simple and compound interest, commission, profit and loss.
- Do square root estimates.
- Solve real life applications of percent.
- Estimate to determine reasonableness of a computed answer
- Estimate percentages of numbers
- Use equivalent numbers to estimate
- Determine over and under estimates.
- Identify patterns and relationships using graphs, tables and rules
- Solve two-step equations with variables and all rational numbers.
- Use properties of real numbers for addition and multiplication.  
Translate a word problem into an inequality.
- Translate an inequality verbally.
- Solve one- and two-step inequalities.

- Graph inequalities on the coordinate plane.
- Use formulas to solve equations.
- Use Pascal's triangle \*
- Distinguish between increasing and decreasing variation when working with graphs.

## **Geometry:**

Students will:

- Know formulas related to three-dimensional objects including volume and surface area of a cylinder, cone, sphere, pyramid, and prism.
- Recognize angle pairs
- Know the formulas and laws of triangles including use of Pythagorean Theorem to find missing sides.
- Identify and use sine, cosine, and tangent ratios to identify angles and side length in right triangles.\*
- Find the midpoint and length of a line on the coordinate plane using the midpoint and distance formulas.
- Use proof statements to prove two triangles congruent by SSS, SAS, and ASA methods.
- Perform conversions between measurement systems and determine most accurate unit from each system for a given application.
- Use scale to construct a new model of a given object
- Use scales on maps and floor-plans to interpret actual distance or size
- Explain the impact of changing a figure's dimensions on its perimeter, area, and volume.
- Construct congruent angles and segments.
- Construct line and angle bisectors.
- Identify and construct perpendicular bisectors of a segment.
- Identify parallel lines and their transversal, perpendicular lines and planes using proper symbols.
- Identify vertical, alternate interior, alternate exterior, and corresponding angles and calculate their measure.
- Identify right angles formed by perpendicular lines and use proper marking.
- Identify line and point (rotational) symmetry.
- Identify translation, reflection, rotation, dilation in designs and verbalize definitions.
- Identify similar polygons arranged in various positions.
- Use ordered pairs and coordinate planes to transform polygons in to different positions.
- Create a table showing the developing pattern of a fractal\*

\* Time permitting

## **Probability and Statistics:**

Students will:

- identify relationships between two variables using scatter-plots
- find the upper and lower quartiles for data sets
- predict the probability of an event occurring or not occurring
- recognize independent and dependent events
- select an appropriate format for presenting data.
- interpret data.
- evaluate arguments based on data analysis.
- find the probability of simple and compound events.
- use fractional notation to find permutations and combinations.
- make predictions based on experimental and theoretical outcomes.

## **Materials**

- graph paper
- protractor
- math manipulatives
- overhead projector
- Glenco student and teacher books and materials
- calculators

## **Instruction**

- hands on activities
- lecture
- practice problems
- cooperative group projects and activities
- problem solving