



Clear Creek Independent School District

Educate • Equip • Excel

Leading the Way

Mathematics
Grade 8 PreAP
2011-12

Clear Creek Independent School District

Portrait of a Graduate

The Clear Creek ISD portrait of a 21st century graduate reflects the beliefs, goals, and mission of the district. The portrait is reflected by the successful integration of instruction, character development, and technology designed to build 21st century skills and equip students to demonstrate mastery of the following:

Courage – as demonstrated through:

- ☛ a personal code of ethics that is the foundation of a strong character
- ☛ the confidence to lead, venture, persevere, and address challenges
- ☛ a spirit of confidence and dignity

Collaboration – as demonstrated through:

- ☛ ethical leadership
- ☛ effective communication and creative problem-solving skills necessary to succeed in increasingly complex social and work environments
- ☛ active participation in and responsible contributions to team efforts
- ☛ supportive and cooperative interpersonal relationships
- ☛ a respectful understanding of diversity

Innovation – as demonstrated through:

- ☛ ethical decision-making and conduct
- ☛ efficient and effective use of technology to research, organize, evaluate and communicate information
- ☛ a heightened sensibility of the connections between the academic world and global issues
- ☛ a conscientious recognition of civic rights and environmental obligations
- ☛ the enthusiastic application of creativity, originality, and self-expression

Self-Direction – as demonstrated through:

- ☛ a strong work ethic
- ☛ accountability for personal and professional achievement
- ☛ a commitment to the process of learning and establishing a vision for the future
- ☛ the continuous improvement and maintenance of mental and physical health
- ☛ the development of initiative, flexibility, and adaptability in accepting responsibility for actions
- ☛ the ability to initiate change or adapt to changes in personal and professional settings



Department of Curriculum and Instruction

Department	Mathematics	PEIMS Code	03103100
Subject Area	Grade 8	Grade Level	8

COURSE DESCRIPTION

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 objects or 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.

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

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.

COURSE GOALS

- (1) Number, operation, and quantitative reasoning. The student understands that different forms of numbers are appropriate for different situations.
- (2) Number, operation, and quantitative reasoning. The student selects and uses appropriate operations to solve problems and justify solutions.
- (3) Patterns, relationships, and algebraic thinking. The student identifies proportional or non-proportional linear relationships in problem situations and solves problems.
- (4) Patterns, relationships, and algebraic thinking. The student makes connections among various representations of a numerical relationship.
- (5) Patterns, relationships, and algebraic thinking. The student uses graphs, tables, and algebraic representations to make predictions and solve problems.
- (6) Geometry and spatial reasoning. The student uses transformational geometry to develop spatial sense.
- (7) Geometry and spatial reasoning. The student uses geometry to model and describe the physical world.
- (8) Measurement. The student uses procedures to determine measures of three-dimensional figures.
- (9) Measurement. The student uses indirect measurement to solve problems.

- (10) Measurement. The student describes how changes in dimensions affect linear, area, and volume measures.
- (11) Probability and statistics. The student applies concepts of theoretical and experimental probability to make predictions
- (12) Probability and statistics. The student uses statistical procedures to describe data
- (13) Probability and statistics. The student evaluates predictions and conclusions based on statistical data.
- (14) Underlying processes and mathematical tools. The student applies Grade 8 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school.

PROCESS SKILLS:

The student is expected to:

- 1) compare and order rational numbers in various forms including integers, percents, and positive and negative fractions and decimals;
- 2) select and use appropriate forms of rational numbers to solve real-life problems including those involving proportional relationships;
- 3) approximate (mentally and with calculators) the value of irrational numbers as they arise from problem situations (such as π , $\sqrt{2}$);
- 4) express numbers in scientific notation, including negative exponents, in appropriate problem situations;
- 5) compare and order real numbers with a calculator;
- 6) select appropriate operations to solve problems involving rational numbers and justify the selections;
- 7) use appropriate operations to solve problems involving rational numbers in problem situations;
- 8) evaluate a solution for reasonableness;
- 9) use multiplication by a given constant factor (including unit rate) to represent and solve problems involving proportional relationships including conversions between measurement systems;
- 10) compare and contrast proportional and non-proportional linear relationships;
- 11) estimate and find solutions to application problems involving percents and other proportional relationships such as similarity and rates;
- 12) generate a different representation of data given another representation of data (such as a table, graph, equation, or verbal description);
- 13) predict, find, and justify solutions to application problems using appropriate tables, graphs, and algebraic equations;
- 14) find and evaluate an algebraic expression to determine any term in an arithmetic sequence (with a constant rate of change);
- 15) generate similar figures using dilations including enlargements and reductions;
- 16) graph dilations, reflections, and translations on a coordinate plane.;
- 17) draw three-dimensional figures from different perspectives;
- 18) use geometric concepts and properties to solve problems in fields such as art and architecture;
- 19) use pictures or models to demonstrate the Pythagorean Theorem;
- 20) locate and name points on a coordinate plane using ordered pairs of rational numbers;
- 21) find lateral and total surface area of prisms, pyramids, and cylinders using concrete models and nets (two-dimensional models);
- 22) connect models of prisms, cylinders, pyramids, spheres, and cones to formulas for volume of these objects;
- 23) estimate measurements and use formulas to solve application problems involving lateral and total surface area and volume.
- 24) use the Pythagorean Theorem to solve real-life problems;
- 25) use proportional relationships in similar two-dimensional figures or similar three-dimensional figures to find missing measurements;
- 26) describe the resulting effects on perimeter and area when dimensions of a shape are changed proportionally;
- 27) describe the resulting effect on volume when dimensions of a solid are changed proportionally;
- 28) find the probabilities of dependent and independent events;
- 29) use theoretical probabilities and experimental results to make predictions and decisions;

- 30) select and use different models to simulate an event;
- 31) use variability (range, including interquartile range (IQR)) and select the appropriate measure of central tendency to describe a set of data and justify the choice for a particular situation;
- 32) draw conclusions and make predictions by analyzing trends in scatterplots;
- 33) 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 and without the use of technology;
- 34) evaluate methods of sampling to determine validity of an inference made from a set of data;
- 35) recognize misuses of graphical or numerical information and evaluate predictions and conclusions based on data analysis;
- 36) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;
- 37) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness;
- 38) 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
- 39)** select tools such as real objects, manipulatives, paper/pencil, and technology or techniques such as mental math, estimation, and number sense to solve problems.

The Framework for the Clear Creek ISD curriculum document template was formed through the collaboration of members of the Department of Curriculum and Instruction with input from classroom teachers. It is based upon the “Backwards by Design” approach reflected in the research and work of Wiggins, G., McTigue, J. & Tomlinson, C., 1998, 2003, 2006, 2009.

Year-At-A-Glance	Department	Mathematics	PEIMS Code	03103100
	Subject Area	Grade 8 PreAP	Grade Level	8

1 st Nine Weeks	August Unit 01 – Rational Numbers
	September Unit 01 – Rational Numbers Unit 2: Integer, algebraic expressions, one-step equations and properties
2 nd Nine Weeks	October Unit 2: Integer, algebraic expressions, one-step equations and properties First Nine Weeks Test Unit 3: Proportion and Similarity
	November Unit 04: Fractions, Decimals and Percents, Application of Percents Unit 05 – Exponents, Squares, Square Roots and Pythagorean Theorem
	December Unit 05 – Exponents, Squares, Square Roots and Pythagorean Theorem First Semester Exam
3 rd Nine Weeks	January Unit 06: Geometry and Coordinate plane
	February Unit 07 – Probability Unit 8: Interpreting graphs and tables, Statistics and sequences
4 th Nine Weeks	March Unit 08A – STAAR Review March 26 STAAR Test Unit 09 – Two-Step Equations
	April Unit 09 – Two-Step Equations Unit 10 – Math Bonds with Science
	May Unit 11 – Bridging 8 th Grade Math to Algebra Final Exam