Chino Valley Unified School District
High School Course Description

CONTACTS	
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A. COVER PAGE - COURSE ID	
1. Course Title:	Integrated Math I
2. Transcript Title/Abbreviation:	Integrated Math I
3. Transcript Course Code/Number:	5113
4. Seeking Honors Distinction:	No
5. Subject Area/Category:	(c) Mathematics
6. Grade level(s):	9-12
7. Unit Value:	5 credits per semester/10 total credits – math
8. Was this course previously approved by UC?	No
9. Is this course classified as a Career Technical Education course?	No
10. Is this course modeled after an UC approved course?	Yes
11. Repeatable:	Yes
12. Date of Board Approval:	July 17, 2014

13. Brief Course Description:
Integrated Math I is the first course of a three course sequence including Integrated Math I, Integrated Math II, and Integrated Math III. This course satisfies the California Common Core Standards for Integrated Math I and is intended for all ninth graders. Integrated Math I builds and strengthens students' conceptual knowledge of functions, linear functions, equations, inequalities, sequences, basic exponential functions, systems of linear equations, systems of linear inequalities, one variable descriptive statistics, correlation and residuals, analyzing categorical data, mathematical modeling, and both coordinate and transformational geometries.

14. Prerequisites:	
15. Context for Course:	
16. History Of Course Development:	
17. Textbooks	Integrated Math I Common Core Math Program Publisher: Carnegie Learning
18. Supplemental Instructional Materials:	

B. COURSE CONTENT

Course Purpose:
The purpose of Integrated Math 1 is to develop students' ability to think mathematically and develop their conceptual understanding of mathematics and procedural fluency in mathematics. Integrated Math 1 will extend the mathematics students learned in earlier grades and begin the development of concepts in Number and Quantity, Algebra, Functions, Modeling, Geometry, and Statistics and Probability needed for higher level mathematics courses. Extensive use of models/real-world situations, manipulatives, graphs, and diagrams will help

students see the connections between different topics which will promote students view that mathematics is a set of related topics as opposed to a set of discrete topics. In addition, students will learn to solve problems graphically, numerically, algebraically, and verbally and make connections between these representations. Students in this course will learn to use mathematical models to understand real world events and situations, and use algebraic reasoning to manipulate these models for deeper learning.

Course Outline:

Unit 1 Quantities and Relationships

Overview: This unit introduces students to the concept of functions. Lessons provide opportunities for students to explore functions including linear, exponential, quadratic, linear absolute value functions and linear piecewise functions through problem situations, graphs, and equations. Students will classify each function family using graphs, equations, and graphing calculators. Each function family is then defined and students will create graphic organizers that represent the graphical behavior of each function family and an example of each function family.

Students will learn to:

- Determine independent and dependent quantities
- Identify graphs that model scenarios
- Label graphs modeling scenarios with independent and dependent quantities
- Identify similarities of pairs of graphs
- Determine whether graphs are discrete or continuous
- Use the vertical line test to determine if graphs represent functions
- Rewrite functions using function notation
- Identify graphs that represent functions
- Determine whether functions are increasing, decreasing, constant, or a combination of increasing and decreasing based on its graph
- Determine whether functions have an absolute minimum, absolute maximum, or neither based on its graph.
- Determine whether graphs represent linear, quadratic, exponential, linear absolute value. Linear piecewise, or constant functions
- Identify the appropriate function family based on characteristics
- Create equations and graphs for functions given a set of characteristics
- Identify the function family represented by graphs

Assignments:

- Homework
- Quizzes
- Classwork Task
  - ➢ There Are Many Ways to Represent a Function: Recognizing Algebraic and Graphical Representations of Functions.
- End of Unit Test

Unit 2 Graphs, Equations, and Inequalities

Overview: This unit reviews solving linear equations and inequalities with an emphasis towards connecting the numeric, graphic, and algebraic methods for solving linear functions. Students explore the advantages and limitations of using tables, functions, and graphs to solve problems. A graphical method for solving linear equations, which involves graphing the left and right side of a linear equation, is introduced. Upon student understanding of solving and graphing equations by hand, the unit introduces the use of a graphing calculator. Finally, the graphical method for solving problems is extended to include non-linear equations and inequalities.

Students will learn to:

- Identify independent and dependent quantities and write functions representing problem situations
- Complete tables of values and calculate unit rate of change
- Identify input values and output values, and rates of change for given functions
- Solve functions for given input values
- Determine input values for given output values using a graph
- Complete tables to represent problem situations
- Identify input values, output values, y-intercepts, and rates of change for functions
- Estimate intersection points of functions and dependent values using graphs
- Determine exact values of intersection points using algebra
- Write equations and inequalities using a graph
- Answer questions using a graph and graph solutions on a number line
- Write and solve inequalities to answer questions from a problem situation
- Represent solutions on a graph by drawing an oval around the solutions and writing corresponding inequality statements
- Write compound inequalities in compact form
- Write inequalities from number lines
- Graph inequalities on number lines
- Write compound inequalities representing situations
- Represent solutions of compound inequalities on number lines then write final solutions represented by the number line
- Solve and graph compound inequalities on number lines
- Evaluate absolute values
- Determine the number of solutions and calculate solutions of equations
- Solve linear absolute value equations
- Solve linear absolute value inequalities and graph solutions on number lines
- Graph functions that represent problem situations and draw an oval on the graph to represent the solutions

Assignments:

- Homework
- Quizzes
- Classwork Task
  - What Goes Up Must Come Down: Analyzing Linear Functions
- Walk The Line Project

- End of Unit Test

Unit 3 Linear Functions

Overview: This unit guides student exploration and comprehension of different forms of linear equations. Questions ask students to compare the mathematical and contextual meanings of various linear equations and to determine when to use the most appropriate form of a linear equation to represent a problem situation.

Students will learn to:

- Determine linear regression equations and correlation coefficients using a graphing calculator and use the equations to make predictions
- Complete tables of values and calculate unit rates of change
- Identify input values, output values, and rates of change for given functions
- Solve functions for given input values
- Determine input values for given output values using a graph
- Define variables and write expressions and equations to represent problem situations
- Use a given equation to determine unknown values
- Determine x- and y- intercepts of equations then graph the equations
- Convert between degrees Fahrenheit and degrees Celsius
- Convert equations from standard form to slope-intercept form
- Convert equations from slope-intercept form to standard form
- Solve literal equations for given variables
- Write linear functions two different ways to represent problem situations

Assignments:

- Homework
- Quizzes
- Classwork Task
  - Is It Getting Hot in Here: Modeling Data Using Linear Regression
- Performance Task
- End of Unit Test

Unit 4 Sequences

Overview: This unit introduces students to sequences, and then focuses student attention on arithmetic and geometric sequences. Students then use recursive and explicit formulas to determine subsequent terms of a sequence. The relationship between arithmetic sequences and linear functions and some geometric sequences and exponential functions is developed.

Students will learn to:

- Describe and continue patterns
- Write numeric sequences to represent patterns and situations

- Determine the common difference for arithmetic sequences
- Determine the common ratio for geometric sequences
- Continue arithmetic sequences
- Continue geometric sequences
- Determine whether sequences are arithmetic, geometric, or neither then continue the appropriate sequences
- Determine unknown terms of arithmetic sequences using the explicit formula
- Determine unknown terms of geometric sequences using the explicit formula
- Determine whether sequences are arithmetic or geometric then use the appropriate recursive formula to determine unknown terms
- Determine unknown terms of arithmetic sequences using a graphing calculator
- Complete tables and graph sequences on the coordinate plane
- Write arithmetic sequences as linear functions then graph the functions
- Write geometric sequences as exponential functions then graph the functions

Assignments:

- Homework
- Quizzes
- Classwork Task
  - ➢ The Password Is… Operations!: Arithmetic and Geometric Sequences
- End of Unit Test

Unit 5 Exponential Functions

Overview: This unit examines the graphical behavior of exponential functions, including intercepts, domain and range, intervals of increase and decrease, and asymptotes. Students also explore the transformations of exponential functions. The unit then introduces students to the relationship between rational exponents and radical form. Students will learn the strategy to use common bases to solve simple exponential equations algebraically.

Students will learn to:

- Write simple interest functions to represent problem situations
- Use a given simple interest function to determine account balances after a given number of years
- Use a given simple interest function to determine the number of years it will take for a balance to reach given amounts
- Write compound interest functions to represent problem situations
- Use a given compound interest function to determine account balances after a given number of years
- Use a given compound interest function to determine the number of years it will take for a balance to reach given amounts
- Use simple and compound interest expressions to complete tables representing problem situations
- Write functions to represent populations over time
- Use a given population function to determine the population after a given number of years
- Use a given population function to determine the number of years it will take for a population to reach a

given amount
- Complete tables and graph given functions then identify x-intercepts, y-intercepts, asymptotes, domains, ranges, and interval(s) of increase or decrease
- Rewrite functions in terms of basic functions
- Represent functions as vertical translations using coordinate notation
- Represent functions as horizontal translations using coordinate notation
- Describe graphs in relation to basic functions
- Sketch g(x), given the graph of f(x) and given translation(s)
- Write equations for given translations
- Write equations for given graphs of g(x)
- Represent functions using coordinate notation and identify the line of reflection
- Sketch g(x), given the graph of f(x) and given reflection(s)
- Write equations of functions based on described reflections
- Write equations and sketch functions of given transformations
- Use a graph to identify the transformation needed to transform f(x) to g(x)
- Use the functions to identify the transformation needed to transform f(x) to g(x)
- Write expressions as single powers
- Evaluate cube root expressions
- Evaluate expressions
- Write radicals as powers
- Write powers as radicals
- Write expressions in radical form
- Write expressions in rational exponent form
- Write functions that represent data sets in tables
- Graph exponential equations for x
- Determine whether exponential expressions are equivalent
- Write exponential functions to represent data sets in tables

Assignments:
- Homework
- Quizzes
- Classwork Task
  - Checkmate!: Solving Exponential Functions
- End of Unit Test

Unit 6 Systems of Equations

Overview: This unit focuses on solving systems of linear equations graphically and algebraically using the substitution method and the linear combination method.

Students will learn to:
- Write and graph systems of linear equations to represent problem situations then estimate and interpret break-even points
- Transform equations in systems of equations so coefficients are integers
- Solve systems of equations by substitution and identify the systems as consistent or inconsistent
- Write systems of equations to represent problem situations then solve using the linear combination method

- Solve systems of equations using the linear combination method
- Write systems of equations to represent problem situations then solve using a graphing calculator, substitution, or linear combination

Assignments:

- Homework
- Quizzes
- Classwork Task
  - Which is the Best Method?: Solving Systems of Equations
- Performance Task
- End of Unit Test

Unit 7 Systems of Inequalities

Overview: This unit focuses on solving systems of linear inequalities graphically.

Students will learn to:

- Write linear inequalities in two variables to represent problem situations
- Identify whether graphs of linear inequalities would be represented by solid or dashed lines
- Determine the half-plane that would be shaded for inequalities using a test point
- Graph linear inequalities
- Graph inequalities then determine if given ordered pairs are solutions
- Write systems of linear inequalities to represent problem situations
- Determine whether given points are solutions to systems of linear inequalities
- Graph systems of linear inequalities and identify solutions
- Write systems of three or more linear inequalities to represent problem situations
- Graph solution sets and determine points that satisfy the inequalities in the system
- Analyze a solution set to answer questions
- Graph solution sets for systems of linear inequalities

Assignments:

- Homework
- Quizzes
- Classwork Task
  - Tuning In: Linear Programming
- End of Unit Test

Unit 8 Analyzing Data Sets for One Variable

Overview: This unit reviews data analysis of data sets with one variable. Students first learn to represent data graphically through dot plots, histograms, and box-and-whisker plots. The unit leads students to determining measures of center for a data set, determining any outliers in a data set, and determining the interquartile range and standard deviation for data sets.

Students will learn to:

- Construct graphical displays for given data sets then describe distributions

- Analyze dot plots, box-and-whisker plots, and histograms to answer questions
- Create dot plots of data sets then calculate means and medians and identify the best measure of center to describe the data
- Determine the best measure of center to describe data sets then determine means and medians
- Calculate the interquartile range and outliers of data sets and box-and-whisker plots
- Calculate the mean and standard deviations of data sets with and without a graphing calculator
- Construct box-and-whisker plots of data sets then calculate the most appropriate measure of center and spread
- Calculate the most appropriate measure of center and spread from side-by-side stem-and-leaf plots

Assignments:

- Homework
- Quizzes
- Classwork Task
  - Go For the Gold
- End of Unit Test

Unit 9 Correlation and Residuals

Overview: This unit introduces the method of least squares to determine a linear regression line of a data set. The unit then progresses to provide opportunities to determine the correlation coefficient of a data set by both pencil-and-paper and by using a graphing calculator. Then the unit exposes students to residuals of a data set in which they will make determinations about which function type might represent a data set. Finally, the unit introduces students to causation and correlation.

Students will learn to:

- Determine least squares regression lines for data points
- Use a linear regression equation to make and compare predictions to a data set
- Determine whether scatter plots have a positive, negative, or no correlation then determine the most appropriate r-values
- Determine correlation coefficients of data sets
- Determine linear regression equations and correlation coefficients of data sets then state if the linear regression equation is appropriate
- Use linear regression equations to complete tables and construct residual plots
- Use scatter plots, lines of best fit, and residual plots to determine if linear models are appropriate for data sets
- Use a table to determine linear regression equations, construct scatter plots, and construct corresponding residual plots; then determine if linear models are appropriate for the data set
- Determine whether correlation implies causation
- Answer questions regarding necessary and sufficient conditions

Assignments:

- Homework
- Quizzes
- Classwork Task
  - To Fit or Not to Fit? That is the Question!: Using Residual Plots
- Performance Task
- End of Unit Test

Unit 10 Analyzing Data Sets for Two Categorical Variables

Overview: This unit introduces categorical data as opposed to numerical data students have encountered in the previous two units. Students learn how to organize data from a data table, determine the relative frequency distributions of a data set, determine the relative frequency conditional distribution, and finally to analyze categorical data to problem solve and make decisions.

Students will learn to:

- Organize data sets into two-way frequency tables and marginal frequency distributions
- Construct bar graphs to represent data given in frequency marginal distribution tables
- Complete relative frequency distributions and relative frequency marginal distributions for given frequency marginal distributions
- Construct stacked bar graphs of relative frequency distributions
- Complete relative frequency conditional distributions for given two-way tables
- Use a relative frequency conditional distribution to answer questions
- Use a given data set to create distributions and answer questions

Assignments:

- Homework
- Quizzes
- Classwork Task
  - Oh! Switch the Station!: Drawing Conclusions from Data
- Statistics Project
- End of Unit Test

Unit 11 Mathematical Modeling

Overview: This unit presents opportunities to model real-world data using linear and exponential functions. The focus builds student decision-making to determine the appropriate function or functions for a given data set.

Students will learn to:

- Describe linear piecewise functions in words using a graph
- Answer questions based on a linear piecewise function graph
- Create scatter plots of data sets and sketch functions that best model the data
- Answer questions using a scatter plot and linear; scatter plot and exponential; and scatter plot and quadratic functions
- Determine exponential regression equations and correlation coefficients of given data sets
- Evaluate functions for given values

- Determine exponential regression equations then make predictions
- Determine the indicated regression equation for data sets
- Determine whether a quadratic or exponential function better fits a set of data points
- Use given regression equations to answer questions
- Answer questions using a scatter plot and a quadratic regression equation
- Answer questions using a scatter plot and an exponential regression equation

Assignments:
- Homework
- Quizzes
- Classwork Task
  - Let's Take a Little Trip: Every Graph Tells a Story
- End of Unit Test

Unit 12 Geometry on the Coordinate Plane

Overview: This unit uses distance, midpoint, and slope to examine segments and lines in the coordinate plane. Patty paper and constructions are used to duplicate segments and angles, bisect segments and angles, construct parallel and perpendicular lines, and construct triangles and quadrilaterals.

Students will learn to:
- Calculate distances between given pairs of points and given pairs of points on the coordinate planes
- Translate line segments on coordinate planes as described
- Construct line segments as described
- Determine midpoints of line segments with given endpoints and line segments on coordinate planes
- Locate midpoints of line segments using construction tools
- Translate given angles on coordinate planes as described
- Construct angles using construction tools
- Construct angle bisectors of given angles
- Determine whether lines are parallel, perpendicular, or neither using given equations
- Determine whether lines shown on coordinate planes are parallel, perpendicular, or neither
- Determine equations for parallel lines and perpendicular lines
- Determine equations of vertical lines and horizontal lines that pass through given points
- Calculate distances from given points to given lines
- Construct lines perpendicular to given lines and passing through given points
- Construct lines parallel to given lines and passing through given points
- Construct geometric figures using construction tools

Assignments:
- Homework
- Quizzes
- Classwork Task
  - Where Are You?: Pythagorean Theorem and the Distance Formula
- Performance Task
- End of Unit Test

Unit 13 Congruence Through Transformations

Overview: This unit addresses transformations of figures on the coordinate plane, focusing on similarity and congruence, and the effects of transformation on coordinates. The unit leads student exploration of the conditions for triangle congruence and provides opportunities for constructions of congruent triangles under stated conditions.

Students will learn to:

- Transform geometric figures on coordinate planes as described
- Determine coordinates of translated images without graphing
- Determine coordinates of rotated images without graphing
- Determine coordinates of reflected images with graphing
- Identify transformations used to create images then identify congruent angles and congruent sides and write congruent statements
- List corresponding sides and angles using congruent symbols given a congruence statement
- Determine whether triangles are congruent by Side-Side-Side
- Perform transformations then verify congruence by Side-Side-Side
- Determine whether triangles are congruent by Side-Angle-Side
- Perform transformations then verify congruence by Side-Angle-Side
- Determine needed angle measures or side measures to prove congruence by Side-Angle-Side
- Determine whether congruence can be proven by Side-Side-Side or Side-Angle-Side using given figures
- Determine whether triangles are congruent by Angle-Side-Angle
- Perform transformations then verify congruence by Angle-Side-Angle
- Determine needed angle measures or side measures to prove congruence by Angle-Side-Angle
- Determine whether triangles are congruent by Angle-Angle-Side
- Perform transformation then verify congruence by Angle-Angle-Side
- Determine needed angle measures or side measures to prove congruence by Angle-Angle-Side
- Determine whether congruence can by proven by Angle-Side-Angle or Angle-Angle-Side using given figures

Assignments:

- Homework
- Quizzes
- Classwork Task
  - All the Same To You: Congruent Triangles
- End of Unit Test

Unit 14 Perimeter and Area of Geometric Figures on the Coordinate Plane

Overview: This unit focuses on calculating perimeter and area of various geometric figures represented on the coordinate plane. The use of transformation is explored to ease arithmetic operations.

Students will learn to:

- Translate rectangles and squares to the origin then calculate the perimeter and area
- Determine the perimeter of triangles on the coordinate plane
- Determine the area of triangles on the coordinate plane
- Determine how to double the area of a triangle on the coordinate plane
- Determine the perimeter of parallelograms on the coordinate plane

- Determine the area of parallelograms on the coordinate plane
- Determine how to double the area of a parallelogram on the coordinate plane
- Determine the perimeter of trapezoids or composite figures on the coordinate plane
- Determine the area of trapezoids or composite figures on the coordinate plane

Assignments:

- Homework
- Quizzes
- Classwork Task
  - ➢ Regular or Composite: Finding the Perimeter and Area of Composite Figures
- Tessellation Project
- End of Unit Test

Unit 15 Connecting Algebra and Geometry with Polygons

Overview: This unit focuses on using slope and distance to classify triangles and quadrilaterals on the coordinate plane. Also, given a subset of vertices and a set of conditions, the remaining possible vertices will be determined.

Students will learn to:

- Determine locations of a point to create triangles with given characteristics
- Graph triangles then determine if the triangles are scalene, isosceles, or equilateral
- Graph triangles then determine if the triangles are right, acute, or obtuse
- Given three points, determine the location of the fourth point to create described figures
- Graph quadrilaterals then determine if the quadrilaterals are trapezoids, squares, rectangles, or rhombi
- Determine if points lie on a circle located at the origin given the radius or diameter
- Determine if points lie on a circle located at a given center with a given radius or diameter
- Transform circles as described then determine if points lie on the images
- Complete tables describing circles located at the origin given the radius
- Complete tables describing circles given the circle on a coordinate plane

Assignments:

- Homework
- Quizzes
- Classwork Task
  - ➢ Which One Are You?
- End of Unit Test

Unit 16 Logic

Overview: This unit introduces logical reasoning. Students have opportunities to explore induction and deduction to formulate conclusions. The unit then leads students through conditional statements, truth values, and truth tables which provides opportunities for students to practice direct and indirect proof. The unit concludes by having students solve logic puzzles.

Students will learn to:

- Identify specific information, general information, and conclusions for problem situations

- Identify whether inductive or deductive reasoning is used in problem situations and determine whether conclusions are correct
- Write additional statements required to reach conclusions, given conditional statements and conclusions
- Identify the hypotheses and conclusions, given conditional statements
- Complete truth tables for conditional statements
- Write converses of conditional statements
- Write inverses of conditional statements
- Write contrapositives of conditional statements
- Write converses and true biconditional statements of conditional statements
- Identify properties used to prove given statements
- Use the distributive property to calculate values
- Prove or disprove statements
- Solve logic problem situations
- Complete logic puzzle grids to solve problem situations

Assignments:
- Homework
- Quizzes
- Classwork Task
    - If This, Then That
- End of Unit Test

Key Assignments:
Classwork

Daily classwork is designed around structured tasks. The lessons involve opportunities for students to work individually and cooperatively, to make sense of problems and persevere in solving them, reason abstractly and quantitatively, construct viable arguments and critique the reasoning of others, model with mathematics, use appropriate tools strategically, attend to precision, look for and make use of structure, and look for and express regularity in repeated reasoning. Students will share their mathematical thinking, and develop their ability to think critically and problem solve. Students will daily use at least one of the eight Standards of Mathematical Practice. Examples of a few of these tasks are as follows:

Unit 1: There Are Many Ways to Represent a Function: Recognizing Algebraic and Graphical Representations of Functions. In this task, students will sort eighteen graphs of functions according to specific graphical behaviors and use a graphing calculator to match an equation to each graph. Questions then ask students to sort the graphs based on the form of the equations. This leads students to identifying one of five different functions: linear, exponential, quadratic, linear absolute value, and linear piecewise. Finally, students paste each graph with its corresponding equation into appropriate graphic organizer and describe the graphical behavior of each function.

Unit 2: What Goes Up Must Come Down: Analyzing Linear Functions. In this task, students will explore the use of tables, graphs, and equations to determine solutions to equations. Questions ask students to consider how each representation is used to determine an exact value versus an approximate value. Once students have performed calculations by hand they explore the use of a graphing calculator. The activity provides graphing calculator instructions to demonstrate how to use technology strategically in determining solutions using various methods.

Unit 3: Is It Getting Hot in Here: Modeling Data Using Linear Regression. In this task, students are given a linear function in the form of a table of values that represent the average temperature for each decade from 1880 to 2009. Students begin by identifying the independent and dependent variables and they create a scatterplot with their graphing calculators from the data in the given table. The scatterplot is then used to answer questions related to the scenario.

Unit 4: The Password Is… Operations!: Arithmetic and Geometric Sequences. In this task, students cut out 16 sequences. Each sequence contains the first several terms and the students will generate the next 3 terms of the sequence. Students then describe the pattern used to generate the terms. Next, they sort the sequences into groups based on common characteristics and the students provide a written rationale used to create each group. Both arithmetic and geometric sequences are then defined and an example of each type of sequence is provided and students use the examples to write different sequences having these characteristics. The students then return to the sixteen sequences they sorted previously, and they decide which sequences are arithmetic and which sequences are geometric. Students then identify the common differences or common ratios of each sequence.

Unit 5: Checkmate!: Solving Exponential Functions. In this task, a scenario is given which can be modeled by an exponential growth function. Students will complete a table of values listing each term number and the value of the term. The students then notice a pattern in the data which enables them to write an exponential expression for each value in the table. Students then graph the function using the values in the table and write an equation in function notation representing the situation. Students then use the graphing calculator to compute values related to the situation.

Unit 6: Which is the Best Method?: Solving Systems of Equations. In this task, a scenario is used to explore a system of linear equations. Students will write a system of equations in standard form to describe the situation and solve the system to answer the question. Students will solve the problem using the graphing method, the substitution method, and/or the linear combination method and determine the point of intersection.

Unit 7: Tuning In: Linear Programming. In this multi-day task, a scenario involving television production described by four constraints is given. Students will define variables and identify the constraints as a system of linear inequalities. The students then graph the solution set of the system and label all points of intersection of the boundary lines. By answering several questions related to the scenario using the graph and inequalities, students will write a function to represent the profit and compute the minimum and maximum profits.

Unit 8: Go For the Gold

In this task, a real world problem is given involving participants in the Special Olympics. A table is given listing the participation number and the number of gold medals won. Students must analyze the data by calculating and interpreting the mean and standard deviation. The students then construct a box-and-whisker plot that includes outliers. At the end of the task a statement is given in which a fictional student states that the median and standard deviation should be used to describe the data because the standard deviation is less than the Interquartile range. Students must decide whether the student is correct and explain their reasoning. They use the interquartile range and median to describe the center and spread because the data is skewed. This leads students to conclude that when the median is used the interquartile range should also be used.

Unit 9: To Fit or Not to Fit? That is the Question!: Using Residual Plots. In this multi-day task, a problem situation includes a table containing data relating the time since 1990 and the number of franchised new car dealerships. Students construct a scatter plot, perform a linear regression, determine the correlation coefficient, determine the residuals, and create a residual plot. Graphing calculator instructions are provided for students to determine the residual plot of a data set, and to show how the actual values of the data set differ from the predicted values using the regression equation. Students use all the given information to decide if they believe a linear model is appropriate. A quadratic function is given and students conclude that this type of function appears to be a better fit. The predictions using the quadratic model and the linear model are compared. In the final part of the project, students summarize how the shape of a scatter plot, the correlation coefficient, and the residual plot help determine if a linear model is an appropriate fit for the data set. The importance of using more than one measure to determine if a linear model is a good fit is emphasized in this project, and students conclude how extrapolations may lead to greater differences when comparing different models.

Unit 10: Oh! Switch the Station!: Drawing Conclusions from Data. In this task, a table of data is given involving individual students' grade level and their favorite music genre. Students organize the data by creating a frequency distribution and a stacked bar graph. Both representations are used to answer questions related to the problem. In the second part of the project, students focus on a subset of the data used in the first part of the project. Students reorganize a subset of the data by creating a relative conditional frequency distribution table and a single bar graph. Using these representations, students are able to formulate conclusions for the specified subset of data and use statistics to support their conclusions.

Unit 11: Let's Take a Little Trip: Every Graph Tells a Story. In the first part of this task, the graph of a linear piecewise function modeling Gulliver's time since he left home measured in hours and his distance from home measured in miles is given. Students will identify the function as a linear piecewise function, interpret the absolute maximum, describe the domain and range of the problem situation, locate intervals of increase and decrease, calculate Gulliver's average speed for a specified time interval, and then answer questions related to values on the graph. In the second part of the activity, graphing calculator in conjunctions with Calculator Based Rangers (CBRs) are used to model a person walking which results in the graph of a linear piecewise functions. Using the technology, students will try to generate given graphs by walking distances in various directions and speeds.

Unit 12: Where Are You?: Pythagorean Theorem and the Distance Formula. In this task, students will apply the Pythagorean Theorem to a situation on a coordinate plane. They calculate various distances using coordinates of points aligned either horizontally, or vertically using subtraction and diagonal distances using the Pythagorean Theorem. Students then generalize the distance between any two points and students derive the distance formula.

Unit 13: All the Same To You: Congruent Triangles. This task begins with definitions and symbols associated with congruent line segments and congruent angles. Students will explore the properties of congruent triangles on the coordinate plane. A translation and the Pythagorean Theorem are used to determine corresponding sides of congruent triangles are congruent. A protractor is used to determine the corresponding angles of congruent triangles are congruent. Students then write triangle congruent statements and use the statements to list congruent corresponding sides and congruent corresponding angles.

Unit 14: Regular or Composite: Finding the Perimeter and Area of Composite Figures. In this task, students will analyze a hexagon and use the Distance Formula and Pythagorean Theorem to determine if the hexagon is regular. They then use the measurements to determine the perimeter and area of the polygon. Students are then given a graph of a composite figure and asked to determine the perimeter and area of the figure. Students will draw line segments on the figure to divide it into familiar shapes and work with those shapes. They do this activity twice, dividing the composite figure two different ways and conclude that the area and perimeter remained unaltered.

Unit 15: Which One Are You Again?

In this task, students will graph four points on the coordinate plane and use algebra to determine the characteristics of the quadrilateral with respect to the length of its sides and the measure of the angles. They use the Distance Formula to determine the length of the sides of the quadrilateral and the slope formula to determine which sides if any are parallel or perpendicular.

Unit 16: If This, Then That

In this task, a conditional statement is given. Students identify the hypothesis and conclusion. They then analyze the truth value of each statement dependent upon the truth or falseness of the hypothesis and conclusion. Students will discover the concept of truth tables through this practice.

Homework

Homework will be given for each lesson in Integrated Math 1 and will be used to reinforce newly learned concepts and to review previously learned concepts.

Projects

Walk the Line Project (after Unit 2)

Using a Texas Instruments TI-84 graphing calculator and Calculator Based Ranger (CBR), students will collect distance and time data while walking towards a wall. The students will create a position time graph, create a linear function that models the data, and then answer questions regarding the interpretation of the x-intercept, the y-intercept, and the unit rate of change. The students will also calculate a linear regression line and use it to predict the students distance from the wall at specific moments in time. The goal of this project is for students to apply their knowledge of linear functions and rate of change to a real-world problem.

Statistics Project (after Unit 10)

Students will search in newspapers, magazines, and/or online to find data in which they can create a scatterplot. The students will plot the data in a scatterplot, describe the shape, center, spread and relationships of the variables. Students will interpret the rate of change, and intercepts of linear models. The goal of this project is to let the students see and understand how the math they are learning in the class can be used to help them collect, sort, analyze, and interpret data in real-world situations.

Tessellation Project (after unit 14)

Students will create their own tessellation. Starting with basic polygons, students will alter them, perform a transformation, and then describe the transformation that creates a tessellation. In addition, the students will find examples of tessellations in the real world around them and will be exposed to how these designs can be found in everyday architecture and designs. The goal of this project is for students to gain a better understanding of translations, rotations, and/or reflections through an interdisciplinary approach.

Instructional Methods and/or Strategies:
A variety of instructional strategies will be used throughout Integrated Math 1. Instructional strategies will be utilized during whole group instruction, small group instruction, partner/pair work, and individual work. The key goal of instruction is to challenge students to think about and discuss mathematics while using the eight Standards for Mathematical Practice.

Instructional Methods/Strategies:
Guided Inquiry/Problem Based Learning
Direct Instruction
Kagan Cooperative Learning Structures
Discourse
Use of Visual Representations and Concrete Models
Guided Inquiry

The standards for Mathematical Practice emphasize the importance of making sense of problems and persevering in solving them (MP 1), reasoning abstractly and quantitatively (MP 2), and solving problems that are based upon everyday life, society, and the workplace (MP 4). Implicit instruction models such as guided inquiry provide students with the time and support to successfully engage in mathematical inquiry by collecting data and testing hypothesis. During guided inquiry, the teacher provides the data and then questions students to help them arrive at a solution to the problem. The teacher utilizes this strategy throughout each unit to encourage students to explore and make sense of mathematical situations. Content especially suited to the use of this strategy involves functions with patterns and geometric relationships.

Problem Based Learning

In problem based learning, the teacher poses a problem or question, assists when necessary, and monitors students' methods and solutions. During the use of this strategy students work either individually or in cooperative groups to solve challenging problems with real world applications Throughout problem-based learning teachers encourage students to think for themselves and show resourcefulness and creativity. When students engage in problem solving they must be allowed to make mistakes. The teacher creates a classroom environment that recognizes errors and uncertainties as inevitable accoutrements of problem solving. Through class discussion and feedback, student errors become the basis of furthering understanding and learning. Problem based learning will be utilized during the introduction of a concept as well as at the end of a unit of study.

Direct Instruction

Direct instruction is highly structured and sequential strategy. It is effective for teaching information and basic skills during whole class instruction. In the first phase the teacher introduces, demonstrates, or explains the new concept or strategy, asks questions, and checks for understanding. The second phase is an intermediate step designed to result in the independent application of the new concept or described strategy. In the relatively brief third phase students work independently and receive opportunities for closure. This phase also often serves in part as an informal assessment of the extent to which students understand what they are learning and how they use their knowledge or skills in the larger scheme of mathematics.

Cooperative Learning

The cooperative learning model involves students working either in partners or in mixed ability groups to complete specific tasks. It assists teachers in addressing the needs of the wide diversity of students that is found in many classrooms. The teacher presents the group with a problem or a task and sets up the student activities. While the students work together to complete the task, the teacher monitors progress and assists student groups when necessary. Specific Kagan Cooperative Learning structures that will be used in Integrated Math 1 are as follows: Mix-n-Match, Line-Ups, Inside-Outside Circle, Rally Coach, Quiz-Quiz Trade, Rally Robin, Stand-Up Hand Up Pair-Up, Talking Chips, Timed Round Robin, All Write Round Robin, Round Table, Mix Pair Rally Coach, and Fan-n-Pick. These structures will be utilized within each unit to introduce concepts, practice important skills, and review key content.

Discourse

Throughout this course the teacher will facilitate classroom discussions to support student understanding. The Standards for Mathematical Practice expect students to demonstrate competence in making sense of problems (MP 1), constructing viable arguments (MP 3), and modeling with mathematics (MP 4). Through discourse in the mathematics classroom, students will be expected to communicate their understanding of mathematical concepts, receive feedback, and progress to deeper understanding. The teacher will use facilitation techniques such as rephrasing student comments, allowing wait time, and asking students to revoice peer statements. These discussions will support students as they relate the everyday language of their world to mathematical language and symbols. Mathematical discourse will be an essential component of each unit of study and will provide detailed information to the instructor regarding student understanding and progress.

Visual Representations and Concrete Models Visual representations and models will be utilized to support student understanding of key content standards. The teacher will model effective use of diagrams, concept maps, graphic organizers, and flow charts to show relationships between concepts and develop deeper understanding. Learning that utilizes different modes of instruction is necessary to promote both student understanding and long-term memory. The Mathematical Practice Standards suggest that students look for and make use of structure (MP 7), construct viable arguments (MP 3), model with mathematics (MP 4), and use appropriate tools strategically (MP 5). In order to develop these mathematical habits, the teacher will emphasize meaningful relationships that connect concepts, utilize concept maps and graphic organizers to summarize lesson content and objectives, and facilitate student use of models and representations to demonstrate understanding. For example, teachers will use models to demonstrate the Pythagorean Theorem, utilize algebra tiles to demonstrate an algebraic expression, and use AngLegs to demonstrate triangle congruencies.

Supporting Mathematical Practice 1: Make sense of problems and persevere in solving them

In Integrated Math 1, students will discuss, think, work in groups, and share, which provides a classroom environment for students to make sense of problems, develop strategies, persevere in implementing the strategy, and analyze the results.

As students work collaboratively through problems, they will plan and execute a solution strategy. Each group member has the responsibility to monitor and evaluate the progress of the group, and to make suggestions for changing course, if necessary. Teachers will circulate through the room monitoring students' work, assessing progress, and redirecting with guided questions.

To bring closure and provide summary for each problem, teachers will ask thought-provoking questions that require students to explain their thinking and process. Multiple groups will present their solutions with class discussion centered around alternate solution paths, connections to prior concepts, and generalizations.

Supporting Mathematical Practice 2: Reason abstractly and quantitatively

Throughout the course, scenarios will help students recognize and understand that quantitative relationships seen in the real-world are no different than quantitative relationships in mathematics. Some problems begin with real-world context to remind students that the quantitative relationships they already use can be formalized mathematically. Other problems will use real-world situations as an application of mathematical concepts.

Supporting Mathematical Practice 3: Construct viable arguments and critique the reasoning of others

In Integrated Math 1 classrooms, students are active participants in their learning; they are doing the work, presenting solutions, and critiquing each other. The teacher facilitates the discussion and highlights important connections, strategies, and conclusions.
Each lesson ends with the statement "Be prepared to share your solutions and methods." Students are expected to be able to communicate their reasoning and critique the explanation of others. As students explain problem-solving steps or the rationale for a solution, they will internalize the process and reasoning behind the mathematics.

Supporting Mathematical Practice 4: Model with mathematics

Activities throughout the course provide opportunities for students to create and use multiple representations (words, tables, graphs, and symbolic statements) to organize, record, and communicate mathematical ideas.

Manipulatives and various models are incorporated throughout to develop a conceptual understanding of mathematical concepts. These activities provide opportunities for students to develop strategies and reasoning that will serve as the foundation for learning more abstract mathematics. To foster the transfer of student understanding from concrete manipulatives to the abstract procedures, a variety of instructional prompts are used.

Supporting Mathematical Practice 5: Use appropriate tools strategically

In Integrated Math 1, activities throughout the course facilitate the appropriate use of tools including graphing calculators, rulers, protractors, compasses, and manipulatives. Tools are used in a variety of ways to build conceptual understanding, to explore concepts, and to verify solutions. Worked examples are provided as appropriate within lessons to demonstrate how to use various tools.

Supporting Mathematical Practice 6: Attend to precision

Each lesson throughout the course provides opportunities for students to communicate precisely when writing their solutions, and then sharing their solutions with their peers. Teachers ensure that students label units of measure and explain their reasoning using appropriate definitions and mathematical language.

Supporting Mathematical Practice 7: Look for and make use of structure

Activities throughout the course provide opportunities for students to analyze numeric, geometric, and algebraic patterns. Accompanying questions help students notice relationships for themselves as opposed to memorization of facts.

Supporting Mathematical Practice 8: Look for and express regularity in repeated reasoning

During activities throughout the course, students are provided opportunities to make observations, notice patterns, and make generalizations. Students are required to communicate their generalizations verbally and symbolically. This understanding will lead to greater transfer and ability to solve non-routine problems. In addition, teachers will facilitate discussions that highlight important connections, efficient strategies, and conclusions.

Assessment Including Methods and/or Tools:

A combination of both informal, formal, informative and summative assessments will be used to evaluate student progress towards students' ability to think mathematically, developing students' conceptual understanding of mathematics, and developing students' procedural fluency in mathematics.

Assessment Methods and/or Tools:

- Daily Student Observation
- Formal Daily Assessment
- Performance Tasks
- End of Unit Test
- Projects
- Quizzes
- Semester Final Exam

Daily Student Observation

Daily student observations are in class observations of students working on mathematics tasks, either independently or in groups. Walking around the room, actively listening to students, asking questions, directing discourse, and helping where needed are all forms of informal assessment. The instantaneous feedback to students about where to go next, what question they may want to ask themselves to gain insight into a problem, or simply correcting computational errors, results in this practice being a form of formative assessment. Teachers may use notes or they may focus their observations using checklists based on specific skills and concepts. In addition to notes and checklists, teachers may also use student whiteboards, Thumbs Up/Thumbs Down, or Fist to Five, to informally determine student understanding of the concept being taught.

Formal Daily Assessment

Formal Daily Assessments are both in classroom and out of classroom assessments that teachers use to check for understanding. These assessments are typically done at the end of a lesson to see how much the students have learned. Examples of formal daily assessments are homework, classwork, and Ticket out the Door. These types of assessments are formative because teachers use these assessments to gauge student understanding of the concept, procedure, or skill. Based on student results teachers modify lessons to meet the needs of their students.

Performance Tasks

Performance Tasks consist of problems or scenarios that demand students engage in thinking about a problem, encourage them to justify their thinking, and often require students to engage with other students. Administered to individual students or to groups, performance tasks are often complex problem solving activities that require students to apply prior knowledge in a given situation or to extend current knowledge in new directions.

Both closed tasks and open tasks are used in Performance Tasks. Closed tasks will ask students to provide one correct answer and usually there is only one correct way to reach that answer. In Integrated Math 1, closed tasks will be used to evaluate student procedural fluency in mathematics. Open tasks will come in two forms, open-middled tasks and open-ended tasks. Open-middled tasks require one correct answer; however, students may provide different paths to the answer. Open-middled tasks are effective in assessing how students solve problems and think about mathematics. They reveal student thinking throughout the problem solving process and they give students the opportunity to develop and use their own strategies and to solve problems in ways that are most comfortable to them. Open-ended tasks have many correct answers and many correct routes to getting those answers. They include tasks that require students to make conjectures, solve nonroutine problems, and justify their answers. Open-ended tasks often pose questions based in real situations, thereby giving the students a chance to see how mathematics is used outside the classroom. They often require students to make many decisions about using mathematics and sometimes require students to make assumptions and add pertinent information. They provide teachers with the opportunity to see how their students make problem-solving decisions and how they use the mathematics they have learned. Open-ended tasks also give students the opportunity to be creative and use their own ideas for solving problems. In Integrated Math 1, open tasks will be used to assess students problem solving ability and conceptual understanding.

Performance Tasks will be given at the conclusion of units 3, 6, 9, and 12. The Performance Tasks will be evaluated according to unit goals and objectives and scored with a Four-Point Rubric shown below.

Got It: Evidence shows that the student essentially has the target concept or idea.

- **Score of 4 Excellent: Full Accomplishment**

Strategy and execution meet the content, process, and qualitative demands of the task. Communication is judged by effectiveness, not length. May have minor errors

- **Score of 3 Proficient: Substantial Accomplishment**

Could work to full accomplishment with minimal feedback. Errors are minor, so teacher is confident that understanding is adequate to accomplish objective.

Not Yet: Student shows evidence of major misunderstanding, incorrect concept or procedure, or failure to engage in task.

- **Score of 2 Marginal: Partial Accomplishment**

Part of the task is accomplished, but there is a lack of evidence of understanding or evidence of not understanding. Direct input or further teaching is required.

- **Score of 1 Unsatisfactory: Little Accomplishment**

The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success.

End of Unit Test

End of Unit Tests measure student learning of the content and skills in a unit. Such tests are linked to the specific learning goals of each unit (see course outline), the California Common Core Mathematics Standards for Integrated Math 1, and pay attention to the Standards for Mathematical Practice. To effectively assess such goals, such tests should include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). End of Unit Tests will be given at the end of each unit.

Projects

Projects are another form of formal assessment that will be used in Integrated Math 1. Projects are typically extended open-ended tasks. Like open-ended tasks, projects have many solutions with many routes to the solutions, but they require many more decisions from students and projects typically will require students to work for a week or more. Projects focus on situations outside of school that require students to use different types of mathematics, such as algebra, geometry, or probability in the same task. Also, they connect mathematics to other subjects, such as language arts, science, social studies, art, or music.

Projects allow students to see mathematics in action outside the classroom by giving students a chance to connect mathematics with real situations and other subject areas. They also allow teachers to assess how students think, how our students persevere, and how they connect ideas. If presentations are part of the project, teachers are also able to see how students communicate mathematics orally.

Projects will be evaluated according to unit goals and objectives and scored with a Four-Point Rubric shown below and will be given after units 2, 10, and 14.

Got It: Evidence shows that the student essentially has the target concept or idea.

- **Score of 4 Excellent: Full Accomplishment**

Strategy and execution meet the content, process, and qualitative demands of the task. Communication is judged by effectiveness, not length. May have minor errors

- **Score of 3 Proficient: Substantial Accomplishment**

Could work to full accomplishment with minimal feedback. Errors are minor, so teacher is confident that understanding is adequate to accomplish objective.

Not Yet: Student shows evidence of major misunderstanding, incorrect concept or procedure, or failure to engage in task.

- **Score of 2 Marginal: Partial Accomplishment**

Part of the task is accomplished, but there is a lack of evidence of understanding or evidence of not understanding. Direct input or further teaching is required.

- **Score of 1 Unsatisfactory: Little Accomplishment**

The task is attempted and some mathematical effort is made. There may be fragments of accomplishment but little or no success.

Quizzes

In Integrated Math 1, quizzes are used as formative assessments as part of a unit of study. Quizzes are linked to specific subset of learning goals within a unit of study, the California Common Core Mathematics Standards for Integrated Math 1, and pays attention to the Standards for Mathematical Practice. To effectively assess such goals, quizzes should include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). A minimum of two quizzes will be given per unit.

Semester Final Exams

Semester Final Exams are summative assessments designed to measure student learning of the content and skills learned in a semester. Such exams are linked to the specific learning goals of each unit taught in the semester, the California Common Core Mathematics Standards for Integrated Math 1, and the Standards for Mathematical Practice. To effectively assess such goals, these tests will include various types of assessment items, including multiple choice, selected response, short answer, and both closed tasks and open-middled tasks (see Performance Tasks above). Semester Final exams will be given twice a year, at the end of both Fall and Spring semesters.