ACALANES UNION HIGH SCHOOL DISTRICT
COURSE OF STUDY: CURRICULAR AREA – MATH

COURSE TITLE:	ALGEBRA 1
GRADE LEVEL:	9-12
COURSE LENGTH:	One Year
PREFERRED PREVIOUS COURSE OF STUDY:	Common Core Math 8
CREDIT:	10 Credits
UC/CSU CREDIT:	Meets UC/CSU credit for mathematics requirement; subject area (“c”)
GRADUATION REQUIREMENT:	Fulfills 10 units of Algebra 1 credit required for graduation
STANDARDS AND BENCHMARKS:	California Common Core State Standards Algebra 1
ADOPTED:	May 15, 2019
INSTRUCTIONAL MATERIALS:	Big Ideas Algebra 1, Big Ideas Learning, 2015

COURSE DESCRIPTION:

Algebra 1 formalizes and extends the mathematics that students learned in Common Core math 6 – 8. This course includes content standards from the conceptual categories of Number and Quantity, Algebra, Functions, and Statistics and Probability. Through the application of the Standards for Mathematical Practice, students will increasingly engage with the subject matter and grow in mathematical maturity and expertise.

COURSE OBJECTIVES:

Content Objectives

During the course students will:

1. Develop and extend an understanding of linear and exponential relationships including contrasting these models
2. Solve linear and quadratic equations
3. Engage in methods for analyzing quadratic functions
4. Explore, manipulate, and compare different types of function
5. Analyze real world data using statistics

Skill Objectives:

During the course students will work toward:

1. Active learning through investigation and conjecture
2. Consistent study habits, organization, and personal responsibility for learning
3. Proficiency in writing about mathematics and fluency in using mathematical vocabulary
4. Strategic implementation of instructional technologies
5. Effective communication and collaboration

ASSESSMENT:

Assessments are designed to promote and evaluate mathematical thinking. Teachers use engaging activities that involve students in investigating, conjecturing, verifying, applying, evaluating, and communicating in various assessment modalities.

Formal and informal assessments can be made on the basis of both individual and group work. Assessments should be from a variety of means and could include performance tasks, quizzes, tests, projects, investigations, and daily assignments.

Assessments should be measuring the following claims:
Claim #1 – Concepts & Procedures
Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.
Claim #2 – Problem Solving
Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.
Claim #3 – Communicating Reasoning
Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
Claim #4 – Modeling and Data Analysis
Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.

Performance Tasks

Performance tasks are used to better measure capacities such as depth of understanding, research skills, and complex analysis, which cannot be adequately assessed with selected- or constructed-response items. These tasks may require students to evaluate, optimize, design, plan, model, transform, generalize, justify, interpret, represent, estimate, and calculate solutions. Performance Tasks can be used for a variety of purposes such as topic engagement, formative and evaluative assessment. They may be performed individually or in small groups, depending on the purpose of assessment.

Performance tasks should:

- Integrate knowledge and skills across multiple claims
- Require student-initiated planning and management of information and ideas
- Reflect a real-world task and/or scenario-based problem
- Allow for multiple approaches
- Represent content that is relevant and meaningful to students
- Be assessed using an understandable rubric that provides meaningful feedback for students and the teacher

GRADING GUIDELINES: See AUHSD Grading Guidelines: Final Mark Rubric and Final Course mark Determination Components

COURSE CONTENT:

Mathematical Practices

The Standards for Mathematical Practice are “habits of the mind of mathematically proficient students”. They describe the attributes that mathematics educators at all levels are striving to develop in their students, as these practices are based on key mathematical processes and proficiencies. The goal of implementing these practices is to develop students who can use their knowledge of mathematics in flexible, sophisticated, and relevant ways across multiple disciplines.

#1 Make sense of problems and persevere in solving them (Hypothesize & Strategize)

- Students are:
  - Making conjectures about what the problem is asking and how they can begin to solve it
  - Checking for the reasonableness of the strategy as the work progresses and making adjustments as needed
- Teachers develop this skill by having students:
  - Explain the meaning of the problem and/or restate the problem
  - Analyze the given information and develop entry points into the problem and develop strategies for solving the problem
  - Execute and evaluate multiple strategies

#2 Reason abstractly and quantitatively (De/Contextualize)

- Students are:
  - Determining what numbers and symbols represent through the use of diagrams, graphs or equations
- Teachers develop this skill by having students:
  - Move between multiple representations to determine the meaning behind quantities
  - Express purely mathematical expressions with real world context and taking quantities out of context and representing them as abstract mathematical ideas or expressions

#3 Construct viable arguments; critique others’ reasoning

- Students are:
  - Justifying their thinking by providing evidence based on mathematical properties and using that evidence to evaluate the reasoning of others
- Teachers develop this skill by having students:
  - Make conjectures, compare and contrast methods, and identify flawed logic by providing counter-example

#4 Model with Mathematics

- Students are:
  - Interpreting and constructing graphs, tables, number lines, diagrams or equations to model real-world situational data
- Teachers develop this skill by having students:
  - Use models to make interpolative and extrapolative inferences
  - Examine the effectiveness and appropriateness of a model

#5 Use appropriate tools strategically

- Students are:
  - Selecting appropriate math tools and technology to help solve problems including manipulatives, graphing utilities, tables, matrices, computer applications, compasses, etc.
- Teachers develop this skill by having students:
  - Identify the strengths and weaknesses of different tools in relation to solving a given problem and also use tools to explore, confirm or deepen understanding

#6 Attend to Precision

- Students are:
  - Calculating quantities accurately through proper rounding (based on context), labeling of units of measure, and checking their work
  - Selecting a problem solving method that allows for appropriate precision
- Teachers develop this skill by having students:
  - Formulate precise explanations of their work using vocabulary and justify their rounding process
  - Re-examine their work or thinking process, and then demonstrate the method by which they check their answers

#7 Look For and Make Use of Structure

- Students are:
  - Looking for patterns or relationships and using that structure to simplify complex ideas
- Teachers develop this skill by having students:
  - Extend prior knowledge of similar situations to novel ones or break down complex problems in smaller parts which resemble simpler, more familiar ideas

#8 Look for and express regularity in repeated reasoning (Generalize)

- Students are:
  - Developing general methods, rules, or short cuts and determining when they are appropriate
- Teachers develop this skill by:
  - Facilitating activities which allow for students' "aha!" moments and then helping them use it to develop "rules" based on repeated trials with a process

Modeling with Functions	
Common Core State Standard (CCSS)	**Learning Objective**
N.Q.1 Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	• Apply appropriate units given a specific context • Determine rates from a graph or equation to solve a problem • Interpret and create distance time graphs
N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.	• Perform unit conversions • Create and solve proportions
N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	• Select an appropriate level of precision within the context of a problem
F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x)	• Differentiate between independent and dependent quantities • Understand and identify the key features of the cartesian plane • Define and understand domain and range • Determine the domain and range for a relation • Differentiate between relations and functions by using tables, graphs, equations, mapping diagrams and set • Use the vertical line test to determine if a graph is a function
F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.	• Evaluate expressions • Evaluate and interpret function notation • Create linear functions from patterns
F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥1.	• Represent an arithmetic sequence as a linear function; as a table, list or a graph • Represent a geometric sequence as an exponential function; as a table, list or a graph • Experiment with types of sequences other than arithmetic or geometric
F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	• Use patterns, graphs and tables to create functions • Use function notation • Distance Time Graphs including Increasing, Decreasing interpretation • Discrete vs Continuous Graphs • Interpreting Linear, Quadratic and Exponential Graphs

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★	• Interpreting linear, quadratic and exponential graphs • Relating the domain to its graph
F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	• Compare key characteristics of two different representations of functions, e.g. slope, y-intercepts, maximum, minimum, transformations
F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.	• Use the rate of change to determine the mathematical model: linear or exponential • Associate a common difference with a linear model • Associate a common ratio with an exponential model • Distinguish between growth and decay models
F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	• Compare and identify linear, quadratic and exponential functions • Compare and contrast the growth of linear, quadratic and exponential functions
F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.	• Contextualize models with appropriate constraints or parameters

Linear Functions	
Common Core State Standard (CCSS)	**Learning Objective**
F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★	• Choose and write functions to model data • Compare functions using average rates of change • Solve real world scenarios involving linear functions • Calculate the slope of a line from a table, list of points or graph
F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	• Compare functions using average rates of change • Solve real world scenarios involving linear functions • Construct a graph from a linear equation • Analyze a graph to identify key characteristics
F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	• Use function notation to evaluate, interpret, solve, and graph functions • Use linear equations to solve real world scenarios • Compare and contrast two functions that are represented algebraically, graphically, numerically, in tables and verbally
F.BF.1 Write a function that describes a relationship between two quantities.★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context.	• Write equations in slope-intercept, point-slope and standard form • Use linear equations to solve real world scenarios • Write an equation of a line given its slope and a point on the line • Write an equation of a line given two points on the line • Use lines of fit to model data
F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★	• Write the terms of arithmetic sequences given the rule or inductive reasoning to extend the pattern • Graph arithmetic sequences • Write arithmetic sequences as functions

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.	• Associate a common difference with a linear model • Associate a common ratio with an exponential model • Justify that a model is linear or exponential using rate of change
Linear Equations & Inequalities in One Variable	
Common Core State Standard (CCSS)	**Learning Objective**
A.REI.1 Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	• Solve simple equations, multi-step equations, equations with variables on both sides, and linear absolute value equations • Use unit analysis to model real world scenarios • Identify special solutions (no solutions, all real numbers, etc.) • Justify steps to solve equations using properties of equality
A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	• Solve linear equations and inequalities including multi-step, variables on both sides, and absolute value
A.CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	• Decontextualize real world scenarios to create equation and inequalities to find the solution in the context of the problem
A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.	• Identify restrictions in the context of the problem: domain and range
A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.	• Isolate specified variables in formulas and/or equations

Linear Equations & Inequalities in Two Variables	
Common Core State Standard (CCSS)	**Learning Objective**
A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	• Identify and graph linear equations and inequalities • Using function notation to evaluate and graph functions • Create linear equations from a given data set (graph, table, etc.) • Graph special cases e.g. vertical or horizontal lines and absolute value • Slope and writing equations using slope-intercept and point-slope form • Recognize and rearrange equations into standard form • Recognize and write equations for parallel and perpendicular lines • Compare linear functions to other types • Solve systems by graphing, substitution and elimination
A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.	• Use linear equations, inequalities and systems to model real world scenarios • Consider the context of the problem when verifying solutions (constraints) • Understand special case solutions to systems e.g. no solution and infinitely many solutions
A.REI.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.	• Solve a system using elimination
A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	• Interpret the graph of a system of equations • Solve a system using graphing, substitution or elimination • Select and differentiate between appropriate methods: graphing, substitution or elimination
A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).	• Create a graphic representation of the infinite set of all solutions points for linear equations • Verify that the points on the line are solutions to the linear equation

A.REI.11 Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★	• Verify that the intersection point is a solution to the given linear system • Use technology to model a linear system
A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	• Graph linear inequalities and systems of linear inequalities • Understand that the shaded region is the set of all solutions for the linear inequality • Recognize that the intersection of shaded regions represents the solution set for a system of linear inequalities
Quadratic/Exponential Functions	
Common Core State Standard (CCSS)	**Learning Objective**
F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.★	• Use and interpret function notation with quadratic and exponential functions • Graph, evaluate and interpret quadratic and exponential functions • Identify the graphical characteristics of quadratic functions: shape of graph, vertex, axis of symmetry, maximum or minimum and possible intercepts • Identify the graphical characteristics of exponential functions: shape of graph, end behavior • Differentiate between exponential growth and decay by inspection of equations and graphs • Use graphs to solve quadratics by identifying the x-intercepts as the zeros • Graph quadratics using the axis of symmetry equation x=-b/(2a)
F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★	• Identify the domain of quadratic and exponential functions from function notation and graphs • Model a real world scenario by writing, evaluating and/or graphing a function • Consider the context of the problem when verifying solutions (constraints)

F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.★	• Differentiate between types of functions (linear, quadratic, exponential) by analyzing the rate of change between a set of ordered pairs given a table, list or graph
F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★	• Given the general equation of a quadratic or exponential function, understand how the parameters of the equation affect the graph (e.g. how the "a" value of a quadratic changes the direction of the opening or how the "b" value of an exponential function determines growth or decay)
F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★ a. Graph linear and quadratic functions and show intercepts, maxima, and minima. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.	• Graph quadratic functions and show intercepts, maxima, and minima. • Graph exponential functions with “a” value of one (1)
F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as y = (1.02)t, y = (0.97)t, y = (1.01)12t, y = (1.2)t/10, and classify them as representing exponential growth or decay.	• Rewrite quadratic functions between the different forms: standard, vertex and intercept (factored) form • Use the process of factoring and completing the square in a quadratic function to show zeros, vertex, and symmetry of the graph, and interpret these in terms of a context • Use the properties of exponents to interpret expressions for exponential functions. (e.g. Identify percent rate of change in functions and classify them as representing exponential growth or decay)
F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.	• Given two different representations, compare key characteristics of alike functions. (e.g. minimum/maximum for quadratics or growth rate for exponential)

F.BF.1 Write a function that describes a relationship between two quantities.★ a. Determine an explicit expression, a recursive process, or steps for calculation from a context. b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.	• Create a quadratic or exponential function to model data or a real world scenario
F.BF.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.	• Graph a function using transformations of a parent function: quadratic or absolute value • Analyze the transformations of a parent function on a graph and write the indicated function
Quadratic Equations	
Common Core State Standard (CCSS)	**Learning Objective**
N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.	• Simplify radical expressions with a non-negative radicands
A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.★ a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	• Factor polynomials including special cases • Find the zeros of a quadratic function using graphing, the Zero Product Property and/or factoring • Use intercepts and points to graph and write quadratic functions • Use completing the square to solve quadratic equations, find and use maximum/minimum values • Use appropriate techniques to solve real world scenarios

A.REI.4 Solve quadratic equations in one variable. a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form (x – p)2 = q that has the same solutions. Derive the quadratic formula from this form. b. Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.	• Use completing the square to solve quadratic equations (square root property) • Observe and understand the derivation of the quadratic formula • Use the quadratic formula to solve quadratic equations • Interpret the value of the discriminant to determine the nature of the roots • Determine and apply the appropriate strategy to factor the given polynomial • Recognize when the quadratic formula gives non-real solutions
CCSSM Common Core State Standard (CCSS)	**Learning Objective**
Statistics	
Interpreting Categorical and Quantitative Data (S-ID)	
S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).	• Construct and analyze histograms which represent data
S.ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	• Compare and contrast representations of data to make observations about distribution and measures of central tendencies
S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	• Analyze the effects of changes within the given data set • Determine how data points can affect the central tendencies and measures of distribution

S-ID.4 **Summarize, represent, and interpret data on a single count or measurement variable.** 4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	• Calculate probabilities using normal distributions • Recognize normal data sets
S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models. b. Informally assess the fit of a function by plotting and analyzing residuals. c. Fit a linear function for a scatter plot that suggests a linear association.	• Create a scatter plot from a given data set • Identify and describe correlations between data sets • Draw and estimate a line of best fit • Use two points to write an equation that estimates the line of best fit • Use residuals to determine how well the function fits the data • Critique graphs for skewed representation (i.e. scale) • Model a real world scenario
S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	• Analyze characteristics of the graph and to relate to the context of the real world scenario
S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.	• Compute and interpret the correlation coefficient of linear fit using technology • Connect a given correlation coefficient to the characteristics of the graph
S.ID.9 Distinguish between correlation and causation.	• Determine whether data is in a cause-and-effect relationship or merely related
Making Inferences and Justifying Conclusions (S-IC)	
S-IC.1 **Understand and evaluate random processes underlying statistical experiments.** 1. Understand statistics as a process for making inferences	• Distinguish between populations and samples

about population parameters based on a random sample from that population.	
S-IC.2 **Understand and evaluate random processes underlying statistical experiments.** 2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, if a model says a spinning coin falls heads up with probability 0.5, would a result of five tails in a row cause one to question the model?	● Analyze types of sampling methods
S-IC.3 **Make inferences and justify conclusions from sample surveys, experiments, and observational studies.** 3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	● Analyze methods of collecting data ● Recognize bias in survey questions and sampling