Correlations to Holt, Rinehart, and Winston, Algebra 1

This table shows Sketchpad and Fathom activities you can use with many of the lessons in your textbook. The activities listed come from these activity books: *Exploring Algebra 1 with The Geometer's Sketchpad* (EA1G), *Exploring Algebra 2 with The Geometer's Sketchpad* (EA2G), and *Exploring Algebra 1 with Fathom* (EA1F).

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
Chapter 1 Exploration	EA1G	2	The Golden Rectangle and Ratio	Construct the ratio while building rectangles and spirals.
1.1	EA1G	1	Raz's Magic Multiplying Machine	Explore features of multiplication with a continuous dynamic model.
1.1	EA1G	1	Mystery Machines	Figure out where 0 and 1 are located on these machines, or what operations they perform.
1.3	EA1G	3	Order of Operations	Explore how mathematical communication requires agreement on certain rules.
1.4	EA1G	5	Coordinates: The Fly on the Ceiling	Measure coordinates and plot points with the help of a fly on Descartes' ceiling.
1.4	EA1G	5	The Origin: Center of the World	Work with the origin and negative coordinates, identify the quadrants, and draw figures.
1.4	EA1G	5	Points Lining Up in the Plane	Find points that satisfy algebraic rules and write rules to describe sets of points.
1.5	EA1G	5	Points Lining Up in the Plane	Find points that satisfy algebraic rules and write rules to describe sets of points.
1.6	EA1G	6	Lines of Fit	Approximate a line of best fit to a number of data points, and use the line to make an estimate.
1.6	EA2G	8	Fitting Functions to Data	Students transform functions to fit data and use a least-squares calculation to judge how good the fit is.
2.2	EA1G	1	Adding Integers	Add positive and negative integers using a visual model.
2.2	EA1G	1	Identity Elements and Inverses	Determine which operations have identity elements and inverses and which do not.
2.2	EA1G	1	Exploring Properties of Operations	Verify or disprove various properties, some common and some obscure.
2.3	EA1G	1	Subtracting Integers	Subtract positive and negative integers using a visual model.
2.3	EA1G	1	Exploring Properties of Operations	Verify or disprove various properties, some common and some obscure.
2.4	EA1G	1	Raz's Magic Multiplying Machine	Explore features of multiplication with a continuous dynamic model.
2.4	EA1G	1	Multiple Models of Multiplication	Look at multiplication in four very different ways.
2.4	EA1G	1	Dividing Real Numbers	See how division works by switching a model from multiplication to division.
2.4	EA1G	1	Identity Elements and Inverses	Determine which operations have identity elements and inverses and which do not.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
2.4	EA1G	1	Exploring Properties of Operations	Verify or disprove various properties, some common and some obscure.
2.5	EA1G	1	Multiple Models of Multiplication	Look at multiplication in four very different ways.
2.5	EA1G	1	The Commutative Property	Use a dynamic model to determine which algebraic operations are commutative.
2.5	EA1G	1	The Associative Property	Use a dynamic model to determine which algebraic operations are associative.
2.5	EA1G	1	Exploring Properties of Operations	Verify or disprove various properties, some common and some obscure.
2.5	EA1G	3	The Distributive Property: A Painting Dilemma	A Student Activities Committee project leads to a mathematical principle.
2.5	EA1G	3	The Distributive Property	A visual model brings the distributive property to life.
2.6	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
2.7	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
Chapter 3	EA1G	4	Approximating Solutions to Equations	Substitute many values quickly and easily to find approximate solutions.
Chapter 3	EA1G	4	Undoing Operations	Use inverse operations in a visual model to undo an algebraic expression.
Chapter 3	EA1G	4	Solving Linear Equations by Balancing	Manipulate a balance model and use it to solve equations.
Chapter 3	EA1G	4	Solving Linear Equations by Undoing	Use a visual model and inverse operations to solve equations.
Chapter 3	EA1G	4	Solving Linear Equations by Jumping	Use distances and rates to write and solve equations of the form $a + bx = c + dx$.
3.1	EA1G	3	Equivalent Expressions	Compare expressions to determine which are equivalent.
3.1	EA1G	3	Equivalent Expressions: The Border Problem	Invent a variety of equivalent expressions for a real-world problem.
3.3	EA1F	2	Equation Solving—Cryptography	Practice undoing a linear expression as a way to solve an equation.
3.5	EA1G	3	The Distributive Property: A Painting Dilemma	A Student Activities Committee project leads to a mathematical principle.
3.5	EA1G	3	The Distributive Property	A visual model brings the distributive property to life.
4.1	EA1F	1	Ratios—Surveys	Examine ways to represent ratios; use different ratios to solve proportions for unknowns.
4.1	EA1G	2	Ratio and Proportion	Explore ratios and proportions involving side lengths of rectangles.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
4.1	EA1G	2	Proportions in Similar Triangles	Use ratio and proportion in triangles to determine inaccessible distances.
4.1	EA1G	2	Rates and Ratios	Work with a Sketchpad pasta machine to better understand rates and ratios.
4.1	EA1G	2	The Golden Rectangle and Ratio	Construct the ratio while building rectangles and spirals.
4.2	EA1F	1	Proportions—Veterans	Set up and solve proportions using census microdata and compare statistics between U.S. states.
4.2	EA1F	1	Proportions—Squirrel Population	Simulate several capture-recapture scenarios; set up and solve proportions.
4.3	EA1F	7	Simulation—Stick or Switch	Make sense of probability; learn about conditional probability; create probability simulations.
4.4	EA1F	1	Measures of Center—Aircraft Efficiency	Investigate mean and median and look at attributes that contribute to efficiency.
4.6	EA1F	1	Box Plots—Insurance	Graph and compare life expectancy data (male, female) within countries and between countries.
4.6	EA1F	1	Box Plots—Think Box	Drag data points to see how changes affect the box plot.
4.6	EA1F	1	Histograms—Ontario Communities	Interpret data on geographic location and income; explore how changes in bin width affect histograms.
4.6	EA2G	8	Box and Whiskers	Students change data and explore the effects on a box-and-whiskers plot.
5.1	EA2G	1	Introducing Dynagraphs	Students explore dynagraphs to develop a feel for functional relationships.
5.1	EA2G	1	From Dynagraphs to Cartesian Graphs	Students make connections between symbolic, Cartesian, and dynagraph representations of functions.
5.1	EA2G	1	Domain and Range	Students explore domain and range of functions, including those with restricted domain or range, using dynagraphs and Cartesian graphs.
5.1	EA2G	1	Functions Again and Again	Students define an iterated coordinate transformation on a point, and observe and draw conclusions from the orbit.
5.1	EA2G	2	Relations and Functions	Students explore the definitions of relation and function, and develop a vertical line test for functions.
5.1	EA1F	2	Slope—Runners	Understand the slope of a line as a constant rate; calculate the slope of a line by dividing vertical change by horizontal change.
5.1	EA2G	2	The Circumference Function	Students measure, graph, and analyze the function that connects a circle's diameter and circumference.
5.1	EA1G	2	Rates and Ratios	Work with a Sketchpad pasta machine to better understand rates and ratios.
5.1	EA2G	2	Radius and Arc Length	Students explore the relationship between the radius of a circle and the arc length of a semicircle.
5.1	EA2G	2	Functions in a Triangle	Students measure constructions in a triangle and investigate the relations and their graphs.
5.1	EA2G	2	Functional Geometry	Students explore relations defined by geometric measurements and create graphs, explaining how they decided on the independent variable.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	Unit	Title	Description
5.1	EA1F	5	Functions—Model Rockets	Understand that a function has no more than one output for each input but may have more than one input with the same output; learn and apply *independent* and *dependent variable, domain, range*.
5.2	EA1F	2	Lines of Fit—Women's High Jump	Use movable lines to identify a line of fit between two points and find its slope.
5.2	EA1G	5	The Slope of a Line	Explore the relationship between the slope of a line and the points that determine the line.
5.2	EA1G	5	The Slope Game	Construct and play a game involving lines and slope measurements.
5.2	EA1G	5	More Slope Games	Acquire an intuitive feel for slope by playing four different games involving slopes.
5.3	EA1F	1	Dimensional Analysis—Fastest Animals	Use unit ratios to convert units, make connections between ratios and measurement, and validate conversion factors.
5.3	EA1G	2	Rates and Ratios	Work with a Sketchpad pasta machine to better understand rates and ratios.
5.3	EA1G	6	Direct Variation	Build a geometric model to study direct variation.
5.4	EA1F	2	Intercept Form—Hot Dogs	Understand slope as the rate of change and recognize it as the coefficient in the linear equation.
5.4	EA1G	5	How Slope Is Measured	Connect an intuitive sense of slope to specific calculations based on coordinates.
5.4	EA1G	6	The Slope-Intercept Form of a Line	Plot points determined by $y = mx + b$ and construct the resulting line and families of lines. This activity is also available in the Supplemental Activities folder using the form $y = a + bx$.
5.5	EA1F	2	Point-Slope Form—Men's High Jump	Use a movable line and new attributes to write the equation of a line in point-slope form.
5.5	EA1F	2	Point-Slope Form—Life Expectancy	Develop and use the point-slope form for the equation of a line.
5.5	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
5.5	EA1G	6	The Point-Slope Form of a Line	Examine the effect of eaCconstant on the graph of an equation in the form $y = m(x - h) + k$. This activity is also available in the Supplemental Activities folder using the form $y = y_1 + b(x - x_1)$.
5.5	EA1G	6	The Standard Form of a Line	Explore the effects of a, b, and c on the graph of a line expressed in the form $ax + by = c$.
5.6	EA1F	2	Linear Modeling—Dissolved Oxygen	Understand the need to develop a method for finding lines of fit; use quartile points to find a line of fit.
5.6	EA1G	5	Slopes of Parallel and Perpendicular Lines	Experiment and draw conclusions about the slopes of parallel and perpendicular lines.
6.1	EA1F	3	Inequalities—Strange Diet	Translate inequality statements from context to symbols; solve inequalities; interpret a solution in context.
6.1–6.3	EA1G	4	Properties of Inequality	Investigate arithmetic properties of inequality using a visual model.
6.1–6.3	EA1G	4	Solving Inequalities by Substitution	Substitute many values quickly to find the solution set of an inequality.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
6.1–6.3	EA1G	4	Solving Inequalities by Balancing	Use a balance model to solve equations.
6.3	EA1G	4	Solving Compound Inequalities	Substitute many values quickly to solve compound inequalities.
6.4	EA2G	1	Domain and Range	Students explore domain and range of functions, including those with restricted domain or range, using dynagraphs and Cartesian graphs.
6.4	EA1F	3	Absolute Value—Radio Contact	Solve inequalities with absolute values; understand solution sets and the logical meanings of *and* and *or*.
6.4	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the *x*- or *y*-values of the vertices are multiplied by various constants.
6.4	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to *x*- and *y*-values.
6.4	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
6.4	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
6.4	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
6.4	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
6.4	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
6.5	EA1G	4	Properties of Inequality	Investigate arithmetic properties of inequality using a visual model.
6.5	EA1G	4	Solving Inequalities by Substitution	Substitute many values quickly to find the solution set of an inequality.
6.5	EA1G	4	Solving Inequalities by Balancing	Use a balance model to solve equations.
7.1	EA2G	3	Solving Systems of Equations	Students use rate information from two companies to find out which is cheaper for various moves.
7.1	EA1F	3	Linear Systems—The Road Trip	Use graphs of linear systems of equations to model and solve real-world problems.
7.2	EA2G	3	Solving Systems of Equations	Students use rate information from two companies to find out which is cheaper for various moves.
7.2	EA1F	3	Systems Solving—High Jump Records	Use substitution to solve a system of linear equations modeling a real-world problem; interpret results.
7.3	EA2G	3	Solving Systems of Equations	Students use rate information from two companies to find out which is cheaper for various moves.
7.3	EA1F	3	Elimination—Package Charges	Discover that the sum of two linear equations in a system is a linear equation whose solutions include the solution of the system; visualize what the elimination method represents graphically.
7.4	EA2G	3	Solving Systems of Equations	Students use rate information from two companies to find out which is cheaper for various moves.
7.5	EA2G	3	Graphing Inequalities in Two Variables	Students use a prepared sketch to graph various inequalities in *x* and *y*.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	Unit	Title	Description
7.5	EA2G	3	Graphing Systems of Inequalities	Students use a prepared sketch to solve systems of two and three inequalities.
7.5	EA1F	3	Two-Variable Inequalities—The Quest	Solve linear inequalities with two variables; graph inequalities using shading.
7.5	EA1G	4	Properties of Inequality	Investigate arithmetic properties of inequality using a visual model.
7.5	EA1G	4	Solving Inequalities by Substitution	Substitute many values quickly to find the solution set of an inequality.
Chapter 7 Project	EA2G	3	Linear Programming: Swans and Giraffes	Students explore a linear programming problem, writing constraint equations, defining the feasible region, and maximizing a quantity.
8.1	EA1G	2	Exponents	Learn principles of exponents by experimenting with repeated multiplication.
8.1	EA1F	4	Exponents—Moore's Law	See the same data modeled two ways and discover the multiplication property of exponents.
8.2	EA1G	2	Exponents	Learn principles of exponents by experimenting with repeated multiplication.
8.2	EA1F	4	Power Properties—Base e	See that continuous compounding of an investment at rate r for one year is modeled by the exponential equation $y = e^r$.
8.2	EA1F	4	Power Properties—Radiation	Investigate an exponential decay model and see $(c^a)^x = c^{ax}$.
8.3	EA1G	2	Exponents	Learn principles of exponents by experimenting with repeated multiplication.
8.4	EA1G	2	Zero and Negative Exponents	Use a visual model to understand the behavior of negative exponents.
8.4	EA1F	4	Inverse Variation—Boyle's Law	Model inversely proportional quantities, and investigate the change in one variable as the other doubles.
8.6	EA1F	4	Exponential Growth—Interest	Learn that a linear equation models simple interest and that an exponential equation models compound interest.
8.6	EA1F	4	Exponential Relationships—Population Growth	Use an exponential equation to model population growth and see how the base is a constant ratio of consecutive values.
8.6	EA2G	6	Exponential Functions	Students graph exponential functions, examine their properties, and use them to model real-world applications.
8.7	EA2G	6	Exponential Functions	Students graph exponential functions, examine their properties, and use them to model real-world applications.
Chapter 9	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
Chapter 9	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
Chapter 9	EA2G	4	Parabolas in Factored Form	Students investigate the relationship between the factored form of a quadratic function and its graph.
Chapter 9	EA2G	4	Parabolas in Standard Form	Students use the standard form to identify the behavior of the graph when a, b, and c are changed.
Chapter 9	EA2G	4	Changing Quadratic Function Forms	Students change quadratic functions between standard, vertex, and factored forms.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
Chapter 9	EA2G	4	The Discriminant	Students calculate and explore the discriminant of a quadratic function.
Chapter 9	EA2G	4	Parabolas: A Geometric Approach	Students construct a parabola geometrically.
9.1–9.2	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
9.2	EA1G	3	The Product of Two Binomials	Use tiles to model multiplication of binomials.
9.3	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
9.3	EA1G	3	The Product of Two Binomials	Use tiles to model multiplication of binomials.
9.3	EA1F	6	Binomial Products—Sales and Profits	Explore how linear models can give both graphical and symbolic information about the quadratic model that is their product.
9.4	EA2G	1	Odd and Even Functions	Students explore odd and even functions using dynagraphs and transformations.
9.4	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
9.4	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
9.5	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
9.5	EA1F	6	Common Factor—Acceleration	Use factoring to find a quadratic model for real-world data involving motion on an incline.
9.6	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
9.6	EA1G	3	Squaring Binomials	Use dynamic algebra tiles to connect algebraic and geometric squares.
9.7	EA1F	6	Polynomial Factoring—Maximum Area	Use factoring as a process to model polynomials; learn about relationships between intercepts, zeros, and factors.
9.7	EA1G	7	Factoring Trinomials	Factor trinomials using algebra tiles and investigate the role of the coefficients.
9.8	EA1F	6	Factored Form Quadratic—Gravity	See relationships among the coefficients of a quadratic equation in general form, the factored form of the equation, and the function's zeros; use sliders to discover how the factored form relates to the graph.
9.8	EA1F	6	Binomial Expansion—Flipping Coins	Explore how patterns in binomial expansions relate to flipping coins.
9.8	EA1G	7	Factoring Trinomials	Factor trinomials using algebra tiles and investigate the role of the coefficients.
Chapter 10	EA2G	4	Changing Quadratic Function Forms	Students change quadratic functions between standard, vertex, and factored forms.
Chapter 10	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
Chapter 10	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	Unit	Title	Description
Chapter 10	EA2G	4	Parabolas in Factored Form	Students investigate the relationship between the factored form of a quadratic function and its graph.
Chapter 10	EA2G	4	Parabolas in Standard Form	Students use the standard form to identify the behavior of the graph when a, b, and c are changed.
Chapter 10	EA2G	4	The Discriminant	Students calculate and explore the discriminant of a quadratic function.
Chapter 10	EA2G	4	Parabolas: A Geometric Approach	Students construct a parabola geometrically.
Chapter 10	EA2G	4	Parabolas in Headlights and Satellite Dishes	Students construct and explore a two-dimensional model of a parabolic reflector.
Chapter 10	EA2G	4	Conic Reflections	Students explore reflective properties of ellipses and hyperbolas.
Chapter 10	EA2G	4	Modeling Projectile Motion	Students make a Sketchpad model of a basketball's flight, and make the ball go through a basket.
Chapter 10 Extension	EA2G	4	Changing Quadratic Function Forms	Students change quadratic functions between standard, vertex, and factored forms.
10.1	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
10.1	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
10.1	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
10.1	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
10.1	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
10.1	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
10.1	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
10.1	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
10.1	EA1F	6	General Form Quadratic—Escape Ramp	Solve a real-world problem and dynamically explore how a graph of the general form of a quadratic is determined by its coefficients.
10.1	EA1F	6	Vertex Form Quadratic—Protecting Wildflowers	Create a strategy for modeling quadratic data (based on a vertex-dilation equation); use sliders and units to discover the roles of values used in the vertex form of the quadratic.
10.1	EA1G	7	Modeling with Quadratic Equations: Where Are the Giant Ants?	Explore issues of scale to better understand quadratic and linear relationships.
10.1	EA1G	7	Graphing Quadratic Functions	Plot the graph of $y = ax^2 + bx + c$ and study the effects of changing the parameters.
10.1	EA1G	7	Graphing Factored Quadratics	Graph a function in the form $f(x) = a(x - r_1)(x - r_2)$, and investigate the role of the parameters.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
10.1	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
10.2	EA1G	3	Squares and Square Roots	Explore squares and square roots using virtual dot paper.
10.2	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
10.2	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
10.3	EA1G	3	Algebra Tiles	Model algebraic quantities with the dimensions and area of dynamic tiles.
10.5	EA2G	4	Parabolas in Standard Form	Students use the standard form to identify the behavior of the graph when a, b, and c are changed.
10.5	EA2G	4	The Discriminant	Students calculate and explore the discriminant of a quadratic function.
10.5	EA1F	6	The Quadratic Formula	Explore roles of coefficients of quadratic functions in locations of zeros, as given by the quadratic formula, and in the location of x-intercepts of the function's graph.
10.5	EA1F	6	Parabola—Solar Oven	Use a quadratic equation to model a solar oven; discover relationships between the quadratic formula and the graph.
10.6	EA2G	3	Graphing Inequalities in Two Variables	Students use a prepared sketch to graph various inequalities in x and y.
10.6	EA2G	3	Graphing Systems of Inequalities	Students use a prepared sketch to solve systems of two and three inequalities.
10.6	EA1G	4	Properties of Inequality	Investigate arithmetic properties of inequality using a visual model.
10.6	EA1G	4	Solving Inequalities by Substitution	Substitute many values quickly to find the solution set of an inequality.
11.1	EA1G	6	Inverse Variation	Plot (x, y) points representing an inverse relationship, and then plot a family of curves.
11.2	EA2G	6	Rational Functions	Students explore rational functions as transformations of $y = 1/x$.
12.1	EA1G	3	Squares and Square Roots	Explore squares and square roots using virtual dot paper.
12.2	EA2G	1	Domain and Range	Students explore domain and range of functions, including those with restricted domain or range, using dynagraphs and Cartesian graphs.
12.2	EA1G	3	Squares and Square Roots	Explore squares and square roots using virtual dot paper.
12.2	EA2G	6	Square Root Functions	Students explore the square root function and think about the conditions under which inverse relations are also inverse functions.
12.3	EA1G	3	Squares and Square Roots	Explore squares and square roots using virtual dot paper.
12.3	EA1G	5	The Pythagorean Theorem	Verify the Pythagorean theorem using coordinates and develop the distance formula.
12.3	EA2G	7	Right Triangle Functions	Students calculate ratios for right triangles, plotting the values to reveal the graphs of the trigonometric functions.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	Unit	Title	Description
12.3 Extension	EA2G	7	Unit Circle and Right Triangle Functions	Students compare the unit circle definitions and right triangle definitions of trigonometric functions.
12.4	EA1G	3	Squares and Square Roots	Explore squares and square roots using virtual dot paper.
12.4	EA1G	5	The Pythagorean Theorem	Verify the Pythagorean theorem using coordinates and develop the distance formula.
12.5	EA2G	4	Parabolas: A Geometric Approach	Students construct a parabola geometrically.
12.5	EA2G	4	Parabolas in Headlights and Satellite Dishes	Students construct and explore a two-dimensional model of a parabolic reflector.
12.5	EA2G	4	Conic Reflections	Students explore reflective properties of ellipses and hyperbolas.
12.5	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
12.5	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
12.5	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
12.5	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
12.5	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
12.5	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
12.6	EA1G	2	Proportions in Similar Triangles	Use ratio and proportion in triangles to determine inaccessible distances.
12.6	EA2G	7	Right Triangle Functions	Students calculate ratios for right triangles, plotting the values to reveal the graphs of the trigonometric functions.
12.6 Extension	EA2G	7	Unit Circle and Right Triangle Functions	Students compare the unit circle definitions and right triangle definitions of trigonometric functions.
12.7	EA1G	2	Proportions in Similar Triangles	Use ratio and proportion in triangles to determine inaccessible distances.
12.7	EA1G	2	The Golden Rectangle and Ratio	Construct the ratio while building rectangles and spirals.
12.7	EA2G	7	Right Triangle Functions	Students calculate ratios for right triangles, plotting the values to reveal the graphs of the trigonometric functions.
12.7 Extension	EA2G	7	Unit Circle Functions	Students use a unit circle to define the trigonometric functions.
12.7 Extension	EA2G	7	Unit Circle and Right Triangle Functions	Students compare the unit circle definitions and right triangle definitions of trigonometric functions.
12.8	EA2G	9	Solving Systems Using Matrices	Students solve a system of equations expressed as a single matrix equation.
13.1	EA1F	7	Geometry by Probability—Monte Carlo Method	Use a probability simulation to estimate area.

Legend: SA = Supplemental Activity

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	Unit	Title	Description
13.4	EA1F	7	Probability—Euchre Deck	Create simulations to answer probability questions; contrast sampling with and without replacement; understand difference between independent and dependent events.
13.5	EA1F	7	Probability—Dice Games	Use Fathom to simulate a game based on a historical question that led to probability as a branch of mathematics.
Chapter 14 Exploration	EA1G	2	The Chaos Game	Produce striking results by randomly applying ratios.
Chapter 14	EA2G	4	Parabolas in Factored Form	Students investigate the relationship between the factored form of a quadratic function and its graph.
Chapter 14	EA2G	4	Parabolas in Standard Form	Students use the standard form to identify the behavior of the graph when a, b, and c are changed.
Chapter 14	EA2G	4	Changing Quadratic Function Forms	Students change quadratic functions between standard, vertex, and factored forms.
Chapter 14	EA2G	4	The Discriminant	Students calculate and explore the discriminant of a quadratic function.
Chapter 14	EA2G	4	Parabolas: A Geometric Approach	Students construct a parabola geometrically.
14.1	EA2G	1	Introducing Dynagraphs	Students explore dynagraphs to develop a feel for functional relationships.
14.1	EA2G	1	From Dynagraphs to Cartesian Graphs	Students make connections between symbolic, Cartesian, and dynagraph representations of functions.
14.1	EA2G	1	Domain and Range	Students explore domain and range of functions, including those with restricted domain or range, using dynagraphs and Cartesian graphs.
14.1	EA1G	1	Mystery Machines	Figure out where 0 and 1 are located on these machines, or what operations they perform.
14.1	EA2G	1	Functions Again and Again	Students define an iterated coordinate transformation on a point, and observe and draw conclusions from the orbit.
14.1	EA2G	2	Relations and Functions	Students explore the definitions of relation and function, and develop a vertical line test for functions.
14.1	EA2G	2	The Circumference Function	Students measure, graph, and analyze the function that connects a circle's diameter and circumference.
14.1	EA2G	2	Radius and Arc Length	Students explore the relationship between the radius of a circle and the arc length of a semicircle.
14.1	EA2G	2	Functions in a Triangle	Students measure constructions in a triangle and investigate the relations and their graphs.
14.1	EA2G	2	Functional Geometry	Students explore relations defined by geometric measurements and create graphs, explaining how they decided on the independent variable.
14.2	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
14.2	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
14.2	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
14.2	EA1F	5	Line Transformations—Elevator	Investigate vertical and horizontal translations of lines and relate transformations of data to transformations of functions.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
14.2	EA1F	5	Parabola Transformations—Handshakes	Learn to modify a quadratic equation in order to translate its graph.
14.2	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
14.2	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
14.2	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
14.2	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
14.2	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
14.2	EA2G	6	Rational Functions	Students explore rational functions as transformations of $y = 1/x$.
14.2	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
14.3	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
14.3	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
14.3	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
14.3	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
14.3	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
14.3	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
14.3	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
14.3	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
14.3	EA2G	6	Rational Functions	Students explore rational functions as transformations of $y = 1/x$.
14.3	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
14.4	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
14.4	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
14.4	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
14.4	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
Legend: SA = Supplemental Activity				

Textbook Lesson	Related Sketchpad or Fathom Activity			
	Book	**Unit**	**Title**	**Description**
14.4	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
14.4	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
14.4	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
14.4	EA2G	6	Absolute Value Functions	Students graph and explore the absolute value function, reviewing the point-slope form of linear functions.
14.4	EA2G	6	Rational Functions	Students explore rational functions as transformations of $y = 1/x$.
14.4	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
14.5	EA2G	4	Parabolas in Vertex Form	Students graph parabolas using the vertex form.
14.5	EA2G	4	Exploring Parabolas in Vertex Form	Students graph parabolas using the vertex form (open-ended).
14.5	EA2G	5	Stretching and Shrinking Coordinates	Students investigate the behavior of polygons when the x- or y-values of the vertices are multiplied by various constants.
14.5	EA2G	5	Translating Functions	Students translate function graphs vertically and horizontally by adding constants to x- and y-values.
14.5	EA1F	5	Parabola Transformations—Book Sales	Model quadratic data; deepen understanding of transformations; explore dilations of functions.
14.5	EA2G	5	Reflecting Function Plots	Students reflect function plots across the axes and explore connections between algebraic and geometric transformations.
14.5	EA2G	5	Stretching and Shrinking Functions	Students stretch and shrink function graphs vertically and horizontally.
14.5	EA2G	5	Transforming Odd and Even Functions	Students explore the symmetry in odd and even functions.
14.5	EA2G	SA	Function Transformation Game	Students match the graph of a mystery function by choosing a parent function and applying transformations to it.
Legend: SA = Supplemental Activity				