High School Algebra 1 Topic 2/3 - FCPS 2025-2026

Topic 2/3: Linear Functions and Equations	Estimate Time Frame: 12 blocks
Essential Standards: KY.HS.A.13, KY.HS.F.1, KY.HS.F.3, KY.HS.F.4, KY.HS.SP.6, KY.HS.SP.7 **Supporting Standards:** KY.HS.F.2, KY.HS.F.5, KY.HS.F.6, KY.HS.F.7, KY.HS.F.12, KY.HS.SP.8, KY.HS.N.4, KY.HS.N.5, KY.HS.N.6, **Assessment Resource:** enVision Topic 2 and Topic 3 and Formative Assessment Lesson **(FAL):** Interpreting Distance Time Graphs	

FCPS Supporting Links	Additional Supporting Links
Pacing Guide Standards Resources Crosswalk FCPS P-12 Mathematics Guidance Document FCPS Achievement & Trauma-Informed Strategies in the Classroom	Kentucky Academic Standards KSA Blueprint Target of the Standards - conceptual, procedural & application Three-Reads Routine Notice and Wonder Routine MILC Resources Topic 2: Linear Equations ***enVision Teacher Guide: page 54A to 54I for specific Topic 2 Focus-Coherence-Rigor*** MILC Resources Topic 3 Linear Functions ***enVision Teacher Guide: page 86A to 86I for specific Topic 3 Focus-Coherence-Rigor***

Big Ideas
Interpret functions given graphically, numerically, symbolically, and verbally. Translate between representations and understand the limitations of various functions. Work with functions given by graphs, tables, and equations.

Essential Questions	Common Preconceptions/Misconceptions
How can linear functions be used to model situations and solve problems?	• Some students may miscalculate the slope. Remind students that the slope measures a line's steepness, so the height change comes first when you read slope as a fraction. • Some students may incorrectly interpret the y-intercept value using (2,0) instead of

Looking at a graph, can you explain what is happening in a real-world context? What makes a relation a function? How do arithmetic sequences relate to linear functions? Why is it useful to have different forms of linear equations?	(0,2). Have students check whether the equation validates their coordinates for representing the y-intercept. • Some students often reverse the independent and dependent variables, y, when given data. • Students not only simplify problems but also need to use appropriate vocabulary, such as terms, coefficients, and degrees, as they describe their process. • Students will need to describe the meaning of parts of an expression, such as a particular term or coefficient, and also explain the meaning of the full expression. • Students will fluently manipulate expressions into equivalent forms based on patterns they have noticed across problems. It is recommended that they use Algebra Tiles and Algeblocks. • Students frequently confuse the concept of each domain value being paired with one range value as also meaning each range value can only have one domain value. One way to illustrate this is to have at least 13 students match their names with their birth months. Every student will have exactly one birth month, but at least one month will be chosen twice. Students should consider if this is a function. This can also be seen in a table or a diagram with arrows connecting the input and output. • Students may think a correlation coefficient of (-1) indicates no correlation. Instead, it means a strong negative correlation.
Standards for Mathematical Practices	**Kentucky Interdisciplinary Literacy Practices (KILP)**
MP.1. Make sense of problems and persevere in solving them. MP.2. Reason abstractly and quantitatively. MP.3. Construct viable arguments and critique the reasoning of others. MP.4. Model with mathematics. MP.5. Use appropriate tools strategically. MP.6. Attend to precision. MP.7. Look for and make use of structure. MP.8. Look for and express regularity in repeated reasoning. ***enVision Teacher Guide: page 54D & 86D for specific Topic 2/3 Math Practice suggestions***	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schemas to understand and create text. 3. View literacy experiences as transactional, interdisciplinary, and transformational. 4. Utilize receptive and expressive language arts to better understand self, others, and the world. 5. Apply strategic practices, with scaffolding and then independently, to approach new literacy tasks. 6. Collaborate with others to create new meaning. 7. Utilize digital resources to learn and share with others. 8. Engage in specialized, discipline-specific literacy practices. 9. Apply high-level cognitive processes to think deeply and critically about text. 10. Develop a literacy identity that promotes lifelong learning. *Incorporating texts into math instruction fosters interdisciplinary learning for a more engaging educational experience.*

High School Algebra 1 Topic 2/3 - FCPS 2025-2026

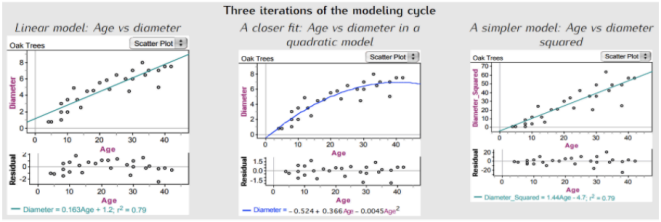
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Interpret functions that arise in applications in terms of the context.		
KY.HS.F.3 Understand average rate of change of a function over an interval. a. Calculate and interpret a function's average rate of change (presented symbolically or as a table) over a specified interval. b. Estimate the rate of change from a graph. ★ **MP.2, MP.4, KILP.3, KILP.9** ☐ *Conceptual* ☐ *Procedural* ❑ *Application* Considerations: The rate of change over an interval is equivalent to the slope between its endpoints. For linear functions, the rate of change is constant over all intervals. However, for nonlinear functions, the average rate of change may vary depending on the interval. *Supporting Standards:* KY.HS.F.5, *KY.HS.A.23*	I am learning to understand a function's average rate of change over an interval. • I can define the rate of change in relation to slope. • I can calculate the average rate of change from different representations, such as tables, graphs, and a set of points. • I can interpret a function's average rate of change and understand its significance in describing its behavior over an interval. • I can estimate the rate of change of a function from a graph.	• Supplement resources for the average rate of change (slope) • Desmos: Graphing Stories • Formative Assessment Lesson **(FAL):** Interpreting Distance-Time Graphs
Attending to the Standards for Mathematical Practice		
Students make sense of the rate of change, recognizing that it captures how the input and output of a function vary simultaneously (MP. 2). For example, students explain that the rate of change for nonlinear functions is not constant. Students use equations, tables, and graphs to analyze rate of change in applied and mathematical contexts (MP.4).		
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Create equations that describe numbers or relationships.		

KY.HS.A.13 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. MP.2, MP.5, KILP.7, KILP.9 ☐ *Conceptual* ☐ *Procedural* ☐ *Application* Clarifications: Students solve systems of equations with two or more variables to solve problems in a real-world setting. *Supporting Standards: KY.HS.A.23*	I am learning to create equations in two or more variables to represent relationships between quantities and graph them. • I can identify relationships between quantities that can be represented by equations (in two or more variables). • I can create accurate equations to represent given relationships. • I can graph equations on coordinate axes with labels and scales. • I can interpret the meaning of the slope and intercepts in the context of the graphed equation. • Analyze the graphed equations to identify patterns, trends, and key features to make predictions and solve problems.	• Lesson 2-2 Point Slope Form • Lesson 2-1 Slope-Intercept Form • Lesson 2-3 Standard Form • **3-Act Task:** How Tall is Tall? P. 75 • Lesson 2-4 Parallel and Perpendicular Lines
Attending to the Standards for Mathematical Practice		
Students interpret a story or situation into an equation or inequality, connecting the terms and symbols within the equation or inequality to the context (MP.1) and relate how the solution to the equation or inequality connects back to the original problem (MP.4). Students utilize technology to graph equations and use the graph to describe qualitatively and quantitatively the relationship between variables (MP.5). Students explain when they would opt for different equivalent forms of an equation (MP.7).		
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Understand the concept of a function and use function notation.		
KY.HS.F.1 Understand properties and key features of functions and the different ways functions can be represented. MP.2, MP.4, KILP.1, KILP.2, KILP.6 a. 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	I am learning to determine if a relation is a function and how to represent it. • I can explain that a function assigns exactly one output to each input from its domain. • I can relate the domain of a function algebraically, graphically, numerically in tables, or by verbal descriptions. • I can use appropriate function notation.	• Lesson 3-1 Domain, Relations, and Functions • Lesson 3-2 Linear Functions • **3-Act Task:** The Express Lane p. 110 • Lesson 3-4 Arithmetic

function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. ☐ *Conceptual* ❑ *Procedural* ❑ *Application* b. Using appropriate function notation, evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context. ☐ *Conceptual* ☐ *Procedural* ❑ *Application* c. 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. ☐ *Conceptual* ❑ *Procedural* ❑ *Application* d. Relate the domain of a function to its graph, where applicable, to the quantitative relationship it describes. (algebraically, graphically, numerically in tables, or by verbal descriptions). ☐ *Conceptual* ☐ *Procedural* ☐ *Application* Clarifications: When describing relationships between quantities, the defining characteristic of a function is that the input value determines the output value or, equivalently, the output value depends upon the input value. In some situations where two quantities are related, each can be viewed as a function of the other. a. n/a b. A function is often described and understood in terms of the output behavior, or over what input values it is increasing, decreasing, or constant.	• I can evaluate functions for inputs in their domains. • I can interpret statements that use function notation. I am learning to compare the properties of two quantities to model functions. • I can compare the constant rate of change and the initial value of a function using a table. • I can determine a function's rate of change and initial value using a graph. • I can represent functions algebraically and determine the rate of change. I am learning to interpret key features to sketch the graph. • I can interpret the key features of graphs and tables representing functions, relating them to the modeled quantities. o "What input values are increasing, decreasing, or constant. o Important questions include, "For what input values is the output value positive, negative, or 0?"	Sequences (You may consider teaching with 6-5 to teach standard F.12) • ❗ Exclude Lesson 3-3: Transforming Linear functions - KY.HS.F.8 is NOT an algebra 1 standard

Important questions include, “For what input values is the output value positive, negative, or 0? What happens to the output when the input value gets very large in magnitude?” Graphs become useful representations for understanding and comparing functions because these behaviors are often easy to see in the graphs of functions. Key features include, but are not limited to: intercepts; intervals where the function is increasing, decreasing, or remaining constant; relative maxima and minima; symmetries; end behavior; periodicity. c. n/a d. Students compare characteristics from various representations for one type of function family at a time. Students might determine which function has the larger maximum for quadratics when given two different representations of quadratic functions. *Supporting Standard: KY.HS.F.2, KY.HS.F.3, KY.HS.F.4.a, KY.HS.F.5, KY.HS.F.6, KY.HS.F.7, KY.HS.N5*		
Attending to the Standards for Mathematical Practice		
Students reason quantitatively about the relationship between domain and range of functions across abstract and concrete representations (MP.2). Students look closely to discern arithmetic and geometric relationships as patterns with additive and multiplicative changes, respectively (MP.7). Students notice the regularity in the pattern to write a general formula for arithmetic or geometric sequence (MP.8).		
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster:		

KY.HS.F.4 Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). ★ MP.4, MP.5, KILP.1, KILP.7 a. Graph linear functions. ~~b. Graph absolute value functions.~~ f. (+) Graph piecewise functions, including step functions. (8th-grade Algebra only) ☐ *Conceptual* ☐ *Procedural* ☐ *Application* *Supporting Standard: KY.HS.N.5, KY.HS.F.3, KY.HS.F.5, KY.HS.F.6, KY.HS.F.7 KY.HS.A.13, KY.HS.A.23,*	I am learning to graph functions using the key features. • I can identify key features of a linear function graph, including slope, y-intercept, and x-intercept. • I can interpret the rate of change and the y-intercept from the given data. • I can graph linear functions, representing them on a coordinate plane. • I can graph linear functions using technology to enhance accuracy and efficiency.	• Students should use graphs throughout Topics 2 and 3 to justify their reasoning and better understand linear equations and functions.
Attending to the Standards for Mathematical Practice		
Students use graphs to answer questions and/or make predictions for a given context (MP. 4). Students use technology to explore concepts of function families and show key features of the graph (MP. 5). Students compare and contrast different characteristics of functions to connect features of the graph with different real-world contexts (MP.6). Students manipulate expressions, being careful to preserve equivalence and describe why a particular expression provides insights into the function (MP.3, MP.6).		
Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Summarize, represent and interpret data on two categorical and quantitative variables.		
KY.HS.SP.6 Represent data on two quantitative variables on a scatter plot and describe how the explanatory and response variables are related. a. Calculate an appropriate mathematical model, or use a given mathematical model, to solve problems in context. b. Informally assess the fit of a model (through	I am learning to represent data on two quantitative variables on a scatter plot and describe relationships. • I can plot ordered pairs on a coordinate grid. • I can create a scatter plot to represent data on two quantitative variables, labeling the axes appropriately. • I can describe the association of a scatter plot as positive, negative, or no association.	• Lesson 3-5 Scatter Plots and Lines of Fit • Lesson 3-6 Analyzing Lines of Fit (include residuals)

calculating the correlation for linear data, plotting, calculating, and analyzing residuals). **MP.3, MP.4, MP.5, KILP.2, KILP.7, KILP.8** ☐ Conceptual ☐ Procedural ☐ Application Emphasize linear, quadratic, and exponential models as illustrated below.  *Supporting Standard: KY.HS.SP.8*	I am learning to assess the fit of mathematical models to the data. • I can informally assess the model's fit by calculating the correlation coefficient for linear data. • I can find the line of best fit for a data set. • I can interpret the meaning of the correlation within the context of the data. • I can analyze the scatter plot to determine the relationship between the explanatory and response variables, identifying patterns or trends. • I can use residuals to find the line of best fit for a data set.	

Attending to the Standards for Mathematical Practice

Students discover structures or patterns in data to answer statistical questions using tables or appropriate representations (MP.7). Students informally determine whether a selected model is appropriate for a set of data and use technology when appropriate to do so (MP 5). Students draw and discuss conclusions about a statistical question (MP.3) using appropriate mathematical models.

Essential Standards	Sample Learning Intentions & Success Criteria	HQIR/Resource Considerations
Cluster: Interpret linear models.		
KY.HS.SP.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **MP.1, MP.2, KILP.1, KILP.3, KILP.6** *☐ Conceptual ☐ Procedural ☐ Application* Students demonstrate interpreting slope in the context of a given situation when examining two variable statistics: " For each additional known	I am learning to interpret the slope and intercept of a linear model within the context of given data. • I can identify and define the slope and intercept of a linear model. • I can interpret the slope as the rate of change, representing how one variable responds to changes in another variable. • I can apply the concepts of slope and intercept to explain real-world scenarios represented by linear models.	• Lesson 3-5 Scatter Plots and Lines of Fit

unit increase in an explanatory variable, we expect or predict a known unit increase (or decrease) in the response variable." Students demonstrate interpreting intercepts in the context of a given situation when examining two-variable statistics. They define intercept as "the predicted known unit of a response variable when the explanatory variable is zero known units." *Supporting Standard: KY.HS.SP.8*	• I can analyze the slope and intercept to make predictions and draw conclusions about the relationships between variables.	

Attending to the Standards for Mathematical Practice

Students interpret the results to a statistical question and relate the results to the context of the data (MP.1, MP.2). Students use technology to compute correlation coefficients (MP.5). Students recognize that correlation is an indication of a linear relationship between two quantitative variables and not simply another word for association (MP.6).

Supporting Standards

KY.HS.N.4 Use units in context as a way to understand problems and to guide the solution of multi-step problems; ★ **MP.5, MP.6**
a. Choose and interpret units consistently in formulas;
b. Choose and interpret the scale and the origin in graphs and data displays.

KY.HS.N.5 Define appropriate units in context for the purpose of descriptive modeling. ★ **MP.1, MP.6**

KY.HS.N.6 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities**.** ★ **MP.2, MP.6**

KY.HS.F.2 Recognize that arithmetic and geometric sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **MP.7, MP.8**

KY.HS.F.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **MP.3, MP.6**

KY.HS.F.6 Write a function that describes a relationship between two quantities. ★ (This is a modeling standard)
a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

b. Combine standard function types using arithmetic operations. **(3-Act Math Task)**

KY.HS.F.7 Use arithmetic sequences to model situations and scenarios.
a. Use formulas (explicit and recursive) to generate terms for arithmetic sequences.
b. Write formulas to model arithmetic sequences and apply those formulas in realistic situations. ★**MP.4, MP.8**

KY.HS.F.12 Construct linear functions, including arithmetic sequences, given a graph, a description of a relationship, or two input-output pairs (including reading these from a table). **MP.7, MP.8**

KY.HS.SP.8 Understand the role and purpose of correlation in linear regression.**MP.5, MP.6**
Considerations:
a. Students use technology.
b. Students understand correlation measures linear associations between two quantitative variables, addressing the direction (positive or negative) and the relative strength of the given association.
c. Students understand that one of the most common misinterpretations of correlation is to think of it as a synonym for causation. A high correlation between two variables (suggesting a statistical association between the two) does not imply that one causes the other.

KY.HS.A.25 Graph linear inequalities in two variables.
a. Graph the solutions to a linear inequality as a half-plane (excluding the boundary in the case of a strict inequality). **MP.5**

Vocabulary

equation - a mathematical statement that says that two expressions have the same value; any number sentence with an =. EX: 4+2=3+3
expression - a finite combination of symbols that are well-formed according to the rules applicable in the context at the end.
Point-slope form - a linear equation is given by: $y–y1=m(x–x1)$ where m represents the slope of the line, and (x1,y1) is a specific point that lies on the line.
Standard form of a linear equation - a linear equation in two variables, x and y, is given by: $Ax+By=C$ where A, B, and C are real numbers (and typically, for Algebra 1, are often integers), and A and B are not both zero.
Inequality - A mathematical expression that shows that two quantities are not equal.
slope - a constant rate of change
function - A correspondence between two sets, the domain, and range, that assigns to each member of the domain exactly one member of the range.
input - The number substituted for the variable in a function or rule machine.
linear function - A function defined by $f(x) = mx + b$.
non-linear - Not on a line.
output - The number resulting from a function or rule machine.

High School Algebra 1 Topic 2/3 - FCPS 2025-2026

rate of change - The speed at which a variable changes over a specific period of time. Also, the slope of a function is the same.
function notation - A notation used in defining a function. EX: f(x) = 2x + 20
arithmetic sequence - A Sequence that has a constant difference between terms.
average rate of change - Avg. rate = [f(x2) - f(x1)]/(x2 - x1)
intercepts - *x-intercept* of a line or curve is the point where it crosses the x-axis; *y-intercept* of a line or curve is the point where it crosses the y-axis.
linear - of or pertaining to a line; having a degree of one nonlinear - not having a resemblance to a line

Additional Supporting Vocabulary to include:
Continuous, Discrete , Domain, One-to-one, Range, Transformation, Translation, Negative association, Negative correlation, No association, Positive association, Correlation, Trend line, Causation, Correlation coefficient, Line of best fit, Linear regression

*****Disclaimer: Success Criteria is the evidence students must produce to demonstrate learning. This example is not comprehensive.
** Mathematical Practices (A.MP. 1- 8) should be evidenced at some point throughout each unit, depending on the explored tasks. It is important to note that MP. 2 should support learning in every lesson.
******* Modeling Standards: Modeling is best interpreted not as a collection of isolated topics but rather in relation to other standards. Making mathematical models is a Standard for Mathematical Practice, and specific modeling standards appear throughout the high school standards indicated by a star symbol (★). The star symbol sometimes appears on the heading for a group of standards; in that case, it should be understood to apply to *all* standards in that group.