High School Algebra 2 FCPS 2025-2026 Math Unit Framework Topic 1

Algebra 2 Topic 1: Linear Functions and Systems	Estimate Time Frame: 10 Block Days
Essential Standards: F.1.a, F.1.c, F.1.d, F.8a, F.8.b, A.24 Assessment Resource: enVision Topic 1	

FCPS Supporting Links	Additional Supporting Links
Pacing Guide enVision Algebra 2 Standards Crosswalk Resource FCPS P-12 Mathematics Guidance Document	Kentucky Academic Standards KSA Blueprint Achieve the Core Operations and Algebraic Thinking Progressions Target of the Standards - conceptual, procedural & application Three-Reads Routine Notice and Wonder Routine MILC Resources Topic 1 Linear Functions and Systems ***enVision Algebra 2 Teacher Guide: pages 2A to 2D for specific Topic 1 Focus-Coherence-Rigor***

Big Ideas
Students should be able to solve linear equations algebraically and graphically. Students will apply these prerequisite skills to solve problems and analyze situations using one or more functions.

Essential Questions	Common Preconceptions/Misconceptions
• How can functions be used to represent and solve problems involving quantities? • What mathematical evidence supports your assumption that the function has no maximum value? • What have you learned before about graphing linear equations that is helpful when graphing a system of linear equations to estimate its	**Prerequisite Skills:** • Equations, verbal descriptions, graphs, and tables • Construct functions with and without technology • Solve equations and inequalities • Transform linear functions

solution?	• Absolute value **<u>Misconceptions:</u>** • Students may forget when to use a bracket and when to use a parenthesis in interval notation. Have students make flashcards to review. One side should have interval notation, and the other should represent the same interval on a number line. • Students should focus on recognizing that a parenthesis in the interval notation corresponds to an open circle on the number line and a bracket represents a closed circle. Topic 1-0 (1st Day of School) Review Algebra 1 - (Syllabus day + 1), Plot Points, linear equations, slope, and graphing linear equations. Use technology as well to re-introduce concepts. Topic 1-2 Transformations Show other functions they will also see (radical, exponential, cubic, etc.) *Note: 1-4 (Arithmetic Sequences and Series) will be combined with enVision 6-7 (Geometric Sequences and Series), which is recommended to be taught in the ACT review unit in late February or March.

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 2D for specific Math Practice suggestions***	1. Recognize that text is anything that communicates a message. 2. Employ, develop, and refine schema 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.*

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. a. Understand that a function from one set (called the domain) to another set (called the range) assigns exactly one element of the range to each domain element. 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.	We are learning how to interpret key features of functions. • I can recognize the definition of a function and understand its role in modeling relationships between two quantities. • I can identify key features of graphs and tables representing functions, including intercepts, slope, maxima, minima, and	• Topic 1-1 • Topic 1-2 • Topic 1-3 *Use Ex 3 to evaluate the function at specific points. **Key features include, but are not**

☐ 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 amounts 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 and, where applicable, to the quantitative relationship it describes. **MP.2, MP.4, MP.7, KILP.1, KILP.2, KILP.6** ☐ Conceptual ❑ Procedural ❑ Application *Supporting Standard(s): KY.HS.F.3, KY.HS.F.4*	inflection points. • I can interpret key features of graphs and tables in the context of the modeled quantities, understanding how changes in one quantity affect the other. We are learning how the domain relates to the quantitative relationship described by the function. • I can understand the concept of the domain of a function as the set of all possible input values. • I can determine which input values are valid for the function in the domain. • I can relate a function's domain to the specific quantitative relationship it describes, recognizing how the domain constraints reflect real-world constraints or conditions.	**limited to,** intercepts, intervals where the function is increasing, decreasing, or remaining constant, relative maxima and minima, symmetries, end behavior, and periodicity. Desmos: Domain and Range Desmos: Domain and Range Card Sort MILC: Introducing Interval and Set Notation MILC: Key Features Exit Slip
Cluster: Build new functions from existing functions.		
KY.HS.F.8 Understand the effects of transformations on the graph of a function. a. 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. b. Experiment with cases and illustrate an explanation of the effects on the graph using technology.	We are learning about the effects of transformations on the graph of a function. • I can understand the types of transformations that can be applied to a function graph, including translations, reflections, stretches, and compressions. • I can understand how translations affect the graph horizontally and vertically,	• Topic 1-2 Mastery of this standard includes recognizing even and odd functions from their graphs and algebraic

MP.3, MP.5, KILP.5, KILP.7, KILP.9 *Supporting Standard(s): KY.HS.F.4* ☐ Conceptual ☐ Procedural ❑ Application	shifting the function left, right, up, or down. • I can comprehend how reflections across the x-axis and y-axis change the orientation of the graph. • I can 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. • I can use technology to support my understanding and explain the effects of transformation.	expressions.
Cluster: Represent and solve equations and inequalities graphically.		
KY.HS.A.24 Justify that the solutions of the equations f(x) = g(x) are the x-coordinates of the points where the graphs of y = f(x) and y = g(x) intersect. Find the approximate solutions graphically using technology or tables. ★ **MP.3, MP.5, KILP.6, KILP.7, KILP.9** *Supporting Standard(s): KY.HS.A.17* ☐ Conceptual ☐ Procedural ❑ Application	We are learning how to justify the solutions to the equations. • I can use graphs and graphing technology to find or approximate solutions to equations. • I can determine the solutions to equations using graphs and graphing technology. • I can justify that the solutions of the equations f(x) = g(x) are the x-coordinates of the points where the graphs of y = f(x) and y = g(x) intersect.	• Topic 1-5 Solve by Graphing
Cluster: Create equations that describe numbers or relationships.		
KY.HS.A.14 Create a system of equations or inequalities to represent constraints within a modeling context. Interpret the solution(s) to the corresponding system as viable or nonviable options within the context.	We are learning to interpret the solutions to the corresponding system. • I can create a system of equations or inequalities.	• Topic 1-6 • Topic 1-7 Students may be

MP.4, MP.5, KILP.3, KILP.9, KILP.10 *Supporting Standard(s): KY.HS.A.12, KY.HS.A.13, & KY.HS.A.20* □ Conceptual ❑ Procedural □ Application	• I can understand that a system of equations or inequalities is a set of mathematical expressions representing relationships between variables. • I can solve and interpret solutions to a system of equations or inequalities in context as viable or nonviable options within the context of the problem.	asked to find an optimal solution and the conditions under which the optimal solution would occur for a given real-world situation. Supplement with Linear Programming as found in MILC Topic 1.

Attending to the Standards for Mathematical Practice

A function is often described and understood in terms of the output behavior, or over what input values the function is increasing, decreasing, or constant. 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.

Students reason quantitatively about the relationship between the domain and range of functions across abstract and concrete representations.
(MP.2).

Students explain that the solutions of a system of equations or inequalities are all the points represented on the graph, and therefore, where two functions overlap, illustrate solutions to two functions (MP.1, MP.3).

Students use technology to determine solutions to a system of linear inequalities (e.g., using DESMOS or graphing calculators) (MP.5).

Supporting Standards

KY.HS.A.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★

a. Write the standard form of a given polynomial and identify the terms, coefficients, degree, leading coefficient, and constant term.
b. Factor a quadratic expression to reveal the zeros of the function it defines.
c. Use the properties of exponents to rewrite exponential expressions.
d. (+) Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. **MP.5, MP.7**

KY.HS.A.12 Create equations and inequalities in one variable and use them to solve problems**. MP.1, MP.4**

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**

KY.HS.A.17 Solve and justify equations in one variable. Justify the solutions and give examples showing how extraneous solutions may arise. a. Solve rational equations written as proportions in one variable. b. Solve radical equations in one variable. **MP.3, MP.5, MP.7**

KY.HS.A.20 Solve systems of linear equations in two variables.
a. Understand that a system of two equations in two variables has the same solution as a new system formed by replacing one of the original equations with an equivalent equation.
b. Solve systems of linear equations with graphs, substitution, and elimination, focusing on pairs of linear equations in two variables. **MP.3**

KY.HS.F.3 Understand the average rate of change in a function over an interval.

KY.HS.F.4 Graph functions expressed symbolically and show key features of the graph, with and without using technology (computer, graphing calculator). ★
f. (+) Graph piecewise functions, including step functions.

KY.HS.F.6 Write a function that describes a relationship between two quantities**. ★ MP.4, MP.7**

Vocabulary

average rate of change, interval notation, minimum, maximum, zero of a function compression, reflection, transformation, translation, absolute value function, domain, peicewise-defined function, step function, internal, intercept, point of intersection, system of linear equations, system of linear inequalities, solution of a system of linear equations

*****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.