# CAR Unit Template

## Unit Title: Algebra 1 – Linear and Exponential Modeling: Functions and Bivariate Statistics – Unit 2 -

##  Module B

**Grade level:**

**Timeframe:**

## Essential Questions

## Standards

### Standards (Taught and Assessed):

 **F.IF.B.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.*★ (modeling

 **F.IF.B 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. standard)

 **F.IF.C.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.*

 **F.BF.B.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.

 **F.LE.A.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.

 **F.LE.A.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.

 **F.IF.C.7.** Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases★ (modeling standard)

e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

**Key**: Major Cluster Supporting Cluster Additional Cluster

### Highlighted Career Ready Practices and 21st Century Themes/Skills

### Social-Emotional Learning Competencies

## Instructional Plan

Pre-Assessment and Reflection

| **Pre-Assessment** | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections** |
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Student Learning Objectives (SLO), Strategies, Formative Assessment, Activities and Resources (add rows as needed)

| **SLO – WALT****We are learning to/that** | **Student Strategies** | **Formative Assessment** | **Activities and Resources** | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections** |
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| **F.IF.B.5. - WALT** relate the domain of a function to its graph |  |  |  |  |
| **F.IF.B.5. - WALT** relate the domain of a function to the quantitative relationship it describes in the context of the problem or situation |  |  |  |  |
| **F.IF.B.6. - WALT** calculate the average rate of change of linear and exponential functions, presented as a table, over a specified interval and interpret it in the context of the problem |  |  |  |  |
| **F.IF.B.6. - WALT** estimate the average rate of change of linear and exponential functions from a graph and interpret it in the context of the problem |  |  |  |  |
| **F.IF.B.6. - WALT** calculate the average rate of change of linear and exponential function, presented symbolically, over a specified interval and interpret it in the context of the problem |  |  |  |  |
| **F.IF.C.9. - WALT** compare properties of two exponential functions each represented in different ways (numerically, graphically, algebraically, or verbally) |  |  |  |  |
| **F.BF.B.3. - WALT** identify the effect on the graph of linear and exponential functions by replacing *f*(*x*) by *f*(*x*) + *k*, *kf*(*x*), *f*(*kx*), and *f*(*x* + *k*) for specific values of *k*, and illustrate an explanation of the effects on the graph using technology |  |  |  |  |
| **F.BF.B.3. - WALT** identify the effect on the graph of linear and exponential functions by replacing *f*(*x*) by *kf*(*x*) and *f*(*kx*) for specific values of *k*, and illustrate an explanation of the effects on the graph using technology |  |  |  |  |
| **F.BF.B.3. - WALT** find the value of *k* given graphs of linear and exponential functions |  |  |  |  |
| **F.BF.B.3. - WALT** experiment with all cases, *f*(*x*) + *k*, *f*(*x* + *k*), *kf*(*x*) and *f*(k*x*), and illustrate an explanation of the effects on the graph using technology |  |  |  |  |
| **F.BF.B.3. - WALT** recognize even and odd functions from their graphs and algebraic expressions for them |  |  |  |  |
| **F.LEA.1B - WALT** recognize situations in which one quantity changes at a constant rate per unit interval relative to one another (linear relationships) |  |  |  |  |
| **F.LE.A.1. - WALT** recognize situations in which a quantity grows or decays by a constant percent (exponential relationships) |  |  |  |  |
| **F.LE.A.1. - WALT** distinguish between situations that can be modeled with linear functions and with exponential functions |  |  |  |  |
| **F.LE.A.1. - WALT** prove that a function is linear by showing that the first differences are equal |  |  |  |  |
| **F.LE.A.1. - WALT** prove that a function is exponential by showing that the function grows by equal factors over equal intervals |  |  |  |  |
| **F.LE.A.3. - WALT** use a graph and a table to observe that a quantity that increases exponentially eventually exceeds a quantity that increases linearly |  |  |  |  |
| **F.IF.C.7. - WALT** graph exponential functions, showing intercepts and end behavior of the graph |  |  |  |  |

Benchmark Assessment 1

| **Benchmark Assessment** | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections**  |
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Benchmark Assessment 2

| **Benchmark Assessment**  | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections** |
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Summative Assessments (add rows as needed)

| **Summative Assessment**  | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections** |
| --- | --- |
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Interdisciplinary Connections

| **Interdisciplinary Connections** | **Modifications (ELL, Special Education, Gifted, At-risk of Failure, 504) and Reflections** |
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