Vertical Progression:

8th Grade	**8.F.B Use functions to model relationships between quantities.** o **8.F.B.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
Algebra 1	**ELG.MA.HS.A.7 Create equations that describe numbers or relationships** o **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.* [exponential equations have integer exponents] o **A-CED.2** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. o **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. o **A-CED.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
Algebra 2	**ELG.MA.HS.A.7 Create equations that describe numbers or relationships** o **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.* [exponential equations have rational or real exponents]

Students will demonstrate command of the ELG by:

- Creating equations and inequalities in one variable and using them to find a solution.
- Defining the variable/unknown.
- Determining the best model and equation for the real-world problem.
- Creating exponential equations with rational or real exponents

Vocabulary:

- equation
- exponential function
- inequality
- linear function
- quadratic function

Sample Instructional/Assessment Tasks:

1) **Standard(s): A-CED.1**

Source: Adapted from **Engage New York Algebra 2, Module 1**

Item Prompt:

Anne and Maria play tennis almost every weekend. So far, Anne has won 12 out of 20 matches.

a) How many matches will Anne have to win in a row to improve her winning percentage to 75%?

b) How many matches will Anne have to win in a row to improve her winning percentage to 90%?

c) Can Anne reach a winning percentage of 100%?

d) After Anne has a reached a winning percentage of 90% by winning consecutive matches (part b), how many matches can she now lose in a row to have a winning percentage of 50%?

Correct Answer:

a. 12 matches

b. 60 matches

c. No

d. 64 matches

2) **Standard(s): A-CED.1**

Source: Engage New York Algebra 2, Module 1

Item Prompt:

Melissa walks 3 miles to the house of a friend and returns home on a bike. She averages 4 miles per hour faster when cycling than when walking, and the total time for both trips is two hours. Find her walking speed.

Correct Answer:

Walking speed of 2 miles per hour