

## Algebra 1: Topic 3- Linear Functions

Students will extend their understanding of linear equations to linear functions. Students will learn methods to write, graph, and transform linear functions. They will also apply analytic methods to tabular and graphic data sets that have linear relationships.

Essential Question: How can linear functions be used to model situations and solve problems?

Essential Understanding Per Lesson:

3.1-A relation is a function if each element of the domain is assigned to exactly one element of the range.

3.2- Linear functions can be represented in multiple ways, using words, tables, graphs, and rules. Function notation is a way to write the rule of a function  $f$ . The output of the function  $f(x)$ , read “ $f$  of  $x$ ” means that  $f$  is a function of the input variable  $x$ .

3.3- Many real-world problem situations can be represented with a mathematical model, but that model might not represent the real-world situation exactly.

3.4- Recursive and explicit formulas are used to describe arithmetic sequences. Arithmetic sequences, similar to linear functions, relate quantities that increase at a constant rate.

3.5- When data presented in a scatter plot suggests a linear function, a line can be fitted to the data and a linear function can be written to represent the relationship.

3.6- When a line is fitted to a set of data, the closer the data points are to the line, the stronger the correlation. A plot of residuals can be used to determine the line of best fit, which is the trend line that most closely models the data.

STEM Project:

Students will learn how recycling can offset carbon dioxide production. They will apply their understanding of linear functions to analyze trends in recycling data.

Mathematical Modeling:

Students will explore and apply concepts related to collecting and using data to write a model. Students will analyze two lines at a grocery store for which data could be collected about several variables. They will use this data, and the topics covered in the unit, to create a linear model in order to make a decision.

\*The video shows two lines in a grocery store—an express lane and a regular lane. The express lane has 8 people with baskets while the regular lane has 3 people with carts. Should you choose the express lane or regular lane?

Content Standards:

HSF.IF.A.1, HSF.IF.A.2, HSF.IF.A.3, HSF.IF.B.5, HSF.LE.A.2, HSF.BF.B.3, HSF.IF.C.7,  
HSS.ID.B.6.A, HSS.ID.B.6.C, HSS.ID.C.7

Mathematical Practice Standards:

MP.1-MP.8