Unit 6: Linear Functions

Content Area: **Mathematics**
Course(s): **Algebra 8**
Time Period: **January**
Length: **4 weeks**
Status: **Published**

Transfer

Big Idea: Linear Functions

Enduring Understandings

A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable

Functions can be represented in a variety of ways, such as graphs, tables, equations, or words. Each representation is particularly useful in certain situations

A function that models a real-world situation can then be used to make estimates or predictions about future occurrences

Essential Questions

What does y-intercept form of a linear equations tell me about its graph?

How do you use an equation to make predictions about data?

How do you use scatter plots to find correlations between variables?

Critical Knowledge and Skills

Vocabulary

Arithmetic Sequence, Common Difference, Function, Direct Variation, Explicit Formula, Inverse Function, Linear Equation, Opposite Reciprocals, Parallel Lines, Perpendicular Lines, Point-Slope Form, Rate of Change, Recursive formula, Sequence, Slope, Slope-Intercept Form, Standard Form of a Linear Equation, Term of a Sequence, X-Intercept,Y-Intercept

Learning Objectives

Find rates of change from tables (F.LE.1.b)

Find slope (F.LE.1.b)

Write linear equations using slope-intercept form (F.IF.7.a)

Graph linear equations in slope-intercept form (F.IF.7.a)

Write and graph an equation of a direct variation (A.CED.2)

Represent arithmetic sequences using function notation (F.IF.3, F.LE.2)

Write and graph linear equations using point-slope form (F.LE.2)

Graph linear equations using intercepts (A.CED.2)

Write linear equations in standard form (A.CED.2)

Determine whether lines are parallel, perpendicular, or neither (G.GPE.5)

Write equations of parallel lines and perpendicular lines (G.GPE.5)

Find the inverse of a function (F.BF.4.a)

Recognize possible associations and trends in data (S.ID.5)

Represent data on two quantitative variables on a scatter plot and describe how the variables are related (S.ID.6)

Fit a function to the data of a scatter plot (S.ID.6)

Plot and analyze residuals of the fit of a function (S.ID.6)

Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data (S.ID.7)

Compute (using technology) and interpret the correlation coefficient of a linear fit (S.ID.7)

Distinguish between correlation and causation (S.ID.9)

Resources

Desmos Linear Bundle

Khan Academy: Linear Equations & Graphs

Khan Academy: Linear Word Problems

NCTM: Barbie Bungee Activity

3 Act Math: Turbo Texting

Standards

RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.

RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

CRP2. Apply appropriate academic and technical skills.

CRP4. Communicate clearly and effectively and with reason.

CRP11. Use technology to enhance productivity.

9.1.8.A.2 Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.

9.1.8.C.5 Calculate the cost of borrowing various amounts of money using different types of credit (e.g., credit cards, installment loans, mortgages).

9.1.8.D.3 Differentiate among various investment options.

9.1.8.E.6 Compare the value of goods or services from different sellers when purchasing large quantities and small quantities.

9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.

8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.

8.2.8.C.8 Develop a proposal for a chosen solution that include models (physical, graphical or mathematical) to communicate the solution to peers.

MA.F-IF.A	Understand the concept of a function and use function notation
MA.K-12.2	Reason abstractly and quantitatively.
MA.F-IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.S-ID.B	Summarize, represent, and interpret data on two categorical and quantitative variables
MA.K-12.4	Model with mathematics.
MA.S-ID.B.6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.7	Look for and make use of structure.
MA.S-ID.C	Interpret linear models
MA.S-ID.C.7	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.F-IF.C.7a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MA.S-ID.C.8	Compute (using technology) and interpret the correlation coefficient of a linear fit.
MA.S-ID.C.9	Distinguish between correlation and causation.
MA.A-CED.A	Create equations that describe numbers or relationships
MA.A-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
MA.F-BF.B	Build new functions from existing functions
MA.F-BF.B.4a	Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.
MA.F-LE.A	Construct and compare linear and exponential models and solve problems
MA.F-LE.A.1b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
MA.F-LE.A.2	Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
MA.G-GPE.B	Use coordinates to prove simple geometric theorems algebraically
MA.G-GPE.B.5	Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).