Unit #3: Functions

Content Area: **Mathematics**
Course(s): **English I**
Time Period: **January**
Length: **1**
Status: **Published**

Enduring Understandings

- • Linear functions may be used to represent and generalize real situations.
- A function can be represented graphically using ordered pairs that consist of the input and the output of the function in the form (input, output).
- A function can be represented with an algebraic rule.
- A function is a specific topic of relationship in which each input has a unique output which can be represented in a table.
- Algebraic representation can be used to generalize patterns and relationships.
- Changes in varying quantities are often related by patterns which can be used to predict outcomes and solve problems.
- Different representations (written descriptions, tables, graphs, and equations) of the relationships between varying quantities may have different strengths and weaknesses.
- Linear functions may be used to represent and generalize real situations.
- Slope and y-intercept are keys to solving real problems involving linear relationship models of data.
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- Some data may be misleading based on representation.
- The equation y = mx+b is a straight line and that slope and y-intercept are critical to solving real problems involving linear relationships.
- The symbolic language of algebra is used to communicate and generalize the patterns in mathematics.
- Written descriptions, tables, graphs, and equations are useful in representing and investigating relationships between varying quantities.

Essential Questions

- How can graphs, tables, or equations be used to predict data?
- How can linear relationships be modeled and used in real-life situations?
- What conclusions can be drawn from data displayed on a graph?
- What defines a function and how can it be represented?
- What do the slope and y-intercept of a line of best fit signify on a graph?
- What is the pattern relating the variables?
- What makes a function linear?
- What relationships can be seen in bivariate data?
- When is one representation of a function more useful than another?
- Why is it useful to represent real-life situations algebraically?

Standards/Indicators

MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.4	Model with mathematics.
MA.K-12.7	Look for and make use of structure.
MA.8.EE.B	Understand the connections between proportional relationships, lines, and linear equations.
MA.8.EE.C	Analyze and solve linear equations and pairs of simultaneous linear equations.
MA.8.EE.C.8	Analyze and solve pairs of simultaneous linear equations.
MA.8.F.A	Define, evaluate, and compare functions.
MA.8.F.B	Use functions to model relationships between quantities.

Lesson Titles

- Best Fit Lines
- Best Fit Lines
- Functions
- Graphing Linear Equations Using Intercepts
- Linear Equations in Two Variables
- Rate of Change
- Slope
- Slope-Intercept Form
- Writing Linear Equations

21st Century Skills and Career Ready Practices

CAEP.9.2.8.B.1	Research careers within the 16 Career Clusters ® and determine attributes of career success.
CAEP.9.2.8.B.2	Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
CAEP.9.2.8.B.4	Evaluate how traditional and nontraditional careers have evolved regionally, nationally, and globally.
CAEP.9.2.8.B.5	Analyze labor market trends using state and federal labor market information and other resources available online.
CAEP.9.2.8.B.6	Demonstrate understanding of the necessary preparation and legal requirements to enter the workforce.
CAEP.9.2.8.B.7	Evaluate the impact of online activities and social media on employer decisions.

Inter-Disciplinary Connections

- Budget
- LAL - Vocabulary
- Personal Income

LA.L.8.4	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.
PFL.9.1.8.A	Income and Careers
PFL.9.1.8.B	Money Management
SCI.7-8.5.1.8.B	Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.

Anticipatory Set

- Current Events
- Mathematics History
- Relate to prior knowledge
- Video clips

Instructional Strategies, Learning Activities, and Levels of Blooms/DOK

- Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects
- Construct and interpret scatter plots and two-way tables for patterns such as positive or negative association, linearity or curvature, and outliers.
- Generate an approximate line of best fit.
- Interpret the slope and y-intercept of the line of best fit in context.
- Show that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table.
- SWBAT determine whether a function is linear or non-linear.
- SWBAT draw and use best-fit lines o make predictions about data.
- SWBAT reason from a context, graph, or table after knowing which quantity is the input and which is the output.
- SWBAT represent and compare functions numerically, graphic ally, verbally and algebraically.
- SWBAT use functions to describe relationships between two quantities.
- SWBAT verify that a relationship is a function or not.
- Use relative frequencies calculated for rows or columns to describe possible association between the two variables
- Use the equation of a linear model to solve problems in the context of bivariate measurement data.

Modifications

ELL Modifications

Content specific:

vocabulary important for ELL students to understand include: function, sequence, inequality, linear, non-linear, x-values, y-values, vertical, table, graph, equation, interval, slope, relationship, dependent variable, independent variable

- Collaboration with ELL Teacher
- Frontload information in native language
- Graphic organizers
- Modification plan
- Strategy groups
- Teacher conferences
- Using videos, illustrations, pictures, and drawings to explain or clarification

504 & IEP Modifications

- Break tests down in smaller increments
- Increase one-to-one time
- Modifications & accommodations as listed in the student's IEP
- Modified or reduced assignments
- Position student near helping peer or have quick access to teacher
- Prioritize tasks
- Provide numbered lines for graphing inequalities
- Provide worked out examples on classwork and homework that students can use as a guide when working independently
- Reduce length of assignment for different mode of delivery
- Think in concrete terms and provide hands-on-tasks
- Use patterns that are easily discernible in function tables
- Working contract between you and student at risk

G&T Modifications

- Finding function rules that are two step/multi-step
- Solving multi-step systems of equations
- Writing, solving, and graphing two step inequalities

Formative Assessment

- Exit Question - Domain/Range
- Graphic Organizer
- Group Work
- Guided Practice
- Hand Signals
- Independent Practice
- Observation
- Oral Questioning
- PARCC Question - Domain/Range
- PARCC Question - Identifying Functions
- Senteo
- Slope Organizer
- Think-Pair-Share
- Written Work

Summative Assessment

- Marking Period Assessment
- Project - Line Design
- Self-Assessment
- Test - Functions

Resources & Materials

- Graph Paper
- PMI - Functions

Technology

- Calculator
- desmos.com
- Graphing Calculator
- Khan Academy - Functions https://www.youtube.com/watch?v=VhokQhjl5t0
- Line of Best Fit https://www.youtube.com/watch?v=LPFrV-QhQE4
- SmartBoard

TECH.8.1.8	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.2.8	Technology Education, Engineering, Design, and Computational Thinking - Programming:

All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.