Unit 5: Writing Linear Equations

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Week 19**
Length: **5 Weeks**
Status: **Published**

Unit Overview

In this unit, students will write equations of lines in slope-intercept form given three situations: the slope and y-intercept; the slope and a point; or two points. They also write equations using a graph of the line or using real-world data. Students will write equations of lines in standard form, and they will use their equations to solve real-world problems. They will also write equations of lines parallel or perpendicular to a given line and use function notation. In addition, students will make scatter plots of data and use a line of fit to model and interpret the data. They will perform linear regression to find the best-fitting line for data and make predictions using the graph and the equation.

Standards

CCSS.Math.Content.HSF-IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
CCSS.Math.Content.HSA-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
CCSS.Math.Content.HSA-CED.A.2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Essential Questions

- How can mathematical models be used to clarify mathematical relationships?
- How can mathematical models be used to describe physical relationships?
- How can knowing the equation of a line help in decision-making?

Application of Knowledge and Skills...

Students will know that...

Students will know that:

- 1) slope-intercept form of a line is y = mx + b
- 2) point-slope form of a line is y - y1 = m(x - x1)
- 3) standard form of a line is Ax + By = C
- 4) parallel lines have the same slope and perpendicular lines have negative reciprocal slopes
- 5) the symbol f(x) is another name for y and is read as 'the value of f at x'
- 6) a line of fit is used to model the trend in data that shows a positive or negative correlation
- 7) a best-fitting line is a line that most closely follows a trend in data

Students will be skilled at...

Students will be able to:

- a) Write linear equations in slope-intercept form
- b) Write linear equations in point-slope form
- c) Write linear equations in standard form
- d) Write equations of parallel and perpendicular lines
- e) Write linear functions using function notation
- f) Solve for values of x or f(x) using function notation
- g) Create scatter plots and write equations to model data
- h) Make predictions using best-fitting lines

Assessments

- Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback
- Daily Do Now Problems Diagnostic: Other written assessments Students will complete daily Do Now problems to assess readiness
- Homework Formative: Other written assessments Students will complete daily homework assignments to reinforce concepts and skills used in class
- Tickets to Leave Formative: Other written assessments One or two problems will be used to determine whether students mastered material taught during the lesson
- Writing Equations Quiz Formative: Written Test Students will take a quiz on writing equations in slope-intercept form given the slope and y-intercept, a graph, a table, a real-world situation, the slope and a point, and two points; writing equations in point-slope form given the slope and a point, and two points; word problems
- Writing Equations Test Summative: Written Test Topics will include: writing equations in slope-intercept form, point-slope form, and standard form; parallel and perpendicular lines; function notation; creating scatter plots and equations of lines of best fit

Activities

Point-Slope Activity

Students will work with equations in point-slope form to discover that the line passes through (x_1, y_1) and has a slope of m.

Graphs of Equations in Standard Form Activity

Students will discover how to identify equivalent equations from standard form.

Writing Linear Equations Tic-Tac-Toe

Students play a game of tic-tac-toe in pairs by correctly solving problems that practice writing linear equations.

Linear Equation Bull's Eye Worksheet

Students will complete a worksheet that reviews and makes connections between slope-intercept form, standard form, and x-intercepts.

Food Preference Correlation Activity

Students will compare favorite foods in partners to create and analyze a scatter plot.

Cell Phone Scatter Plot Activity

Students will use a scatter plot to create an equation and make predictions.

Fuel Consumption Scatter Plot Class Activity

The class will predict future fuel consumption from given data using a table and compare their prediction with that of a linear model.

Communicator Practice

Students will solve differentiated practice problems on SmartPal response boards.

Point-Slope Activity

- Standard Form Activity
- Tic Tac Toe Boards
- Bull's Eye Worksheet

Activities to Differentiate Instruction

Interactive Smart Board Activities will be utilized.

Students will work in mixed-level groups.

Students will be assigned optional and mandatory challenge problems on homework assignments.

Enrichment worksheets will be available for classwork and/or homework.

Homework will be modified as needed.

Self-selection of problem-solving strategy.

Guided notes and study guides will be provided accordingly.

Modified versions of quizzes and tests will be distributed.

Appropriately leveled problems for students to solve when participating in communicator practice will be provided.

Tic Tac Toe game consists of tiered levels.

Integrated/Cross-Disciplinary Instruction

Technology - An excel spreadsheet will be utilized and projected on the Smart Board to complete the Fuel Consumption Activity.

Resources

McDougal Littell Algebra 1 textbook and resource materials

Kuta software

SmartExchange resources

- McDougal Littell Algebra 1
- SMART Exchange