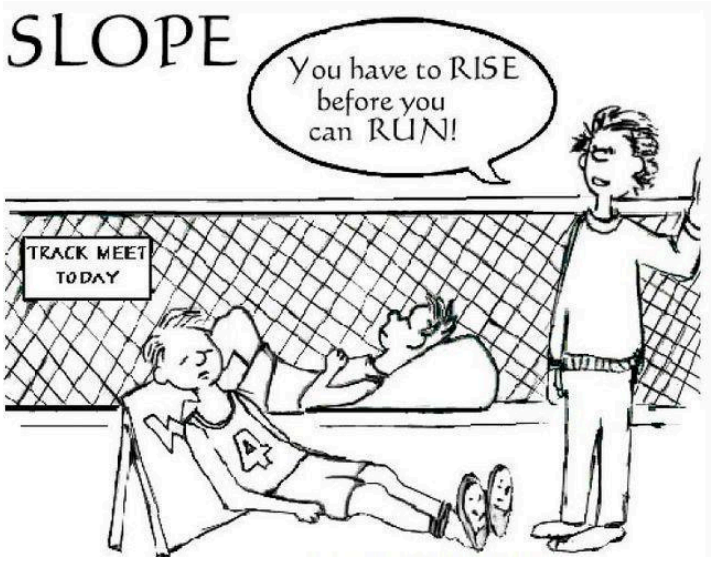
Linear and Nonlinear Functions



Unit Introduction

In this unit, students will dig more deeply into writing and graphing linear equations and further linear functions. Linear function is widely used in our real life with a purpose of analyzing and expressing graphs which shows the fluctuations in this society. Students will be able to graph, read, write, and analyze the linear function graphs by learning about slope, intercepts, and different types of forms to write the equation. Towards the end, students will be given a project which covers all the math skills we have covered from the beginning of school year.

Unit Priority Standards

- HSF.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
- 8.F.A.3 Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
- 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.

Unit Transfer Goals

- Use a problem-solving model that incorporates analyzing the information given, determining a plan or strategy, solving the problem, justifying the solution, and checking for reasonableness of the answer.
- Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.

<table>
<tr><th colspan="2">Unit Essential questions</th></tr>
<tr><td colspan="2">1. What strategies can be used to graph linear equations?
2. How do you write an equation in slope-intercept form?
3. How do you write equations of parallel and perpendicular lines?</td></tr>
<tr><th colspan="2">Acquisition of Knowledge Skill</th></tr>
<tr><td>Students will know…
1. About Linear Function vocabulary.
2. Different ways of graphing a linear equation.
3. Different ways of writing a linear equation.</td><td>Students will be skilled at…I can...
1. Graphing Linear Equations and Functions.
2. Finding Slope and Rate of Change.
3. Graphing Using Slope-Intercept Form.
4. Writing and Using Linear Equations in Slope-Intercept Form.</td></tr>
</table>

Unit Plan

Week 1: (10/25 - 29)	**3.1 & 3.2 Coordinate Plane & Graph Linear Equations**
Learning Target(s):	**Students will be able to...** - Identify the ordered pair in a coordinate plane.
Acquired Knowledge:	**Students will know...** - How four quadrants are different on the coordinate plane depending on the value of the domain, the range changes. - Where the x and y- intercepts should be pointed on the coordinate plane.
Activities & Assessments:	❏ Classroom discussion ❏ Independent practice ❏ Virtual Scavenger Hunt Activity

Week 2: (11/1 - 5)	**3.3 Graph Using Intercepts** **3.4 Find Slope and Rate of Change**
Learning Target(s):	**Students will be able to…** - Graph Linear Equations using intercepts and slope. - Explain what x-intercept and y-intercept are. - Find slope and rate of change.
Acquired Knowledge:	**Students will know…** - How to find the slope using the formula. - When and how to use the slope-intercept form in solving questions.
Activities & Assessments:	❏ Classroom discussion ❏ Independent practice ❏ Graph Linear Functions - Activity

Week 3: (11/8 - 12)	**3.5 - Graph Using Slope-Intercept Form** **3.6 - Model Direct Variation #1**
Learning Target(s):	**Students will be able to…** - Explain what Slope-Intercept Form is. - Graph Linear Equations using Slope-Intercept Form.

	- Graph Linear Function using given ordered pairs.
Acquired Knowledge:	**Students will know…** - What are the steps they should go through to graph the linear equations using the slope-intercept form.
Activities & Assessments:	❏ Unit 3 Review ❏ Unit 3 Test

Week 4: (11/15 - 19)	**3.6 - Model Direct Variation #2** **3.7 - Graph Linear Functions** **Unit 3 Review**
Learning Target(s):	**Students will be able to…** - Apply Direct Variation in solving word problems. - Graph the linear equation/functions which are in direct variation form.
Acquired Knowledge:	**Students will know…** - The constant of variation is equal to the slope. - The characteristics of Direct Variation.
Activities & Assessments:	❏ Group Project ❏ Presentation about the project

Week 5: (11/22 - 26)	**Unit 3 Test** **Stained-Glass Window Graphing Project**
Learning Target(s):	**Students will be able to…** - Demonstrate their understanding in Unit 3 through creating their own linear equations on the project
Acquired Knowledge:	**Students will know…** - n/a
Activities & Assessments:	❏ Individual Project ❏ Unit 3 Test

Assessment Details

Evidence	
I will check students' understanding throughout the unit by...	
Summative - Unit 3 Test - 'Review Presentation' Project ● Students as a group will choose the topic among topics they have learned from the beginning of the school year. They will display their learning through the Google Slides with example questions, and verbally explaining their understanding to their classmates. ○ Student Handout & Rubrics	**Formative** - Class Discussion Observation - Daily Classwork/Homework ● Students will receive daily assignments. This will be randomly checked by accuracy and completion to check their understanding in learning. - Exit Ticket ● Exit tickets will be given to students once a week. This helps check students' level of understanding in their learning. - Pop Quiz ● Pop-quiz will be given to assess students' understanding.