**Writing Linear Functions**

**Note:** Previously, students learned how to determine whether a function is linear and how to graph a linear function given two points, a table, or a point and a slope.

**Objectives:**

**Content**
The students will use the slope-intercept and point-slope forms to write linear functions and use the linear functions to solve problems.

**Language**
The students will use, translate (verbally and in writing), and make connections among algebraic, tabular, graphical, or verbal descriptions of linear functions.

**Vocabulary:**

**Content Specific**
Point-slope form

**Related**
Linear function slope
y-intercept x-intercept
Slope-intercept form

**Materials:**
Algebra 2 textbook and/or laptop, pencil, paper, banner paper, tape, ruler, post-it-notes, Lesson 2-4 Know-It-Notes, Algebra 2 Homework packet, calculator

**Activities:**

- SW read the content and language objectives.
- TW explain that knowing how to determine the equations of lines can be useful in everyday situations using the following scenario:
  
  Suppose we have a linear graph that shows a trend in an item’s price over a period of time, and we want to use the graph to predict the price of the item five (5) years from now. If we had the equation of the line, we could use it to make a prediction by substituting 5 for the independent variable.

- SW work with a partner to come up with another example of real-life situations where equations can be useful.

- SW read section 2-4 (pp. 115 -119) with a partner or in a small group (3 people max) and...
1. SW complete the 2-4 Know-It-Notes (1 – 4).
2. SW complete the Cornell Notes (Split Page Note Taking) answering the following questions:
   1. How can you find the slope of a line from its graph?
   2. How can you find the y-intercept of a line from its graph?
   3. How do you know what values from a table to use in the slope formula when you are finding the slope?
   4. What are two forms for writing the equation of a line?
   5. Given two points on a line, how do you find the slope of the line?
   6. How are the slopes of parallel lines related?
   7. How are the slopes of perpendicular lines related?
   8. Why is the slope of a vertical line (such as x = 4) undefined?
   9. What information is needed in order to write the equation of a line?

   - Each group will present one of the answers to the questions to the entire class.

   - TW Demonstrate writing the equation of a line (using additional examples from the textbook):
     - Slope-Intercept form given a graphed line
     - Finding the slope of a line:
       - Through two points
       - Given a table of values
       - Given a graph of a line
     - Slope-Intercept form and point-slope form given a table of values
     - Slope-Intercept form and point-slope form given a point and the slope
     - Slope-Intercept form and point-slope form given two points
     - Slope-Intercept form and point-slope form of a line parallel to a given line through a given point
     - Slope-Intercept form and point-slope form of a line perpendicular to a given line through a given point
     - Using the graphing calculator to find the equation of a line given a table of values
     - Using the graphing calculator to find the equation of a line given two points
     - Write a linear function to solve a problem

   - SW be divided into groups of 3 or 4. Each group will be given a piece of banner paper along with two points, a table of values, a slope with a point, and a word problem.

   - SW (with their groups) write the equations of the four lines for the given information.

   When they finish, each group will post their banner paper so that the other groups can walk around to check and compare answers. The groups will rotate from banner to banner until the return to their own. (If they find an error, they are to write a comment, answer, or hint on a post-it note and place it on the poster)

   - SW (with their groups) discuss any post-it notes placed on their banner.

   - TW review objectives and clarify any questions.
**Closing Discussion:**

**Thinking out-of-the-box**
Explain how the point-slope form of a line is different from the slope intercept form of a line.

After discussion, have the students post their comments on the blackboard discussion board.

**Review & Assessment:**

**Vocabulary**
On the Lesson 2-4 Know-It-Notes (#5 Get Organized – Frayer Model) in each box, write any appropriate formulas and examples of equations.

**Content**
Independent practice assignment from Algebra 2 Homework packet 6-2 Practice (1 -14) even; 5-7 Practice B (1 – 9) odd; 6-4 Practice (1 – 15) odd

**Extension / Take-home Activity:**
- Write new terms on index cards with definitions and or examples on the back.