



MISSISSIPPI

EXEMPLAR

Units & Lessons

MATHEMATICS

Foundations of Algebra

Grant funded by:



Lesson 7: Where Do I Start?

Focus Standard(s):FOA.15, FOA.16

Additional Standard(s): FOA.17, FOA.20

Standards for Mathematical Practice: SMP.1, SMP.2, SMP.4

Estimated Time: 55 minutes

Resources and Materials:

- Document Camera

Lesson Target(s):

- Given two points or a table that represents linear functions, the students will find the y-intercept using the slope-intercept form of an equation.

Guiding Question(s):

- How can the slope-intercept form of an equation be used to determine the y-intercept?
- How can you find the y-intercept when working with forms other than slope-intercept form?


Vocabulary

Academic Vocabulary:

- Coefficient
- Constant
- Linear function
- Ordered pairs
- Rate of change
- Slope

Instructional Strategies for Academic Vocabulary:

- Model how to use the words in discussion
- Discuss the meaning of word in a mathematical context
- Write/discuss using the words

Symbol	Type of Text and Interpretation of Symbol				
	Instructional support and/or extension suggestions for students who are EL, have disabilities, or perform well below the grade level and/or for students who perform well above grade level				
✓	Assessment (Pre-assessment, Formative, Self, or Summative)				
Instructional Plan					
<p>Understanding Lesson Purpose and Student Outcomes: Students will continue to use multiple representations to write linear equations. Students will deepen their understandings of slope and y-intercept and use this understanding to write linear functions in slope-intercept form.</p> <p>Anticipatory Set/Introduction to the Lesson: Reciprocal Teaching Instruct students to Stand Up-Hand Up-Pair Up. Have students pretend their partner was absent the day before. Student A will explain how to find the slope of a linear function using the formula for slope, a table, and a graph. Student B will ask clarifying questions after Student A explains. Then, students will switch roles. Student B will explain to Student A how to determine the type of change in a linear function. Student A will ask clarifying questions after Student B explains.</p> <p>Activity 1: Finding y-intercepts Direct Instruction Display slope-intercept form: $y=mx+b$. Identify and briefly explain the x, y, m, and b. Explain that in slope-intercept form of an equation, we can easily use the slope of the line and y-intercept to express the linear function, but in some representations, the y-intercept is not given. Ask students to brainstorm ways they have learned to find the slope using the different representations. Allow time to consider if they can think of how a y-intercept may be identified in those forms if it is not shown in the representation.</p> <p>Display the table shown below.</p> <table border="1" data-bbox="310 1263 510 1344"> <tbody> <tr> <td>3</td> <td>8</td> </tr> <tr> <td>5</td> <td>14</td> </tr> </tbody> </table>		3	8	5	14
3	8				
5	14				

✓ Have students find the slope using the slope formula.

Lesson $m = \frac{14-8}{5-3} = \frac{6}{2} = 3$

Model for students how to use a point from the table, (5, 14), to substitute into the slope-intercept form of an equation. Have students complete the equation as it is filled in. Use $y = mx + b$ and **substitute m with 3, x with 5, and y with 14.**

$$14=3(5) + b$$

✓ Allow time for students to solve the equation for the y-intercept.

Model for students how to replace their values, $m = 3$ and $b = -1$, back into slope-intercept form.

$$y = 3x - 1$$

For students who are EL, have disabilities, or perform well below grade level:

- Provide students with highlighters to find corresponding values when evaluating functions.
- Extend the table or graph to find the starting point and slope.

Note: Provide additional examples for students as needed.

Activity 3: Electrical Situation – Is It Functioning Properly?

Note: Prior to the activity, label each corner as A, B, C, and D. Reinforce that the y-intercept may be seen as the following:

- y-intercept: the point where the line crosses the y-axis on a graph.
- y-intercept: the point that has an x value of zero in a table.
- y-intercept: the initial value or starting point in a situation.

Inform students that some companies charge customers an initial fee as well as a unit charge for certain services.

Display the situation below on the board or document camera (SMP.1, SMP.2, SMP.4).

“An electrician’s initial service fee can be represented by (0, 30). The bill after 2 hours can be represented by (2, 150). What equation represents this situation?”

- A. $y = 30x + 150$
- B. $y = 60x - 30$
- C. $y = 150x - 30$
- D. $y = 60x + 30$

- ✓ Have students identify the initial value or y-intercept within the situation and use the method of their choice to determine the rate of change. Allow students time to read the situation quietly and move to a corner with the letter that represents their answer.

Instruct the students to reveal their answer using the “Four Corners” Teaching Strategy as explained below.

- Can’t share their answer with anyone or write their answer on paper.
- Quietly walk to the corner with the letter that best represents their answer choice for the situation.
- Use 1-2 minutes to discuss why they chose their answer.
- Teams should each decide on a speaker to defend their answer choice.

Bring the whole class together while they are still in their corners.

- ✓ Each team to defend their choice.

Reveal the correct answer and address questions and concerns from individual students. Instruct students to go back to their seats.

For students who are EL, have disabilities, or perform well below grade level:

- Encourage students to focus only on the slope at first to narrow down their selection.

Extensions for students with high interest or working above grade level:

- Students may use the two points to make a graph, identify the slope and y-intercept, and write the equation.

Activity 4: Electrical Situation – The Initial Problem

Display the situation below on the board or document camera (SMP.1, SMP.2, SMP.4).

“An electrician charges a service fee of \$30 to come to your home and consider the problem. With your consent, he will work on the situation charging \$60 for each hour it takes to repair the problem. What value represents the initial value or y-intercept in this situation?”

- A. \$90
- B. \$30
- C. \$60
- D. Not enough information

✓ Students show their thinking using the “Four Corners” Teaching Strategy.

Activity 5: Electrical Situation – The Problem is Growing

Display the situation below on the board or document camera (SMP.1, SMP.2, SMP.4).

“An electrician charges a service fee of \$30 to come to your home and look into the problem. With your consent, he will work on the situation charging \$60 for each hour it takes to repair the problem. What value represents the slope in this situation?”

- A. \$30
- B. \$60
- C. \$90
- D. Not enough information

✓ Students show their thinking using the “Four Corners” Teaching Strategy.

Reflection and Closing:

Ask students to brainstorm different services that may have an initial fee and a unit price to consider when purchasing.

- ✓ Have students exchange situations and write linear functions for the situation received.

Homework

- ✓ Have students copy and respond to the following situation by creating a table, graph, and linear equation.

Madison has \$50 in her PayPal account. She sells shoes for \$10 per pair. Write a linear equation to represent the amount of money in her account based on the number of shoes she sells.

For training or questions regarding this unit,
please contact:

exemplarunit@mdek12.org