*Mathematics Instructional Plan – Grade 8*

# Slope and *y*-intercept

**Strand:** Patterns, Functions, and Algebra

**Topic:** Recognize and describe the graph of a linear function.

**Primary SOL:** 8.16 The student will

1. recognize and describe the graph of a linear function with a slope that is positive, negative, or zero;
2. identify the slope and *y*-intercept of a linear function given a table of values, a graph, or an equation in

*y* = *mx* + *b* form;

**Related SOL:** 6.12,7.10, 8.15

## Materials

* Teacher-made slope foldable
* Scissors
* Slope-Intercept Cards (attached)
* Silent Bingo Game Card (attached)
* Graph paper (optional)

## Vocabulary

*coordinate plane* (earlier grades)

*dependent variable, equation of a line,**linear function, negative slope,**positive slope, rate of change, slope, y-intercept (8.16a, 8.16b)*

**Student/Teacher Actions: What should students be doing? What should teachers be doing?**

1. Create a tab foldable with the class. The tabs should display definition, positive slope, negative slope, zero slope, and no slope. Go through the foldable and explain each concept: positive slope, negative slope, zero slope, and no slope.
2. Give each student a pair of scissors and the Slope-Intercept Cards. Have students cut the cards apart and match the cards to make sets of five cards each—equation in standard form, equation in slope-intercept form, *m* (slope), *b* (*y*-intercept), and graph.
3. Distribute copies of the Bingo Game Card. Have students play the Bingo game individually. As the teacher calls out a number for slope or a number for *y*-intercept, students will put a mark beside that equation. Tell them they can only check one equation at a time. Whenever a student gets “Bingo,” check his/her game card.

## Assessment

### Questions

* + - Write whether a slope is positive, negative, zero, or undefined.
    - Write the slope and *y*-intercept of a graph.
    - Write the slope and *y*-intercept of a table of values.
    - Write the slope and *y*-intercept of an equation.

### Journal/Writing Prompts

* + - Write the formula for a linear function, and identify and describe what *m* and *b* stand for. Create an example in your explanation.
    - Write about lines with undefined slope (vertical lines) and compare undefined slope to lines with a defined slope.
    - Explain why the graph of a horizontal line does not have an *x*-intercept, assuming the equation is not *x* = 0. Describe how you know this.
    - Explain why the graph of a vertical line does not have a *y*-intercept, assuming the equation is not *y* = 0. Describe how you know this.

### Other

* + - Have students create a design on graph paper using 10 straight lines. Have them give the design to a partner, who will determine the slope and *y*-intercept of each line.
    - Graph a linear function, given an equation using different methods.

## Strategies for Differentiation

* Encourage the use of graph paper and dry-erase boards with grids for students to see the slope and intercepts.
* Laminate the *Slope-Intercept Cards* so students can write on the cards with dry-erase markers.
* Have students work in pairs for both activities, as needed.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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**Slope-Intercept Cards**

Copy on card stock and cut out.

|  |  |
| --- | --- |
| ***y* = −3*x* − 1** | ***m* = −3** |
| ***b* = −1** |  |
| ***y* = − ­*x* + 2** | ***m* = −** |
| ***b* = 2** |  |

|  |  |
| --- | --- |
| ***y* = 2*x* − 4** | ***m* = 2** |
| ***b* = −4** |  |
| ***y* = *x* − 3** | ***m* =** |
| **b = −3** |  |

|  |  |
| --- | --- |
| ***y* = 2*x*** | ***m* = 2** |
| ***b* = 0** |  |
| ***y* = 4** | ***m* = 0** |
| ***b* = 4** |  |
| ***y = –x + 4*** | ***m = –1*** |
| ***b = 4*** | x+y=4 |
|  |  |
| ***b = 1*** | 2x-3y=-3 |

**Silent Bingo Game Card**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **B** | **I** | **N** | **G** | **O** |
| ***y* = 2*x* + 1** | ***y* = *x* + 3** | ***y* = *x* − 1** | ***x* = 8** | ***y* = 3*x* − 5** |
| ***y* = *x* + 4** | ***y* = ­−*x*** | ***y* = −5*x* + 11** | ***y* = −*x* − 2** | ***x* = 2** |
| ***y* = 3*x* + 2** | ***y* = −2*x* + 9** | **Free**  **Space** | ***y* = 4** | ***y* = −2*x* + 3** |
| ***y* = *x* + 6** | ***y* = −*x* + 1** | ***y* = −2*x* + 1** | ***y* = −*x* + 3** | ***y* = 6*x* − 8** |
| ***y* = −3** | ***y* = 2** | ***y* = 4*x* + 2** | ***y* = *x* + 1** | ***y* = 3*x*** |