

## Classroom Interactions 5E Lesson Plan Template

<b>Author:</b> KP Preut	<b>Title of Lesson:</b> Graphing $y=mx+b$  <b>Lesson Source/Resources:</b>
Lesson #: 2/2 Date lesson will be taught: 11/9	Subject/Grade level: 9th Grade / Algebra 1
<p><b>Concepts/Main Idea</b> – explain the concept(s) that will be the focus of this lesson in detail.</p> <ul style="list-style-type: none"> <li>★ This lesson covers the slope-intercept form of a linear equation           <ul style="list-style-type: none"> <li>○ This equation is linear, representing a line</li> </ul> </li> <li>★ Slope-intercept form is <math>y = mx+b</math> <ul style="list-style-type: none"> <li>○ Inputting an x value and solving will give the y value to a point on the graph (x,y)</li> <li>○ m represents the slope of the line               <ul style="list-style-type: none"> <li>■ Example <math>y=1/2x</math>. The slope is 1/2. Between each point, go up one and over 2</li> </ul> </li> <li>○ b represents the y intercept               <ul style="list-style-type: none"> <li>■ This is where the line crosses the y-axis at (0,b)</li> <li>■ Example: <math>y=x+4</math>. The y-intercept is (0,4)</li> </ul> </li> </ul> </li> <li>★ To graph           <ul style="list-style-type: none"> <li>○ Identify the y-intercept (0,b) and plot this point on the graph</li> <li>○ Use the slope to find addition points on the graph</li> <li>○ Connect these points with a line with arrows on the ends</li> </ul> </li> </ul>	

**Instructional model and strategies** – *The strategies from the learning center that will be used during the lesson*

- 5e lesson model
- Technology component: Online graphing game

**Objective/s-** Write objectives in SWBAT form...  
***The Students Will Be Able To:***

- Students will be able to graph a linear equation given the form  $y=mx+b$

**Evaluation** *Based on your objectives, draft the content of the questions you will ask on your pre- and post-tests; at least 1 question for each objective. Questions do not have to be multiple choice. Your actual pre- and post-tests will be included in the interview paper.*

**Pre-test assessment** – This should line up with the learning targets and provide the teachers with the information needed to make instructional decisions *before* the lesson begins. Be sure the assessment will make the students' thinking visible.

- Included below

**Formative assessment(s)** – This should line up with the learning targets and provide teachers with the information needed to make instructional decisions *during* the lesson. Be sure to describe the format of the assessment and what it is designed to assess.

- Included below

**Post-test assessment** - This should line up with the learning targets and provide teachers with the information needed to be confident that students understand the content. Be sure to describe the format of the assessment and what it is designed to assess.

- Included below

**Kansas Science and Math Standards- Include standard, benchmark and indicator where applicable**

Common Core Math Content:

- ★ F.IF.4: For a function that models a relationship between 2 quantities , interpret key features of expressions, graphs ,and tables in terms of the quantities, and sketch graphs showing key features given a description of the relationship. Key features include: intercepts, intervals where the function is increasing, decreasing, positive, negative, relative maximums and minimums, symmetries, end behavior, periodicity.

Common Core Math Practice:

- ★ M7: Look for and make use of structure

NGSS Science and Engineering Practice:

- ★ S2: Develop and use models

Common Core ELA Practice:

- ★ E6: Use technology and digital media strategically and capably

**Materials list** (BE SPECIFIC about quantities)

for Whole Class:

- ★ 25 Battleship Game Worksheets

per Student:

- ★ 1 iPad
- ★ 1 Unit 3 Spiral

Advance preparation:

- ★ Remind students the day before the lesson to come with their iPad charged
- ★ Have all handouts printed

**Include handouts** at the end of this lesson plan document (blank page provided to paste a copy of your document). List handouts in your materials list.

**Accommodations:** Include a general statement and any specific student needs. Be sure to include struggling readers.

- ★ Students will be allowed to choose an alternative location for their pre-test.
- ★ Instructions will be presented verbally and on paper.
  - Teacher will re-read instructions for students who need them repeated verbally
- ★ Students have multiple options for the Elaborate section
- ★ For struggling learners: Scaffolding will be used to break the lesson into small parts that connect back to previous lessons.

**Safety:** Include a general statement that indicates how you will establish a learning environment where safety for all is assured. Include physical safety concerns specific to this lesson. Identify when you will address these specific concerns with the students

- ★ No physical safety concerns with this lesson.
- ★ The teacher will establish that students must be respectful of one another when working on problems together.

**Extension Activities:**

- **Battleship Graphing Game**

**Backup Plans:**

- ★ If many students are struggling during the explore/explain section, the teacher will use the first part of elaborate section to go over the homework examples as a whole class.

Describe what the student and the teacher will do during each stage of the lesson. Be sure to describe the learning experiences and the assessments. You also need to discuss any management considerations (e.g., picking up materials, movement of students, etc.)

Engagement: Estimated Time: ___ 20 min _____		
What the teacher does AND how will the teacher direct students: (Directions)	Probing Questions: Critical questions that will connect prior knowledge and create a "Need to know"	Expected Student Responses AND Misconceptions - think like a student to consider student responses INCLUDING misconceptions:
<ul style="list-style-type: none"> <li>The teacher will ask students if they have any questions from the homework and go over those problems.</li> <li>The teacher will go over the warm up problem on pg. 45</li> <li>Thumbs up/down to see if students are ready to move on to graphing or need more practice on identifying slope and y-intercept.               <ul style="list-style-type: none"> <li>If more practice is needed, the teacher will go over more examples from the homework assignment.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>★ What is the slope?</li> <li>★ What is the y-intercept?</li> </ul>	<ul style="list-style-type: none"> <li>★ -1 ; 14 ; 5/6</li> <li>★ 1 ; 1/14 ; 6/5</li> <li>★ There is no slope</li> <li>★ (0, 9) ; (0,0); (0,-1)</li> <li>★ (9,0); 0 ; (-1,0)</li> <li>★ There is no y-intercept</li> </ul>

**Exploration:** Estimated Time: 20 min

**What the teacher does AND what the teacher will direct students to do: (Directions)**

Explore Part 1:

- Teacher will start problem 1 on pg. 46 with students.
  - Teacher will ask students to identify the y-intercept and the slope from the equation.
  - Teacher will direct students to try graphing and find the x-intercept on their own.

Explore Part 2:

- Teacher will direct students to try #2 on their own
  - Class will go over it in Explain part 2

Explore Part 3:

- Teacher will direct students to try #3 and #4
  - Class will go over it in Explain part 3

**Probing Questions: Critical questions that will guide students to a "Common set of Experiences"**

★ What is the slope?

★ What is the y-intercept?

★ What is the x-intercept?

**Expected Student Responses AND Misconceptions** - think like a student to consider student responses *INCLUDING* misconceptions:

★  $-1/3$  ; 4 ; -2 ; 1

★ -3 ;  $1/4$  ;  $-1/2$

★ There is no slope

★ (0,-1); (0,0); (0,2); (0,-5)

★ (-1,0); 0; (2,0); (-5,0)

★ -1; 0; 2; 0; -5

★ There is no y-intercept

★ (3,0); (0,0); (1,0); (5,0)

★ (0,3); (0,0); (0,1); (0,5)

★ 3; 0; 1; 5

★ There is no x-intercept



**Explanation:** Estimated Time:     20 min    

**What the teacher does AND what the teacher will direct students to do:** (Directions)

**Clarifying Questions:** Critical questions that will help students “clarify their understanding” and introduce information related to the lesson concepts & vocabulary

**Expected Student Responses AND Misconceptions** - think like a student to consider student responses *INCLUDING* misconceptions:

Explain Part 1:

- Teacher will have students explain how they graphed the equation and found the x-intercept

★ What is the slope?

★  $-1/3$  ; 4 ; -2 ; 1

★ -3 ;  $1/4$  ;  $-1/2$

★ There is no slope

Explain Part 2:

- Teacher will have students explain how they found the slope, y-intercept, x-intercept, and graphed.

★ What is the y-intercept?

★ What is the x-intercept?

★ (0,-1); (0,0); (0,2); (0,-5)

★ (-1,0); 0; (2,0); (-5,0)

★ -1; 0; 2; 0; -5

★ There is no y-intercept

Explain Part 3:

- Teacher will have students explain how they found the slope, y-intercept, x-intercept, and graphed.

★ What was your strategy for graphing?

★ (3,0); (0,0); (1,0); (5,0)

★ (0,3); (0,0); (0,1); (0,5)

★ 3; 0; 1; 5

★ There is no x-intercept

Explain Part 4:

- Teacher will direct students to go to the fill in the blank portion of the notes on pg. 45.
- Teacher and students will go over a general strategy for graphing in  $y=mx+b$

★ I found the slope and y-intercept and used that info to graph

★ I started with the y-intercept the used the slope to find other points

★ I started with the x-intercept and used the slope to find more points

★ I started at the origin and found points using the slope

**Elaboration:** Estimated Time:     20 min    

**What the teacher does AND what the teacher will direct students to do:** (Directions)

- Teacher will take a short break with the students. If the weather is nice, students may take a short walk with the teacher outside. Otherwise, students may take a short walk through the halls with the teacher. (5-10 minutes)

Students will be directed to use the rest of class time to try different activities. If students finish one activity, they should move on to another activity. If they complete all three activities, they may ask to do work for another class.

- Option 1: Complete the Homework
  - Pg 48
- Option 2: Online Graphing Game
  - [https://phet.colorado.edu/sims/html/graphing-slope-intercept/latest/graphing-slope-intercept\\_all.html](https://phet.colorado.edu/sims/html/graphing-slope-intercept/latest/graphing-slope-intercept_all.html)
- Option 3: Graphing Battleship
  - Handout included below

The teacher can give brief explanations of option 1 and 2, but should go through the directions as written for option 3.

**Probing Questions:** Critical questions that will help students “*extend or apply*” their newly acquired concepts/skills in *new situations*

Option 1:

★ What is the slope?

★ What is the y-intercept?

Option 2:

★ How can you change the slope or y-intercept on the graph to match the equation?

★ How can you write an equation that will go through the players battleships?

**Expected Student Responses AND Misconceptions** - think like a student to consider student responses *INCLUDING* misconceptions:

Option 1:

★ Various answers are expected

- Expect students to struggle to understand the slope if it is 1, as there will not be a number in front of x

★ Various answers are expected

- Expect students to struggle to understand the y-intercept as the point (0,b)

★ Expect to help students figure out the technology component.

★ Various answers expected

- Help students understand what slope and y-intercept would be needed to hit points around the one they have already hit.

**Evaluation:** Estimated Time: \_\_\_\_\_15 min\_\_\_\_\_

**Critical questions that ask students to demonstrate their understanding of the lesson's performance objectives.**

**Formative Assessment(s):** *In addition to the pre- and post-test, how will you determine students' learning within this lesson: (observations, student responses/elaborations, white boards, student questions, etc.)?*

- Thumbs up/down to see if students are ready to move on
  - Engage
- Student responses to questions
  - Explore, Explain
- Observations of student work
  - Explore, Elaborate

**Summative Assessment:** *Provide a copy of the key to the post-test in the interview paper.*

- Students will have the last 15 minutes of class to complete the Post-test