

Lesson Plan by Mark A. Hewitt

Lesson: Y-Intercept and Slope Intercept Form

Length: One class period

Age or Grade Intended: 9th grade (Algebra I)

Standard:

Standard 4 — Graphing Linear Equations and Inequalities

Students graph linear equations and inequalities in two variables. They write equations of lines and find and use the slope and y-intercept of lines. They use linear equations to model real data.

A1.4.1 *Graph a linear equation.*

Example: Graph the equation $3x - y = 2$.

A1.4.2 *Find the slope, x-intercept, and y-intercept of a line given its graph, its equation, or two points on the line.*

Example: Find the slope and y-intercept of the line $4x + 6y = 12$.

The preceding two lessons presented recognition of linear graphs and the introduction of the new terminology rate of change and slope. Lesson 3 presents the term *y-intercept* and term *slope intercept form* of a linear equation.

Performance Objectives:

1. All students in the class, given a linear equation in slope-intercept form will identify the slope, with 80% accuracy, by correctly providing the answer for 4 out of 5 assigned problems.

2. All students in the class, given a linear equation in slope-intercept form will identify the y-intercept, with 80% accuracy, by correctly providing the answer for 4 out of 5 assigned problems.

3. All students in the class, given a slope and y-intercept will write the linear equation in slope-intercept form that corresponds to the given slope and intercept values, with 80% accuracy, by correctly providing the answer for 4 out of 5 assigned problems.

Advanced Preparation by Teacher:

The teacher should have the following:

1. An overhead graph transparency with the definitions of rate of change and slope;

2. An overhead graph transparency with the definitions of x-intercept and y-intercept;

3. An overhead graph transparency with an equation in slope-intercept form with a graph of the equation along with a football transparency reusable sticker; and,

4. An overhead projector with a graph transparency (Attached as Appendix A).

In addition, the students have been assigned to read pages 291 through 293 of their textbook. (ALGEBRA I (2004) Pearson Prentice Hall, Bellman, Bragg et. al.)

Procedure:

Introduction/Motivation:

In order to allow the students to have an active and physical role in examining **rate of change** and its related **slope**, I will revisit the slope demonstration from the previous lesson by having each student again lay their arms flat on their desks and have them move their hands off of their desks at an angle formed at their elbows, so that they can each experience the increase in the **rate of change** and **slope**. This will involve students with a spatial intelligence, as they are able to perceive the angular change, as well as those with strength in bodily-kinesthetic intelligence, as they are able to relate physically to the increasing **rate of change** and **slope**.

Next the students will be prompted to engage in a discussion regarding the meaning of the term “interception” and “intercept” as used in football or soccer. The discussion should be allowed to continue for 5 to 8 minutes, with redirection by the teacher if the conversation strays too far from the concept of “intercept” in athletics’ terms. This will assist students with spatial and bodily-kinesthetic intelligences to understand more fully the mathematical concept of intercept, as well as students with interpersonal intelligence strengths, who will most likely engage in the discussion.

Note: Be careful with this discussion. If not directed properly, it can easily become gender specific or be dominated by only a few students. Make sure that all students are engaged in the discussion.

Step-by-Step Plan:

The students will first participate in the demonstration and discussion set forth above. This will segue into an explanation of intercept in mathematical terms. The students will be shown the overhead of the graphed linear equation with the y-intercept denoted. The students will be asked to relate the intercept on the graph to what we just discussed regarding the term intercept. This will elicit responses in terms of **Bloom’s comprehension** and **analysis** levels. As the discussion develops, place a reusable football transparency sticker at the point of the y-intercept on the graph. This additional visual aid should help attach the memory of the discussion.

For the next two or three minutes, we will work on problems finding intercepts on graphs. This will be accomplished by simply drawing different lines on the graph transparency attached as Appendix A. The linear equations associated with the graphs need not be written at this time. The students will be prompted for assistance in solving the problems, which will address **Bloom's knowledge** and **comprehension** levels.

Present the overhead with the definitions of x-intercept and y-intercept and relate them to the graphs the students just worked with. If it is apparent that there is confusion, return to the graph overhead and continue working on intercepts returning to the definition overhead between examples.

Following this, graph the example of a line in slope intercept form from the textbook on the overhead ($y = -\frac{3}{4}x + 2$)*. Show how the number 2 is the intercept and the number $-\frac{3}{4}$ is the slope. Allow for student questions. Ask the students for equations of lines for you to graph, but be ready to modify them so that they actually fit on the graph with a visible intercept. If the students do not provide equations, the ones from the text can be used.

Finally, reverse the process and draw lines on the graph and have the students provide both the y-intercept and the slope through discussion. This will again address **Bloom's knowledge** and **comprehension** levels. When these numbers are provided place them in equations of the slope intercept form. Remember to use the football sticker as the students provide the number for the y-intercept value.

Closure:

At the close of the presentation, the students will be given the opportunity to ask any additional questions. Through directed questions to the students, assist them in summarizing how the concepts of slope and intercept were combined, so that each line had its own distinguishing characteristics. Also summarize how with knowledge of these two characteristics the students will be able to graph any corresponding line.

Assign problems 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 23 and 25 on page 294 of the text as class work/homework. Assist the students as needed in solving these problems during the remainder of the class period.

Adaptation/Enrichment (For ADHD student(s)):

With any ADHD student, attention, inactivity and focus will likely be problems. In order to alleviate this during the presentation, different students will be asked to assist in placing the football overlay on the transparency. This will be focused on any ADHD students in the class, although others should be included, so that the ADHD students have the opportunity to leave their seats

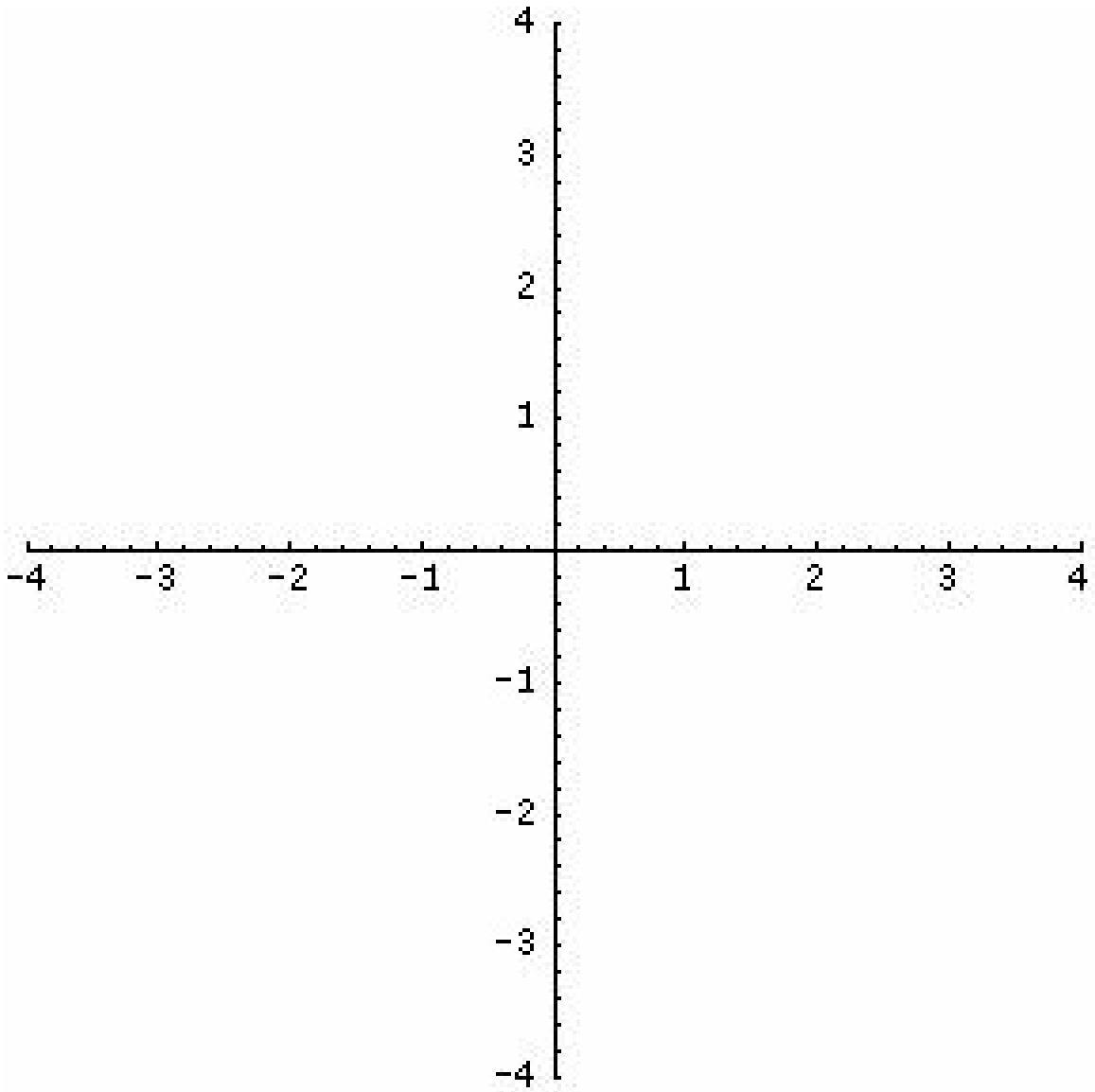
* $y = mx + b$, with m equal to the slope and b equal to the y-intercept.

and move through the classroom. This will provide for both some physical activity to expend excess energy, as well as an opportunity for the student to refocus on the task. In addition, by adapting the class in this way, the student will be given one-on-one instruction through the assistance of the instructor in providing a correct answer to the intercept question.

Finally, the opening of the presentation will elicit a variety of Gardner's Multiple Intelligences, making it much more likely that an ADHD student will be able to focus on the class room presentation.

Self-Reflection:

N/A



Appendix A

Lesson Plan 3