

Introducing MOM
The Mother of all Linear Equations

TABLE OF CONTENTS

Introducing MOM.....	1
The Mother of all Linear Equations.....	1
TABLE OF CONTENTS.....	2
Introduction.....	3
Mission Connection	3
Essential understandings.....	3
Objectives	3
Materials and Resources	3
Learning Activities.....	3
Initiation.....	3
Lesson Development.....	4
Student Activities.....	5
Closure	5
Reflection.....	5
Assessment based on Objectives	5
Accommodations and Differentiation.....	5
Learning Disabled:.....	5
Gifted and Talented:	5

Introduction

The following lesson plan will introduce a new form of a linear equation to students. They will be given a humorous acronym and anecdote in order to help facilitate retention.

Mission Connection

Our students will: develop core skills in:

(1.3.1) mathematics

(1.4.1) problem solving

Essential understandings.

To find slopes of lines and to derive the equation of a line through various methods given different data.

Write the Equation of a line in slope intercept form given only two points.

Objectives

Students will discover that the Point Slope form of a linear equation can be used to generate the Slope Intercept form of a linear equation given only two points on the line. Students will be able to write an equation of a line in slope-intercept form given the slope and one or two points.

Materials and Resources

Drill Transparency with two to three related problems for class work.

books Algebra II Glencoe.

Boards and markers

Text

White

Learning Activities

Initiation

Prior assessments have shown that the students have great difficulty with fractions. I routinely place a brief drill exercise on the overhead to help students reinforce their multiplication tables.

Use Drill transparency as a warm up for the lesson while attendance is taken. Following the drill and brief closure, a brief review of lesson 2-3, determining the slope of a line will take place. This will re-introduce the Point -slope formula, which will be the launching point of the lesson.

Lesson Development

The slope formula can be used to determine the slope of a line given two points on the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Demonstrate with points, (3,2) and (4, 3) and show graphically that the formula basically calculates the horizontal and vertical distances between the two points and provides a negative or positive vector for the direction of the line as well.

We have learned that if a function can be written in the form: $y = mx + b$, then it is a linear function and it is in the Slope Intercept form. Explain to students how the name of the form is derived from the fact that it contains the slope and the y intercept. Also explain the slope is represented by the variable “m” and the y-intercept by the variable “b”. Give a couple of examples.

The point slope form of the equation of a line.

Introduce a new and more powerful equation of the line. $y - y_1 = m(x - x_1)$, where (x_1, y_1) are coordinates of a point on the line and "m" is the slope of the line. Show how we can derive the equation of a line given the slope and one point location.

Use slope of 3 and point (5, 3) and calculate the equation of the line.

If all that is known is two points on a line how can we derive the equation of the line?

First: Use the Slope formula to determine the slope of the line given the two points.

Use the Point Slope form of the equation to determine the equation of the line and the y-intercept.

Finally, explain to students why you call the point slope form of an equation

“MOM”, “the mother of all linear equations”.

Since the Point Slope form of a linear equation begins with the derivation of the slope and the only other information available is the coordinates of a point, as the students follow through with the required operations to the solution they will realize that the end result of the use of the Point slope form of a line is more recognizable Slope Intercept form of the line thus the Mother of all linear equations,(the Point Slope form), gives birth to the Slope intercept form, and to top it off, since it has both an “x” and a “y”, it must be a boy!

Student Activities

Class whiteboard group activity Graph the line that goes through the point (3, 4) and has a slope of 2.

Write the equation of the line in Slope intercept form.

Find the slope of the line passing through the two points (2, 3) and (4, 5). Then using the Point Slope Form “MOM”, derive the equation of the line in Slope intercept form.

Use the whiteboards to promote an air of competition, perhaps invoking a timed response, and offering some reward incentives for the groups who arrive at the correct answers.

Closure

Reflection

What have we discovered?

We learned about a new and more powerful formula for the equation of a line.

Reflect on new knowledge as outline and achieved during this lesson. Basic questions posed to various individuals using a sweep technique.

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Assessment based on Objectives

Using exit ticket students will derive the equation of a line using the steps and methods outlined in the lesson. They will be required to show all work. IF time allows writing exercise could also be employed where the students would be required to explain the various steps to the derivation of the line.

Accommodations and Differentiation

Learning Disabled:

During class work I will be assisting those students who require special needs to help guide them in the activity. The students are grouped in a heterogeneously with a mix of higher achievers and those needing help.

Gifted and Talented:

Find equation of line passing through (-5, -1/2) and (6, -2)

Find equation of a line parallel to above line passing though point (-4, -7)