

21st Century Lesson Plan

Lesson Title: Coefficients and Rate of Change

Objectives:

- Students will understand that an equation's coefficient represents the rate of change.
- Students will be able to identify the rate of change from a table, graph, and equation.
- Students will use Desmos to graph equations.

Materials/Resources Needed:

- Attached worksheet (one copy per student)
- One laptop per group of 3-4 students

Launch:

- "Yesterday, we looked at a scenario in which three vans were traveling at different speeds. We looked at how those different speeds affected the table, equation, and graph for each van's distance over time."
- "Making graphs can be a lot of work, especially when trying to plot more than one set of data. Desmos is an online graphing tool that can make our work a lot quicker. It can help us spend our time on understanding concepts, rather than creating graphs by hand. We can see how changing different parts of an equation will affect what the line looks like."
- I will demonstrate how to create a graph on Desmos.

Explore:

- Students will be working in groups of 3 or 4 on the attached worksheet. The tables are already arranged this way, so they will not have to move seats. The worksheet is set up to scaffold the instruction, leading the students to conclude that the coefficient is the rate of change.
- To begin group work time, I will instruct one member from each group to get a laptop and begin the login process while the group works through questions 1 - 3.
- During group work time, I will be monitoring the students' progress and understanding. I will anticipate students having trouble with highlighting the coefficient in the equation $y = x$, as the coefficient is 1, and does not show up in the equation. I will guide the students to identify the coefficient by examining the pattern of change in the table.

Summary:

- Whole group discussion:
 - "Compare the tables for all four situations."
 - "Compare the graphs for all four situations."
 - "Compare the equations for all four situations."
 - "What is an equation that is steeper than the four situations you were given? Why is it steeper?"
 - "What is an equation that is less steep than the four situations you were given? Why is it less steep?"
 - "In an equation with the form $y = mx$, what does the value of m tell you?"
- Pass out exit ticket:
 - What is an equation that has a steeper line than $y = 10x$?
 - What is an equation that has a less steep line than $y = 10x$?
 - What is the equation that describes this table? Circle the rate of change in your equation.

x	0	1	2	3
y	0	8	16	24

All of the equations you explored yesterday have the form $y = mx$.

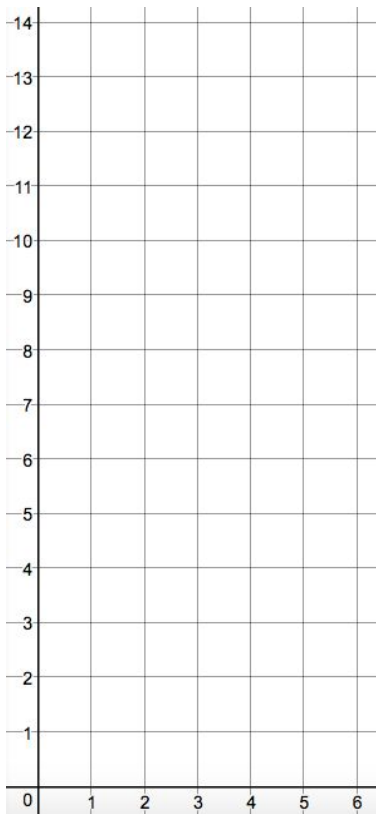
1. Complete the table of (x, y) values below.

x	0	1	2	3	4	5	6
$y = 2x$							
$y = 0.5x$							
$y = 1.5x$							
$y = x$							

2. Highlight m in each equation.

3. Explain the connection between the number m and the pattern in the table for each equation.

4. Graph each equation in Desmos. Then sketch the graph here.



5. Explain the connection between the number m and the pattern in the graph for each equation.

6. What is an equation in the form $y = mx$ that would be steeper than any of the four equations you have worked with so far today?

How do you know it would be steeper?

Put it in Desmos to make sure you are correct.

7. What is an equation in the form $y = mx$ that would be less steep than any of the four equations you have worked with so far today?

How do you know it would be less steep?

Put it in Desmos to make sure you are correct.

8. What happens when you change the value of m in an equation? Be specific.

What happens in the table?

What happens in the graph?