

Introduction

End of Vegas?¹

COMMON CORE STATE STANDARDS TARGETED:

[CCSS: 8EE.5B](#) - Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.

[CCMP: 3](#) – Construct viable arguments and critique the reasoning of others

LEARNING GOALS:

Students will understand/ be able to...

- Make connections between tables, graphs, and linear equations that represent the same rate.
- Compare and contrast different rates (i.e., which city uses more water per day per person).
- Identify where the slope changes within a graph.

EXPECTATIONS:

We will know we've accomplished our learning goals when students...

- Identify the equation, figure and graph that represent the same rate.
- Explain how an equation, figure, and graph are related to one another, how we know that they are representing the same information (i.e., where is the y-intercept in the equation? in the graph?).
- Interpret a graph, describing the slope and any change of slope.

Across tasks, students should be aware of the following expectations:

Work is accurate and precise:

- The problem is set up in a way that helps you solve it.
- Your responses use appropriate units.
- You have checked your work for calculation errors.

Student explanations:

- Describe what you did and why you did it.
- Use multiple representations to show your thinking about math.
- Include a logical argument and evidence to support each answer. It makes sense.

¹ **Inspiration for Task:** Inspiration for the End of Vegas task came primarily from the Lines and Linear Equations lesson developed by the Math Assessment Resource Services (MARS, 2012); see [link](#).

Facts on cities' water use came from:

[LA Times](#), [SF Gate](#), [LA Times](#)

Projections for Lake Mead going dry came from Bennett & Pierce (2007). [Online Library Wiley](#) and [Jeff Masters Colorado River Flow](#)

ESTIMATED TIME:

At least one 50 minute session. There are many points within the activity teachers may wish to discuss or expand upon with their students.

MATERIALS:

- PowerPoint slides
- Student worksheet
- Workout cards
- Answer sheet
- Scissors, glue sticks¹

WAYS TO MAKE THIS TASK MORE ACCESSIBLE FOR ALL LEARNERS:

- Some concepts within this task might be new to students (e.g., average water use *per person per day*, acre foot as a unit of measurement, the term *drought*). You may wish to take a moment to discuss them/ask students to explain in their own words what each concept means.
- You may want to read the water use facts a second time with your students or ask for a volunteer to put these facts into her/his own words:
- While not required, we encourage you to spend an additional 10-15 minutes during a later class providing feedback to students based on your analysis of their Final Lift work, before you begin the next task.

WAYS TO EXTEND THIS TASK:

- Ask students what they know about the current lack of water in the American Southwest/potential causes for the drought or what other real-world problems they would like to investigate using mathematical representations.
- Ask students to sketch additional graphs involving changes in slope based on real-life events. (e.g., [news, pictures, and video of the water pipe breaking at UCLA](#) may serve as inspiration for a discussion of a drastic change in the rate of water use)
- Ask students to consider “what if...” For example, what if Las Vegas cuts their water use in half next year? How would the slope change? Ask them to describe their prediction(s) using words, equations, and/or other representations.

¹ Students will be asked to cut-out the figure, graph and equation that represent LA's water use per day, per person and attach them to their Workout worksheet. If these materials are not available, students can circle the appropriate items instead.