

# Water Project

## Learning Goals



<b>Grade Band</b>	6 – 8
<b>Possible Math Tools</b>	<ul style="list-style-type: none"> <li>• Variables</li> <li>• Rates</li> <li>• Algebraic equations</li> <li>• Linear functions</li> <li>• Volume</li> <li>• Area</li> </ul>
<b>Real-World Context</b>	<p>Students divide into groups, and each group will <b>determine how much water Cortez Elementary would need in an emergency disaster</b>. Students may brainstorm one of many different modeling problems:</p> <ul style="list-style-type: none"> <li>• How much would the water cost?</li> <li>• How much space would it take up?</li> <li>• What's the best way to distribute the water?</li> <li>• How much water should we replenish the school with after the disaster?</li> </ul>
<b>Cross-Curricular Connections</b>	<p>Health and wellness – how much water is healthy to consume</p> <p>Biology – why do our bodies need water</p> <p>Earth Science – how natural disasters form</p> <p>Social Studies – history of disasters and how people respond</p>

### Relevant Common Core Standards:

#### CCSS.MATH.CONTENT.6.EE.A.2

Write, read, and evaluate expressions in which letters stand for numbers.

**Task: Write an expression about how much water people drink, consume, and use in a day.**

#### CCSS.MATH.CONTENT.6.RP.A.3.D

Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

**Task: Measure the amount of water in various bottles of water and locations with water using different measurement units. Then sum the total amount of water.**

#### CCSS.MATH.CONTENT.6.RP.A.1

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.

**Task: Determine the ratio of the amount of water needed per person.**

#### CCSS.MATH.CONTENT.7.RP.A.2.C

Represent proportional relationships by equations.

**Task: Write an equation that uses the information that the amount of water is proportional to the number of people.**

*This lesson was developed by Laura Pahler, Marcy Santos, Ralph Olaiz, Elizabeth Soto, and Vin Kanchana*

*Grant STEM-C-1441024*

*Last Edited Date: 27 July, 2017*

Template developed at



CCSS.MATH.CONTENT.7.EE.B.3

Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.

**Task: Determine a numerical approximation of the amount of water needed for an emergency disaster by doing research or experiments.**

CCSS.MATH.CONTENT.7.EE.B.4

Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

**Task: Assign variables to the number of people, the duration of the disaster, and/or the cost of water.**

CCSS.MATH.CONTENT.7.G.B.6

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

**Task: Measure the amount of space available to store water and then determine the best shape of container to store the water in.**

CCSS.MATH.CONTENT.8.F.A.1

Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.

**Task: Understand that the input is the number of people, duration of the disaster, and/or the cost of water, and the output in the total amount of water needed.**

CCSS.MATH.CONTENT.8.F.B.4

Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two  $(x, y)$  values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

**Task: Construct a function to model the linear relationship between the number of people and the total amount of water. Other function inputs such as space available to store water, the duration of the disaster, or the cost of water.**

CCSS.MATH.CONTENT.8.G.C.9

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

**Task: Use the formula for the volume of shapes to measure the amount of water certain activities need. Additionally, use the formula for the volume of shapes to find the best shape to store t**