

# Bucket of Trouble

Created by:  
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Fall 2015



## The Task

The ceiling of Betty's kitchen has a leak. She hears 10 drips of water in 15 seconds. She puts a bucket under the leak and frantically calls the plumber. The plumber can't be there for 5 hours. Will Betty need to empty the bucket? How much water will she waste?

## Big Ideas

- Estimation of weight and/or volume
- Calculation of weight and/or volume
- Measurement

### Standards of Learning for Grades 3-4-5

3.9 The student will estimate and use US Customary and metric units to measure

a) length b) liquid volume c) weight/mass d) area and perimeter.

4.6a The student will estimate and measure weight/mass.

5.8d The student will estimate and then measure to solve problems using US Customary and metric units.

### Standards of Learning for Grades 6-7-8

6.9 The student will make ballpark comparisons between measurements in US Customary System and metric system.

6.10 The student will describe and determine the volume of a rectangular prism.

7.4 The student will solve multistep practical problems, using proportional reasoning.

7.5b The student will solve practical problems involving the volume of rectangular prisms.

8.3a The student will solve practical problems involving rational numbers, percents, ratios, and proportions.

8.7a The student will investigate and solve practical problems involving volume of prisms.

### **Process Goals**

- Problem Solving and Reasoning – Students will apply rate, volume, and estimation skills and the relationships between them to determine if a bucket will overflow in five hours given that the bucket is being filled at the rate of 10 drips per 15 seconds.
- Connections and Representations – Students will recognize and use mathematical connections to extend or generalize patterns. Students will use abstract or symbolic representation to record and their findings and solve the problem.
- Communication – Students will justify their findings and present their results to the class with precise mathematical language.

### **Related Task – Birthday Balloon Bash**

Mr. Al Gebra's class wanted to surprise him on his birthday by filling his classroom with balloons. How many balloons did they need?

### **Related Task – Million Dollar Question**

Your friend has sent you a text saying you can become a millionaire! He tells you that he won \$2 million in a contest. The money was sent to him in two suitcases, each containing \$1 million in one-dollar bills. He will give you one suitcase of money if you can go to the airport and pick up both suitcases. Is it possible that you could get the suitcases at the airport and get them home?

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## Lesson Plan



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#### Materials

- The task
- Bucket (gallon)
- Eye dropper
- Water
- Timer
- One large presentation paper per group

#### Facilitating Task

- Class will be divided into groups of 3-4 students.
- Read the task together and answer clarifying questions.
- Groups will be given materials upon request.
- Give students individual think time and then work together in groups.
- Groups present findings during last 10-15 minutes of class.

#### Misconceptions

- One drop of water is negligible
- What measure of time should be used
- What measure of volume should be used

#### Suggested Prompts or Questions

- What is the volume of 10 drops of water? Does it fill a cup?
- How many seconds in a minute? How many minutes in an hour?
- How many cups in a gallon?

## Bucket of Trouble



Name \_\_\_\_\_

Date \_\_\_\_\_

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Answer the question using pictures, words, tables, graphs, and/or symbols.