

# Measuring Capacity

NCTM Standards 1, 4, 6, 7, 8, 9, 10  
Common Core State Standards 3.MD 2

## Lesson Planner

### STUDENT OBJECTIVE

- To estimate and measure liquid volume in liters

## 2 Teach and Practice

### MATERIALS

**A** Measuring with Cups, Pints, Quarts, and Gallons (TG pp. 1018–1019)

Extended Activity

**A-1** Measuring with Liters (CCRG p. CC 33)

**B** Comparing Capacities (TG p. 1020)

**C** Measuring Capacity (TG p. 1021)

- a 1-liter container
- a 1-quart container
- water
- 3–6 containers of different sizes

## Lesson Notes

Activity A-1 has been added to **Lesson 13.6**. Use Activity A-1 after Activity A and before Activity B.

### About the Activity

In Activity A-1, students are introduced to the liter. Then, students estimate and measure liquid volumes in liters.

## 2 Teach and Practice

### A-1 Measuring with Liters

small groups



20  
MIN

**Purpose** To estimate and measure liquid volumes in liters

**Introduce** Discuss the term *liter* with students. If students are familiar with the term, ask them to describe where they have seen or heard it. Some students may have seen the term on a soda-bottle label, while others might have heard it in science class.

Show students a 1-liter bottle, and explain that 1 liter of water fills this bottle. Show students a 1-quart container. Tell them that 1 quart of water fills this container. Fill the quart container with water and pour it into the 1-liter bottle.

#### Materials

- For the teacher: a 1-liter bottle, a 1-quart container, water, 3–6 containers of different sizes

NCTM Standards 1, 4, 6, 7, 8, 9, 10  
CCSS 3.MD 2

#### Talk Math

- ❓ Does the water from the 1-quart container fill the 1-liter bottle?  
Explain. Possible answer: Almost. It comes very close to the top of the 1-liter bottle.
- ❓ What unit of measure is almost the same as a liter? A quart

**Task** Students will estimate and measure liquid volumes in liters. Fill the 1-liter bottle with water and ask students to think about the amount of water in the 1-liter bottle. Show students 3 to 6 containers of different sizes such as a fishbowl, a pail, and a coffee mug. Ask students to estimate how many liters of water you need to fill each container. Sort the containers into the following groups based on students' estimates: more than 1 liter, less than 1 liter, and about 1 liter. Pour water into each container to check students' estimates. You may want to perform this part of the activity yourself or choose a student to assist you.

#### Talk Math

- ❓ How can you tell how many liters fill each container? You can count the number of times you pour all of the water out of the 1-liter bottle and into the container.

# Addition and Subtraction Situations

NCTM Standards 1, 2, 4, 6, 7, 8, 9, 10  
Common Core State Standards 3.OA.8

## Lesson Planner

### STUDENT OBJECTIVES

- To solve two-step word problems using the four operations
- To represent these problems using equations with a letter standing for the unknown quantity

## 2 Teach and Practice

### MATERIALS

**A Exploring Situations** (TG p. 1100–1101)

**B Addition and Subtraction Situations**  
(TG p. 1102)

**C Playing a Game: *Least to Greatest***  
(TG p. 1103–1104)

Added  
Activity

**D Writing Equations With Letters for the Unknown Quantity** (CCRG p. CC 35)

## Lesson Notes

Activity D has been added to **Lesson 14.6**. Use Activity D after students have completed Activity C. Alternatively, you can use Activity D before students complete the LAB pages, so that they have an opportunity to use this strategy to solve the problems.

## About the Activity

Activity D has students solve a two-step word problem by writing an equation with a letter standing for the unknown quantity. Students have seen letters used to represent numbers in **Lesson 6.2**.

## 2 Teach and Practice

### D Writing Equations With Letters for the Unknown Quantity

whole class



15 MIN

**Purpose** To write equations with a letter standing for an unknown quantity when solving two-step word problems

**Introduce** Write the following word problem on the board:

Casey has 153 football cards and 238 baseball cards. He gives 78 of his cards to Sam. How many cards does Casey have now?

**Task** Discuss with students the first step in solving this problem. Students should say that the first step is to find the total number of cards that Casey has. Write a sentence on the board that shows how to find the total number of cards, such as the one below.

*Football cards + baseball cards = Total cards*

Prompt students to identify the quantities they know. Write a number sentence on the board that shows the known quantities.

*153 + 238 = Total cards*

#### Talk Math

- 1 Why weren't the words 'total cards' replaced with a number? Possible answer: Because the problem doesn't give us that number.
- 2 Since the problem doesn't tell you the total number of cards, how can you write a number sentence for this situation? Possible answer: You could use a box or a question mark to stand for 'Total cards.'

You may wish to write number sentences that use students' suggestions on the board, for example,  $153 + 238 = ?$  or  $153 + 238 + \square$

Tell students that instead of words, an empty box, or a question mark, a letter can stand for the unknown quantity in a number sentence. Write a number sentence with a  $t$  standing for the total number of cards, such as the one below.

*153 + 238 = t*

#### Talk Math

- 1 What is the value of  $t$ ? Explain how you know. Possible answer:  $t = 391$ ; I added 153 and 238.

Ask students to identify the second step of the word problem. Students should say that the second step is finding the number of cards that Casey has left. Invite volunteers to the board to write number sentences for the second step of this problem. Have students follow the same sequence as above, writing first a sentence with words, then filling in the known quantities, and finally, using a letter to stand for the unknown quantity.

NCTM Standards 1, 2, 4, 6, 7, 8, 9, 10  
CCSS 3.OA 8

#### Ongoing Assessment

- Can students identify the steps needed to solve the problem?
- Do students know what the letter stands for in each step?