



GRADE 4 SUPPLEMENT

Set D3 Measurement: Capacity in Metric Units

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Skills & Concepts

- ★ estimate and measure capacity in metric units
- ★ carry out simple conversions within a system of measurement, such as milliliters to liters

Bridges in Mathematics Grade 4 Supplement

Set D3 Measurement: Capacity In Metric Units

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Bridges in Mathematics is a standards-based K–5 curriculum that provides a unique blend of concept development and skills practice in the context of problem solving. It incorporates the Number Corner, a collection of daily skill-building activities for students.

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Set D3 ★ Activity 1



ACTIVITY

Estimate, Order & Measure Milliliters & Liters

Overview

Students estimate the capacity of 6 different containers, ordering them from least to most capacity. Then they determine the actual capacities to check their estimates. This activity is designed for use by student pairs during Work Places or other work periods.

Skills & Concepts

- ★ estimate and measure capacity in metric units
- ★ carry out simple conversations within a system of measurement, such as milliliters to liters

You'll need

- ★ Estimate, Order & Measure Instructions (page D3.3, run 1 copy)
- ★ Estimate, Order & Measure Record Sheet (page D3.4, run a class set)
- ★ 6 plastic containers (see Advance Preparation)
- ★ 1-cup liquid measuring cup (see Advance Preparation)
- ★ pitcher to hold about 2 liters of water
- ★ cafeteria tray
- ★ towel

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Advance Preparation Gather 6 plastic containers of varying capacity (e.g., margarine, yogurt, peanut butter, cream cheese containers, kids' cups from restaurants, and so on). If any of these are already marked with their capacity, black it out with a permanent marker. Label each container with an alphabet letter, A–F. Find the 1-cup measure that came with your Number Corner materials. If you haven't done so already, use the Calibration Strip on Number Corner Black-line 7.5 to calibrate the cup in increments of 10 milliliters. Place the containers, measuring cup, and pitcher of water on a cafeteria tray. Set up the tray, towel, activity instructions, and record sheets in a location somewhere in the classroom where pairs of students can work independently over the next few weeks as time allows.

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Instructions for Estimate, Order & Measure: Milliliters & Liters

1. Explain that you've set up some materials to give students practice estimating and measuring capacity in metric units. Review the terms *capacity*, *milliliter*, and *liter* with the class.

Activity 1 Estimate, Order & Measure (cont.)

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Note *If you've done the March Calendar Collector with your class, students will already be familiar with milliliters. If not, pass the measuring cup to a volunteer and ask her to find the mark on the cup that shows 200 milliliters. How does this mark compare with the mark on the other side that shows 1 cup? If students are unfamiliar with metric units of capacity, it may help them to see that 200 milliliters is a little less than 1 cup, while the 250 milliliter mark near the very top of the measuring cup is just a little over 1 cup. Review the fact that there are 4 cups in a quart and 1000 milliliters in a liter. Because 250 milliliters is just a little more than a cup, a liter is a little more than a quart.*

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2. Show students a copy of the Estimate, Order & Measure instructions and record sheet. Review the instructions with the class, and model the procedure of estimating and measuring as needed. Let students know where to find the materials and explain that they'll be working in pairs to do this activity. Explain how they'll know when it's their turn, and establish any ground rules for using the materials, turning in their work, and so on.

Estimate, Order & Measure Instructions

To do this activity, you'll need

- ★ Activity Instructions
- ★ Estimate, Order & Measure Milliliters & Liters Record Sheet
- ★ 6 plastic containers labeled with letters A–F
- ★ pitcher
- ★ 1-cup measuring cup
- ★ towel

Instructions for Estimate, Order & Measure: Milliliters & Liters

- 1** Record your name and the date at the top of a record sheet. Choose a partner to work with. You'll both fill out your own record sheets for this activity.
- 2** Look at the 6 containers. Put them in the order you think they belong, from smallest to largest. Record your predictions.
- 3** Go to the sink with your partner and carefully measure 1–2 liters of water into the pitcher.
- 4** Estimate the capacity of Container A in milliliters or liters. (Remember that there are 1,000 milliliters in a liter, and the measuring cup holds 250 milliliters.) Record your estimate.
- 5** Use the water and the measuring cup to find out how much water Container A actually holds (to the nearest 10 milliliters). Record the actual capacity.
- 6** Find the difference between your estimate and the actual capacity. Record the difference in the last column.
- 7** Continue estimating, finding the capacity, and finding the difference for the other 5 containers. Use what you know about the capacity of the first container to help make your estimates.
- 8** When you've found out how much each container actually holds, put them in order from smallest to largest, and record their actual ranking.
- 9** Clean up. After you finish the activity, return all the water to the pitcher and empty the pitcher in the sink. Wipe down the table surface and clear any spills on the floor. Mix up the 6 containers so they're out of order and ready for the next pair of students.

NAME _____

DATE _____

Estimate, Order & Measure Record Sheet

Put the containers in the order you think they belong, from smallest to largest. Record your predictions. Then do the second part of the sheet. After you find out how much water each container holds, fill in the second row on this chart to show their actual order.

	1st smallest	2nd	3rd	4th	5th	6th largest
Estimate						
Actual Rank						

Container	Your estimate (to the nearest 10mL)	Actual Measurement (to the nearest 10mL)	The Difference (to the nearest 10mL)
A			
B			
C			
D			
E			
F			

Set D3 ★ Activity 2



ACTIVITY

Which Container is Best?

Overview

Students estimate which beverage containers are most likely to hold certain amounts of water. Then they test their ideas to find the best containers for several different situations. This activity is designed for use by student pairs during Work Places or other work periods.

Skills & Concepts

- ★ estimate and measure capacity in metric units
- ★ carry out simple conversations within a system of measurement, such as milliliters to liters

You'll need

- ★ Which Container is Best? Record Sheets (pages D3.7 and D3.8, run a class set)
- ★ an assortment of 8 or more beverage containers (see Advance Preparation)
- ★ 1-cup liquid measuring cup (see Advance Preparation)
- ★ pitcher to hold about 2 liters of water
- ★ cafeteria tray
- ★ towel

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Advance Preparation Gather 8 or more beverage containers of varying capacity (e.g., pop can, water bottles of various sizes, small children's cup, drink containers from restaurants including an extra large or "super" size, and so on). Label each container with an alphabet letter. Find the 1-cup measure that came with your Number Corner materials. If you haven't done so already, use the Calibration Strip on Number Corner Blackline 7.5 to calibrate the cup in increments of 10 milliliters. Place the containers, measuring cup, and pitcher of water on a cafeteria tray. Set up the tray, towel, and Record Sheets in a location somewhere in the classroom where pairs of students can work independently over the next few weeks as time allows.

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Instructions for Which Container is Best?

1. Explain that you've set up some materials to give students more practice estimating and measuring capacity in metric units. Show them a copy of the Which Container is Best? Record Sheets. Review the instructions on the sheet with the class, and model the procedure of estimating and measuring as needed.
2. Let students know where to find the materials and explain that they'll be working in pairs to do this activity. Explain how they'll know when it's their turn, and establish any ground rules for using the materials, turning in their work, and so on.

Activity 2 Which Container is Best? (cont.)



INDEPENDENT WORKSHEET

See Set D3 Independent Worksheet 1 for more practice estimating and measuring capacity in metric units.

NAME _____

DATE _____

Which Container Is Best? Record Sheet page 1 of 2

Directions

- a** Record your name and the date at the top of the record sheet. Choose a partner to work with. You'll both fill out your own record sheets for this activity.
- b** For each problem below:
- estimate and record which containers you think will hold the amount of water needed. (It's okay if you choose more than one container that might work.)
 - test your estimates using the liquid measuring cup.
 - decide which beverage container actually works best.
 - record your recommendation.
- c** Clean up. After you finish the activity, return all the water to the pitcher. Wipe down the table surface and clean up any spills on the floor.

Problems

Sarah needs to bring some water for several different activities this week. Help her choose the best container for each activity.

1 For a car trip to her grandma's on Monday, Sarah needs to bring about 500 milliliters of water to drink.

a Estimate: Which of the containers look like they would hold about 500 milliliters?

b Use the liquid measuring cup to help you find the drink container that would work best for the car trip.

c Container _____ holds about 500 milliliters.

2 For ballet class on Wednesday, Sarah needs to bring about 800 milliliters of water to drink.

a Estimate: Which of the containers look like they would hold about 800 milliliters? Are there any two containers that look like they would hold 800 milliliters combined?

b Use the liquid measuring cup to help you find the drink container (or pair of containers) that would work best for ballet class.

c Container(s) _____ hold(s) about 800 milliliters.

Which Container Is Best? Record Sheet page 2 of 2

3 For her track meet on Saturday, Sarah needs to bring about a liter of water to drink.

a Estimate: Which of the containers look like they would hold about 1 liter? Are there any combinations of 2 or more containers that might hold 1 liter?

b Use the liquid measuring cup to help you find the drink container (or combination of containers) that would work best for the track meet.

c Container(s) _____ hold(s) about 1 liter.



CHALLENGE

4 On the way home from track meets, Sarah always buys a 2-liter bottle of juice. How many total milliliters of juice is she drinking if there are 6 track meets this season?

NAME _____

DATE _____

Set D3 ★ Independent Worksheet 1



INDEPENDENT WORKSHEET

Capacity in Daily Life

1 Javier brought a thermos of tomato soup for lunch. He estimates that he brought about $\frac{3}{4}$ of a liter. His friend insists he brought about $\frac{3}{4}$ of a milliliter. Who is correct? Why? You may use measuring tools from your classroom to help you, if needed. Explain your answer using numbers, pictures, and/or words.

2 Julene is making fruit punch for her scout troupe. There are 10 girls in the troupe and each one will have at least 1 glass of punch. Should she use 2 milliliters, 2 liters, 20 liters, or 200 liters of water? Why? You may use measuring tools from your classroom to help you, if needed. Explain your answer using numbers, pictures, and/or words.

