On Core Lessons
for Common Core Math

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Promethean

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Using the Whiteboard Use the table of contents to go to specific sections of the lesson, or, tap **Next** to go to the first section of the lesson.

Teaching the Math Discuss the *Essential Question* with students: How can you use models to compare customary units of liquid volume?

Common Core Standards for Mathematical Content

CC.4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table.

Common Core Standards for Mathematical Practice

CC.K–12.MP.2 Reason abstractly and quantitatively.

CC.K–12.MP.3 Construct viable arguments and critique the reasoning of others.

Navigating the *SMART Notebook* file

	**Home**	Return to the Main Menu.		**Example**	View a sample problem.
	**Teacher Notes**	Open the Teacher Notes PDF.		**Answer**	Show the correct answer to a problem.
	**Previous**	Go to the previous page.		**Try Another**	Generate another problem for extra practice.
	**Next**	Go to the next page.		***SMART Response* Question**	Indicates the question is compatible with a *SMART Response* interactive Response system.
	**Action Arrow**	Reveal hidden content.			
	**Try This**	Reveal additional problems. Tap again to return to the previous page.		**Workspace**	Reveal additional content for the activity. Tap again to return to the previous page.

Tips

Clear or reset the screen To reset the screen, tap **Edit > Reset Page** or tap the **Reset Page** button if it is on the toolbar.

Add tools and functions to your *SMART Notebook* toolbar or floating palette
Tap the **Customize** button in the toolbar or floating palette, and then drag the tool to the toolbar or floating palette.

Using the Whiteboard

- Discuss the problem with students.
- Pull out the Definition tab to view the definition of *liquid volume*.
- Tap the **Action Arrow** to reveal a model.
- Tap **Math Talk** to reveal a discussion question.

Teaching the Math

Define liquid volume as the amount of space a liquid occupies. Discuss the model and how it shows the relationships among gallons, half gallons, quarts, pints, cups, and fluid ounces.

Ask: How are fluid ounces different from ounces? Possible answer: an ounce is a customary unit used to measure weight; a fluid ounce is a customary unit used to measure liquid volume.

Use **Math Talk** to help students recognize a pattern in the units of liquid volume.

Answer Key

Math Talk

Possible description: going from cups to gallons, each unit is 2 times as much as the next smaller unit.

Using the Whiteboard

- Discuss the problem with students.
- Tap the first **Action Arrow** to reveal Step 1.
- Have a volunteer use the **Pen** to draw the model.
- Tap the second **Action Arrow** to reveal Step 2.
- Ask the student to use the **Highlighter Tool** to shade the model.
- Tap the third **Action Arrow** to reveal Step 3.
- Ask a student to use the **Pen** to complete the sentence.

Teaching the Math

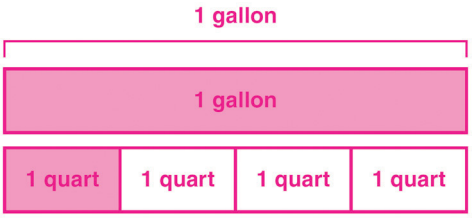
Work through the example with the class.

Ask: In Step 1, why do you draw two bars the same length? Possible answer: because you need to show the relationship between the two units

Ask: How do you know how to show the number of quarts in the bar? Possible answer: 4 quarts are in 1 gallon, so divide the bar for quarts into 4 equal parts. Each part represents 1 quart.

Ask: How can you compare the size of a half gallon to the size of 1 quart? Possible answer: if I mark the halfway point on the bar for 1 gallon, I can see that a half gallon is 2 times as much as 1 quart.

Answer Key



So, 1 gallon is 4 times as much as 1 quart.

Using the Whiteboard

- Pull out the Problem tab and read the problem to the students.
- Review Step 1 and the model.
- Have a volunteer use the **Eraser** to reveal the complete equations.

Teaching the Math

Read and discuss the problem with the class.

Ask: What information do you know? Serena needs to make 3 gallons of lemonade. She has a powder mix that makes 350 fluid ounces of lemonade.

Ask: What are you trying to find? if Serena has enough powder mix

Answer Key

1 gallon = 16 cups

1 cup = 8 fluid ounces

1 gallon = 16 cups × 8 fluid ounces

1 gallon = 128 fluid ounces

Using the Whiteboard

- Pull out the Problem tab and discuss the problem with students.
- Tap **Think** to reveal helpful text.
- Ask a student to use the **Pen** to complete the equations.
- Ask another student to use the **Pen** to complete the table.
- Tap the first **Action Arrow** to reveal Step 3.
- Tap **Think** to reveal the helpful text.
- Ask a student to use the **Pen** to write his or her answers in the space provided.
- Tap the second **Action Arrow** to reveal concluding sentences.
- Ask another student to use the **Pen** to complete the sentences.

Teaching the Math

Ask: How can you solve the problem? Possible answer: I can compare 3 gallons and 350 fluid ounces by writing 3 gallons as fluid ounces.

Ask: Why do you change the larger unit, gallons, to a smaller unit, fluid ounces? Possible answer: I need to compare the measurements using the same measurement unit. From the model, I know 1 gallon is 16 times as much as 1 cup and there are 8 fluid ounces in 1 cup. I can find how many fluid ounces are in 1 gallon by multiplying 16 cups $\times$ 8 fluid ounces, which is 128 fluid ounces. Then I can relate gallons to fluid ounces using a table, so I can compare ounces to ounces.

Answer Key

Gallons	Fluid Ounces
1	128
2	**256**
3	**384**

1 gallon = 128 fluid ounces

2 gallons $\times$ 128 = 256 fluid ounces

3 gallons $\times$ 128 = 384 fluid ounces

350 fluid ounces $<$ 384 fluid ounces

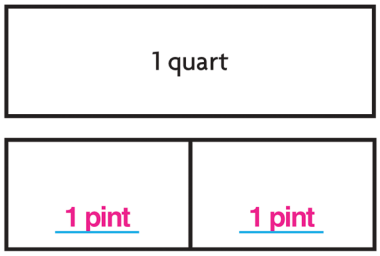
350 fluid ounces is less than 3 gallons.

So, Serena does not have enough mix to make 3 gallons of lemonade.

Using the Whiteboard

- Discuss the problem with students.
- Tap the **Action Arrow** to reveal the model.
- Ask a volunteer to place the correct unit from the dispenser to complete the model and sentence.

Answer Key



1 quart is 2 times as much as 1 pint.

Using the Whiteboard

- Discuss the problem with students.
- Ask students to solve the problem.
- If available, have students use their *SMART Response* remotes to answer.
- If installed, click the *SMART* Response tab, and then start the question to begin voting.
- A volunteer may also use the **Pen** to write the answer on the line.
- Tap the first **Action Arrow** to reveal another problem.
- Ask a volunteer to use the **Pen** to complete the problem.
- Tap the second **Action Arrow** to reveal another problem.
- Ask a different volunteer to use the **Pen** to complete the problem.
- Tap the third **Action Arrow** to reveal a final problem.
- Ask another volunteer to use the **Pen** to complete the problem.

Answer Key

4 gallons = 32 pints

2 gallons (=) 32 cups

4 pints (>) 6 cups

5 quarts (<) 11 pints

Using the Whiteboard

- Read the question to the students.
- Ask students to solve the problem.
- If available, have students use their *SMART Response* remotes to answer.
- If installed, click the *SMART* Response tab, and then start the question to begin voting.
- Students may also use the **Pen** to circle the answer.
- Tap **Answer** to reveal the correct answer.

Teaching the Math

Test Prep Coach

In the Test Prep exercise, if students selected:

A) They chose the number of cups in 1 quart.

B) They doubled the number of quarts.

D) They multiplied the number of quarts by 8 instead of 4.

Answer Key

C) 20 cups

Using the Whiteboard

- Discuss the question with students.
- Ask a volunteer to use the **Pen** to address the first statement in the space provided.
- Ask another volunteer to use the **Pen** to address the second statement in the space provided.

Teaching the Math

This problem requires students to explain which statement makes sense and which one is nonsense.

Ask: How can you use a bar model to find the number of pints in a fraction of a gallon? Possible answer: use the bar model to show the relationship between 1 gallon and pints. Shade to show the fraction of the gallon. Find the number of pints in the fraction of the gallon.

Answer Key

Zach's statement is nonsense.

There are 8 pints in a gallon, not 4, so a pint cannot be $\frac{1}{4}$ of a gallon.

Angela's statement makes sense.

A gallon is 8 times as much as a pint, so 1 pint is $\frac{1}{8}$ of a gallon.

Using the Whiteboard

- Read aloud the *Essential Question*: How can you use models to compare customary units of liquid volume?
- Instruct a volunteer to use the **Pen** to write his or her answer.
- Pull out the Answer tab to reveal a possible answer.

Answer Key

Essential Question

Possible answer: I can use models, such as bars or a table, to show the relationship between the units being compared.

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