Volume & Capacity Conversions

Purpose In this activity, students learn how measurement sizes relate to each other. In other words, what does "1 gallon = 4 quarts" mean? This understanding is a pre-requisite for understanding why conversions are needed (4.8B), which is the focus of this activity.

The word problems in this activity ask students to perform a conversion. While conversion problems are often fairly boring, considerable effort has been made to write problems using a context that will be interesting to 4th graders.

Note: The SE 4.8B says that students are to be given the equivalent measures in table form. This is a great way to start conversions as the mathematical relationships are much easier to see in a table than in an equation.

☐ Teacher-facilitated w/ Small Student Groups	☑ Tutoring/Intervention	☐ Journal
☑ Small Group	☑ Centers	☐ Anchor chart

Setting Up For Instruction

☐ Make 1 single-sided copy of **Amazing Body: Volume & Capacity** (PG. 31–33) for every pair of students.

☐ Other materials:

- ☐ **Scissors**
- ☐ **Glue**
- ☐ **Construction paper**

Thought Extenders

- What are the units in the problem?
- What are two ways to say the units? (Ex. There are 8 ounces in a cup; 1 cup is 8 ounces.)
- What is the problem asking you to do?
- How are the units related?
- Are you changing from a larger unit to a smaller unit or a smaller unit to a larger unit?
- When you are changing from a larger unit to a smaller one, is the larger unit being chopped up into smaller pieces or grouped into larger pieces? Does this mean that you multiply or divide?
- When you are changing from a smaller unit to a larger one, is the smaller unit being chopped up into smaller pieces or grouped into larger pieces? Does this mean that you multiply or divide?

How-To Guide

1. Place students in groups of 3–4 and hand out materials.
2. Ask students to find the cards that show the problems. Students should discuss the relationship shown in each problem.
3. Then they should find the card with the units that match the problem.
4. Finally, they match the other cards that have the same numerical relationship as the units do to make a table.
5. Students should glue the problems and tables to the construction paper.

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AMAZING BODY: VOLUME & CAPACITY ANSWER KEY (PG. 1 OF 3)

Directions: Cut out the cards. Write the labels for each Input and Output. Create tables and fill in the numerical expressions. Glue the tables on construction paper. Write the answers to the questions below the tables. Then cut out the journal question, glue it on the construction paper and answer it.

Human blood vessels hold about 4 L of blood. How many milliliters of blood do human blood vessels hold? 4,000 mL	An adult's stomach can hold about 6 cups of soft drink. Can it hold a 40-ounce drink? Yes
Spit glands produce about 3 pints of spit per day. Ketchup packets hold about 1 ounce of ketchup. How many ketchup packets could the spit fill? 48 ketchup packets	The human stomach absorbs about 16 ounces each hour. How many cups does it absorb over 24 hours? 48 cups
Human stomachs expand when they eat. The stomach can hold about 4 quarts of food. Can it hold 8 pints of milk? Yes	When you give blood, you give about 1 pint of blood. You can give blood about 6 times per year. How many ounces can you give over a year? 94 ounces
The human heart pumps 2,000 gallons of blood a day. How many quarts does the heart pump each day? 8,000 quarts	The human foot can produce a pint of sweat a day. How many fluid ounces is that? (See why you need to wear clean socks?) 16 ounces

Input Liters	Numerical Expression	Output Milliliters
1	× 1000	1,000
2	× 1000	2,000
4	× 1000	4,000

Input Cups	Numerical Expression	Output Ounces
1	× 8	8
3	× 8	24
6	× 8	48

Input Pints	Numerical Expression	Output Ounce
1	× 16	16
2	× 16	32
3	× 16	48

Input Ounces	Numerical Expression	Output Lookout Points
8	÷ 8	1
16	÷ 8	2
64	÷ 8	8

Input Quarts	Numerical Expression	Output Pints
1	× 2	2
3	× 2	6
4	× 2	8
1,000	× 4	4,000
2,000	× 4	8,000

Input Pints	Numerical Expression	Output Ounces
1	× 16	16
2	× 16	32
6	× 16	96
1	× 16	16
2	× 16	32
3	× 16	48

Input Gallons	Numerical Expression	Output Quarts
1	× 4	1

Input Pint	Numerical Expression	Output Fluid Ounces

How could you tell which cards had the same relationship as the units in the problem?

 Name: _____

Directions: Cut out the cards. Write the labels for each Input and Output. Create tables and fill in the numerical expressions. Glue the tables on construction paper. Write the answers to the questions below the tables. Then cut out the journal question, glue it on the construction paper and answer it.

Human blood vessels hold about 4 L of blood. How many milliliters of blood do human blood vessels hold?	An adult's stomach can hold about 6 cups of soft drink. Can it hold a 40-ounce drink?
Spit glands produce about 3 pints of spit per day. Ketchup packets hold about 1 ounce of ketchup. How many ketchup packets could the spit fill?	The human stomach absorbs about 16 ounces each hour. How many cups does it absorb over 24 hours?
Human stomachs expand when they eat. The stomach can hold about 4 quarts of food. Can it hold 8 pints of milk?	When you give blood, you give about 1 pint of blood. You can give blood about 6 times per year. How many ounces can you give over a year?
The human heart pumps 2,000 gallons of blood a day. How many quarts does the heart pump each day?	The human foot can produce a pint of sweat a day. How many fluid ounces is that? (See why you need to wear clean socks?)

Name: _____

Input _____	Numerical Expression	Output _____
1		1,000
2		2,000
4		4,000

Input _____	Numerical Expression	Output _____
1		8
3		24
6		48

Input _____	Numerical Expression	Output _____
1		16
2		32
3		48

Input _____	Numerical Expression	Output _____
8		1
16		2
64		8

 Name: _____

Input _____	Numerical Expression	Output _____
1		2
3		6
4		8

Input _____	Numerical Expression	Output _____
1		16
2		32
6		96

Input _____	Numerical Expression	Output _____
1		1
1,000		4,000
2,000		8,000

Input _____	Numerical Expression	Output _____
1		16
2		32
3		48

How could you tell which cards had the same relationship as the units in the problem?