Module 5 - Lesson 21:

Relate volumes of solids and liquid volume.

CCSS Standard – 5.MD.C.3 / 5.MD.C.3.a / 5.MD.C.3.b

FLUENCY (10-min) **Beep Counting by 5 Tenths by 9 Tenths**

Listen carefully as I count by 5 tenths or 9 tenths. I will replace one of the numbers with the word beep. Raise your hand when you know the beep number. Ready?

$0, 0.5, \_\_\_\_\_$ $2.5, \_\_\_\_\_, 3.5$ $2.5, 2.0, \_\_\_\_\_$

$5.0, \_\_\_\_\_, 4.0$ $0, 0.9, \_\_\_\_\_$ $4.5, \_\_\_\_\_, 6.3$

$4.5, 3.6, \_\_\_\_\_$ $9.0, \_\_\_\_\_, 7.2$

FLUENCY (10-min) **Match: Equivalent Expressions**

LEARN book pages 205 – 207.
Identify equivalent expressions and create equations to build fluency with adding and subtracting mixed numbers with unlike units.

$1\frac{1}{3}+3\frac{2}{9}$	$1\frac{3}{9}+3\frac{2}{9}$
$1\frac{2}{3}+3\frac{2}{9}$	$1\frac{6}{9}+3\frac{2}{9}$
$2\frac{1}{2}-1\frac{1}{8}$	$2\frac{4}{8}-1\frac{1}{8}$
$2\frac{1}{2}-1\frac{3}{8}$	$2\frac{4}{8}-1\frac{3}{8}$

$7\frac{2}{3}+5\frac{3}{4}$	$7\frac{8}{12}+5\frac{9}{12}$
$7\frac{3}{4}+5\frac{1}{6}$	$7\frac{9}{12}+5\frac{2}{12}$
$2\frac{4}{8}-1\frac{1}{2}$	$\frac{\ }{\ }-\frac{\ }{\ }$
$7\frac{3}{4}+5\frac{9}{12}$	$\frac{\ }{\ }+\frac{\ }{\ }$

TASK:
- Lay out all cards faceup.
- Match cards that show two equivalent expressions. **(Note: two cards do not have matches).**
- Lay each set of matched cards side by side. Form an equation by placing an equal sign between equal expressions.
- Continue until all but two cards are matched.

$1\frac{1}{3}+3\frac{2}{9}$ = $1\frac{3}{9}+3\frac{2}{9}$

$4\frac{5}{9}$ $4\frac{5}{9}$

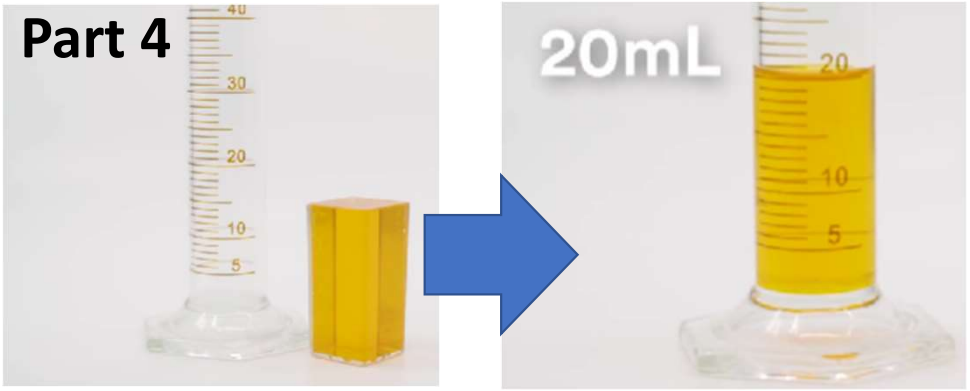
$7\frac{2}{3}+5\frac{3}{4}$ = $7\frac{8}{12}+5\frac{9}{12}$

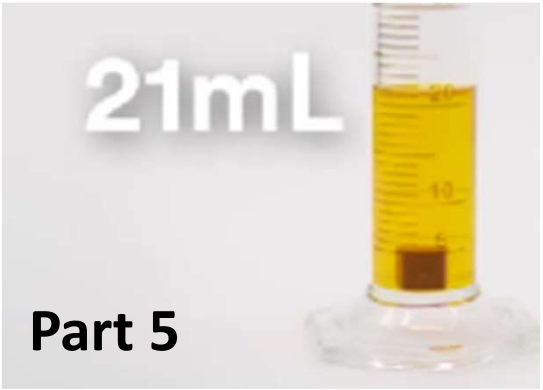
$13\frac{5}{12}$ $13\frac{5}{12}$

LAUNCH (5-min)

Explore methods for finding the volume of a space that <u>cannot</u> be packed with cubes.

Cubes in a Cylinder video





What do you notice? Wonder?

What unit did the person use when PACKING the prism with cubes? *Cubic centimeters*

What unit do we use when measuring volume with a graduated cylinder? *Milliliters*

1 cubic centimeter has the SAME volume as 1 milliliter.

LEARN (35-min) **Relate Cubic Centimeters and Milliliters**

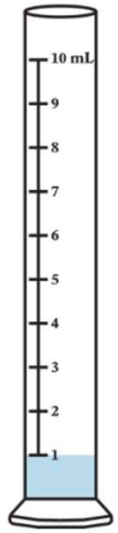
1 cubic centimeter = 1 milliliter

1 cubic centimeter has the same volume as 1 milliliter.

The right rectangular prism held 20 cubes.

The graduated cylinder measured 20 milliliters.

The volume of water increased from 20 milliliters to 21 milliliters when 1 centimeter cube was dropped in.



A VOLUME OF 20 CUBIC CENTIMETERS IS EQUAL TO A VOLUME OF 20 MILLILITERS.

The volume of 1 cubic centimeter is equal to 1 milliliter.

How can knowing that 1 centimeter cube has the same volume as 1 milliliter of water help us solve problems?

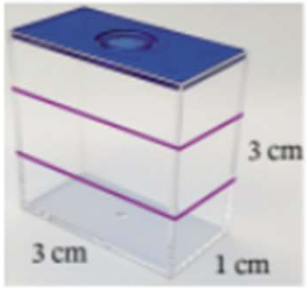
It can help us when we're trying to fill containers that are not right rectangular prisms.

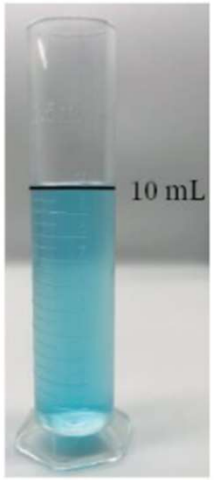
LEARN (35-min) **Solve Problems Involving Cubic Centimeters and Milliliters**

LEARN book page 211.

Let's use what we have learned about fillings to determine volume to solve real-world problems.

1. Tyler plans to pour the water from the graduated cylinder into the container shaped like a right rectangular prism.





The water from the graduated cylinder will not fit in the container.
10 mL > 9 cm^3

a. Draw lines on the container to decompose it into layers.

b. Determine the volume of the container. 3 x 1 x 3 = 9 cubic cm

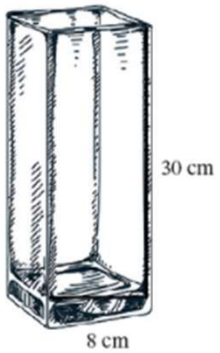
c. Can Tyler pour all the water from the graduated cylinder into the container? Explain.

LEARN (35-min) **Solve Problems Involving Cubic Centimeters and Milliliters**

LEARN book page 211.

2. A company advertises that its glass vase, which is shaped like a right rectangular prism, holds 2 liters of water. The base of the inside of the vase is a square. A side of the base measures 8 centimeters.

   a. Decompose the vase into layers to find its volume.

   Volume of 1 layer:

   8 x 8 x 1 = **64 cubic cm**

   Volume of the vase:

   8 x 8 x 30 = **1,920 cubic cm**

   b. What is the volume of the vase in milliliters?

   1,920 cubic cm = 1,920 cubic mL

   c. What is the volume of the vase in liters?

   1,920 cubic mL ÷ 1,000 = 1.92 liters

   d. Is the company's advertisement correct? Explain.

   No! The company is advertising that the prism holds 2 liters when in fact it only hold 1.92 liters!!

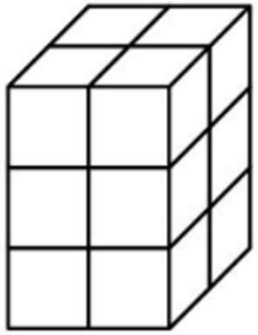
LEARN (35-min) **Problem Set**

LEARN book page 213.

Use the right rectangular prisms to complete the statements.

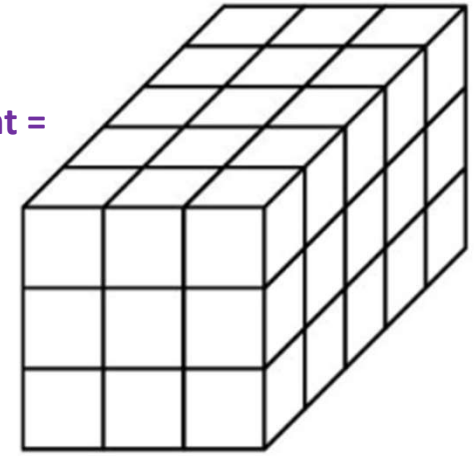
Volume =
Base x Height =
4 x 3 =
12 cubic cm

Base = 4



Volume =
Base x Height =
15 x 3 =
45 cubic cm

Base = 15



1. The right rectangular prism is made of **12** centimeter cubes.

   A container shaped like this right rectangular prism can hold exactly **12** mL of water.

2. The right rectangular prism is made of **45** centimeter cubes.

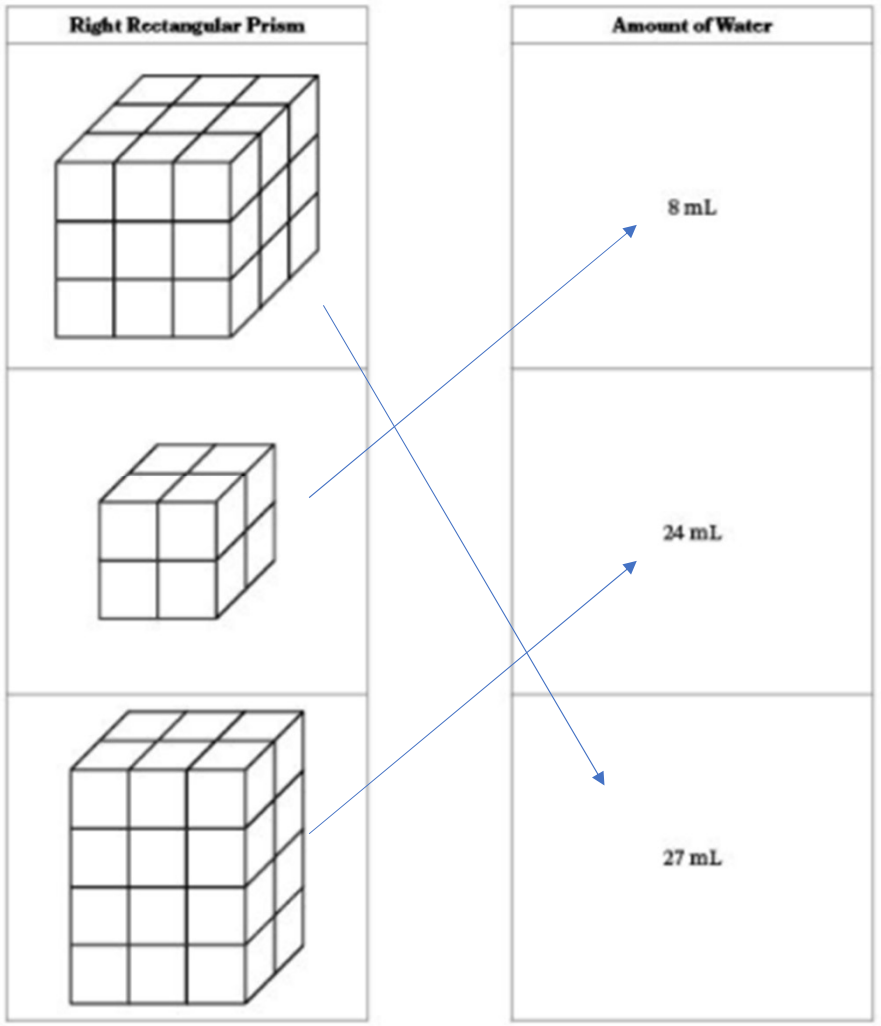
   A container shaped like this right rectangular prism can hold exactly **45** mL of water.

LEARN (35-min)

Problem Set

LEARN book page 214.

3. The right rectangular prisms shown are made of centimeter cubes. Draw a line to match each right rectangular prism with the amount of water in milliliters a container shaped like the prism can hold.



Volume =
Base x Height =
9 x 3 =
27 cubic cm

Base = 9

Volume =
Base x Height =
4 x 2 =
8 cubic cm

Base = 4

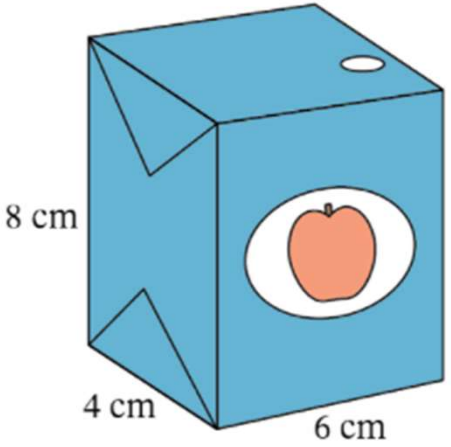
Volume =
Base x Height =
6 x 4 =
24 cubic cm

Base = 6

LEARN (35-min) **Problem Set**

LEARN book page 215.

4. How many milliliters of juice fit in the juice box?

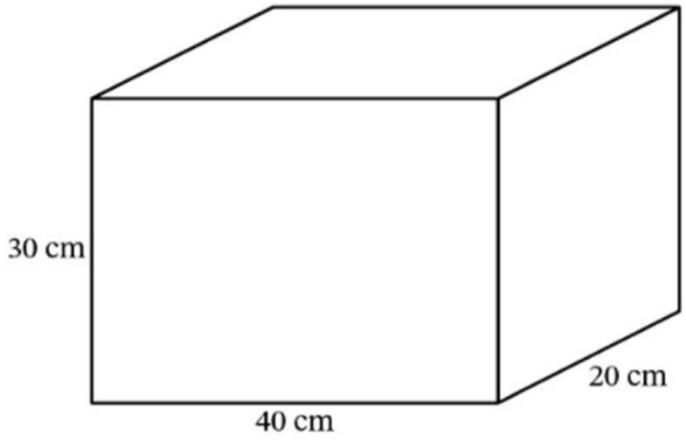


Volume =
L X W X H
4 x 6 x 8 =
24 x 8 =
192 cubic cm

LEARN (35-min) **Problem Set**

LEARN book page 215.

5. Jada has a fish tank that is the shape of a right rectangular prism. The length, width, and height of the fish tank are shown.



Jada's fish tank can hold 24,000 cubic centimeters of water.

Jada's fish tank can hold 24,000 milliliters of water.

Jada's fish tank can hold 24 liters of water.

Volume =
L X W X H
40 x 20 x 30 =
800 x 30 =
24,000 cubic cm

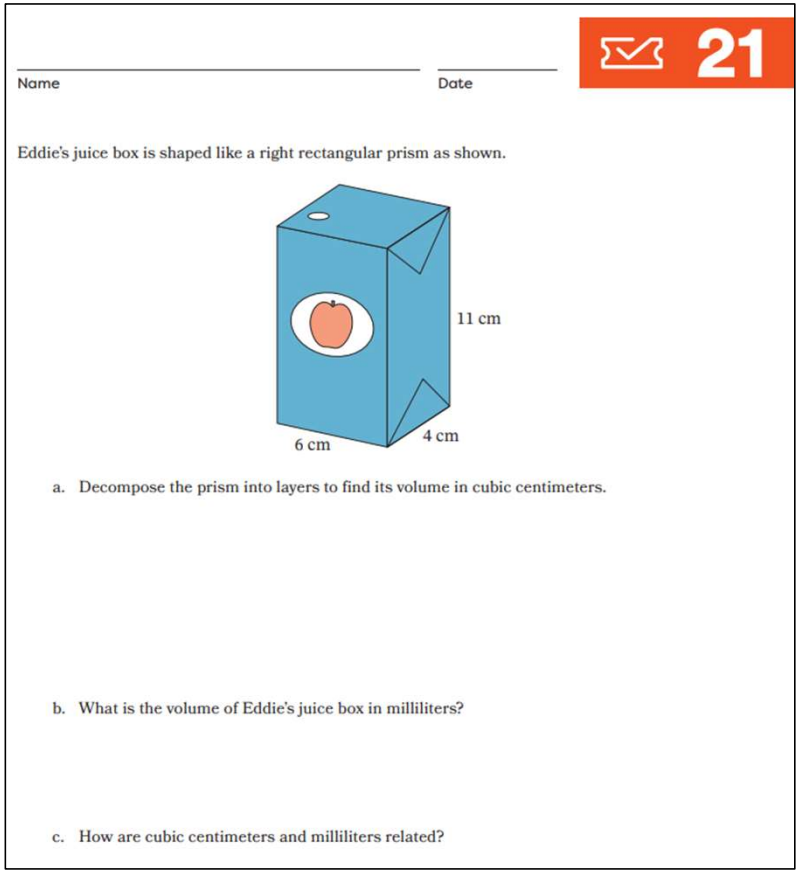
1 liter = 1,000 mL
24,000 x 0.001 =

LAND (10-min) **Exit Ticket**

Exit Ticket – PAGE 217

Small Group Time:
Problem Set Pages 211 -215

Homework:
Page 133 APPLY BOOK



Name _____ Date _____

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Eddie's juice box is shaped like a right rectangular prism as shown.

a. Decompose the prism into layers to find its volume in cubic centimeters.

b. What is the volume of Eddie's juice box in milliliters?

c. How are cubic centimeters and milliliters related?