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LESSON
32 Word Problems with Measurements

MGSE4.MD.2

PART 1 Introduction

Converting customary and metric units can help you solve word problems involving measurements. Follow this four-step process to solve word problems.

1. Understand the problem. Read the problem carefully and determine which information will help you solve the problem and what you need to find.
2. Plan your process. Choose a strategy or method and the necessary steps that will help you solve the problem.
3. Solve the problem. Use the strategy or method you chose and go through all the necessary steps to solve.
4. Check your answer. Does your answer make sense?

Pilar is making a large bowl of punch. She has 9 bottles of juice and 2 bottles of soda that each hold 1 quart. How much room is left for ice and fruit if all the bottles are poured into a $3\frac{1}{2}$-gallon bowl?

When a problem involves operations with different units, convert measurements to the same unit first.

1. Understand the problem.

What are you trying to find? *how much room is left in the bowl*

What information do you have that will help you find the answer? *9 1-qt bottles of juice and 2 1-qt bottles of soda are poured into a $3\frac{1}{2}$-gal bowl.*

Certain words can help you know which operation to use to solve a problem, including:

- addition: *in all, sum, total, increased by*
- subtraction: *less than, difference, decreased by*
- multiplication: *of, product, times*
- division: *equal groups, number in each group*

2. Plan your process.

How can you convert the measurements into the same units? *multiply the number of gallons the bowl can hold by 4 to find the number of quarts it can hold*

What operations will you need to use to solve? *addition, to find the number of quarts of liquid going into the bowl, and subtraction, to find how much space remains*

3. Solve the problem.

Multiply to change gallons to quarts: $3\frac{1}{2} \times 4 = 14$ quarts.

Add to find the total number of quarts: $9 + 2 = 11$ quarts.

Subtract to find the difference: $14 - 11 = 3$ quarts.

So, 3 quarts can be filled with ice and fruit.

SAMPLE

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4. Check your answer.

The answer makes sense because the amount of liquid is less than the capacity of the bowl.

Think About It

What are some strategies other than using equations that could help you solve a problem like the one on page 231?

_____

_____

PART 2 Focused Instruction

You can use what you know about measurements and money to find the best buy between two options. Work with a partner to answer these questions.

➤ Which is the best way to buy 50 yards of yarn?

Option 1: 20 yards of yarn for $7.50
Option 2: 15 feet of yarn for $2.00

Change the options so they are both in the same unit.

Look at option 1. How many bundles of 20 yards do you need to buy to have at least 50 yards of yarn? _____

How much does one bundle cost? _____

How much would it cost to buy at least 50 yards of yarn using this option?

_____

If you bought this many bundles, how much yarn would you have in all?

_____

Will you have yarn left over? If so, how much? _____

Look at option 2. How many yards are in 15 feet? _____

How many bundles of 15 feet would you have to buy to get at least 50 yards?

_____

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How much would it cost to buy at least 50 yards of yarn? _____

Would you have yarn left over? If so, how much? _____

Which is the better deal, option 1 or option 2? Explain.

_____

_____

You may need to convert units in a problem before you can solve it.

➤ A group of 8 friends are practicing soccer. They have a container holding 9.2 liters of water. How many milliliters of water will each friend get if each person drinks the same amount?

Think about the steps that you need to take to solve this real-world problem.

What information do you have that will help you solve the problem?

_____

_____

What do you need to find to solve the problem?

_____

How can you solve the problem?

_____

_____

_____

How many milliliters of water are in the container? _____

Write and solve an expression to find how much water each friend can drink. _____

What operation do you need to use to solve this problem?

How many milliliters of water can each friend drink? _____

SAMPLE

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Use what you know about measurement to answer these questions.

1 A bird has a mass of 4 kilograms. What will be the mass in grams of a group of 9 birds that each has the same mass?

_____

2 A baker needs 1 cup of oil to make 4 loaves of banana bread. How many loaves can he make with $3\frac{1}{2}$ quarts of oil?

_____

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Solve the following problems.

1 Liam has $25. A 4-ounce bag of cashews costs $3. Does Liam have enough money to buy 2 pounds of cashews in bags of this size? Explain.

How many 4-ounce bags of cashews will Liam have to buy to get 2 pounds of cashews?

2 A punch recipe calls for 350 milliliters of orange juice. If the recipe is tripled, will a 1-liter bottle of orange juice be enough? Explain.

How can you use estimation to help you solve this problem?

3 Mr. Nakagawa walked his dog $\frac{3}{10}$ mile and later walked $\frac{7}{10}$ mile on his own. How much farther did he walk on his own than with his dog?

What operation do you need to use to solve this problem?

Answer _____ mile

SAMPLE

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Solve the following problems.

1 Francisco is making a sub sandwich that will be 2.5 meters in length. The sandwich will be divided equally among 10 friends. How many centimeters of the sandwich will each person get?

A 2.5

B 25

C 250

D 2,500

2 The Hamilton family buys $\frac{1}{2}$ pound of sliced cheese and $\frac{3}{4}$ pound of sliced turkey each week. How much of each will they buy over the 52 weeks in a year?

A 2 pounds of cheese and 3 pounds of turkey

B 6 pounds of cheese and 9 pounds of turkey

C 24 pounds of cheese and 36 pounds of turkey

D 26 pounds of cheese and 39 pounds of turkey

3 A local middle school uses a 7-period day. The lunch period lasts 1 hour 10 minutes. The other 6 periods last 44 minutes each. If there are 3 minutes between each period, how long is the school day? Give the answer in hours and minutes. Explain.

_____

_____

_____

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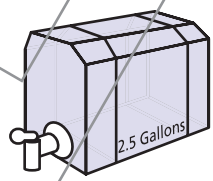
4 There are 3 bags of broccoli. Each bag weighs $\frac{7}{8}$ pound. There are 4 bags of green beans. Each bag weighs $\frac{6}{8}$ pound. How many pounds of broccoli and green beans are there in all? Show your work.

Answer _____ pounds

5 Mrs. Coffey bought this container of spring water. She used 4 quarts of water. How many quarts of water does Mrs. Coffey have left? Show your work.



Answer _____ quarts

6 Marla is conducting an experiment for science class. She grows seedlings and gives them different amounts of sunlight. She records how much the seedlings grow each day.

Part A Marla observed that one seedling grew 1.1 centimeters on Monday, 1.8 centimeters on Tuesday, and 1.5 centimeters on Wednesday. Record the total number of centimeters the seedling grew during the 3 days on the number line below.

Part B Marla uses 1.8 liters of water for the seedlings each week. She uses the same amount of water each day and only waters the seedlings 3 times a week. Marla says that since 1.8 liters = 180 milliliters, she uses 60 milliliters of water each day she waters the seedlings. Is she correct? Explain.

_____

_____

_____

_____

SAMPLE

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