Conversions

Strand:	Computation and Estimation
Topic:	Using proportions to convert between and among measurement systems
Primary SOL:	7.3 The student will solve single-step and multistep practical problems, using proportional reasoning.
Related SOL:	7.10

Materials

- Double Number Line activity sheet (attached)
- Conversion Activity Answer Sheets (attached)
- Conversion activity sheet (attached)
- Answer Key (attached)
- Scientific calculator

Vocabulary

equivalent ratio, metric, proportion, ratio, U.S. Customary (earlier grades)

Student/Teacher Actions: What should students be doing? What should teachers be doing?

1. Distribute the Double Number Line activity sheet. Using the double number lines, represent how units of measurement are related by showing common equal ratios among different units.

2. Have students complete the Double Number Line activity sheet and ask them to make generalizations about their discoveries.

3. Making a connection to the double number lines, shows students how you can set up two equal ratios.

4. Review solving proportions for a missing term from the Proportions lesson.

5. Assign students the Conversion activity (can be converted into a QR activity.)
   - Place students in groups of two or three.
   - Each group will begin at different problem.
   - Students will search for their solution at the top of the next problem that they are to complete.
   - Students should proceed with the next problem, circulating around the room, until all problems are completed.
   - Students should be encouraged to show their work for each question.

Assessment

- **Questions**
  - In what ways can you convert different measurements?
  - Can you identify another measurement comparison?
  - Why can you cross-multiply to find the missing value when solving proportions?
  - Can you demonstrate why cross-multiplication works?

- A laptop cart can hold laptops that are 13 inches in length. Your school ordered laptops that were 30 centimeters in length. If you have no ruler, how would you find out whether the laptops fit?

- **Journal/writing prompts**
  - If you were told 1 cup equals 8 fluid ounces, describe to someone who was not in class how to find out how many cups 35 fluid ounces equals.
  - The teacher told the class that 1 kilometer equals 0.621 miles. One student says that 5 miles is about 8.05 kilometers. Another student says 5 miles is about 3.1 kilometers. Who is right, and why?

- **Other Assessments**
  - Students can look up a conversion on the internet between units. The students can create their own problems and exchange them for their classmate to solve.

Extensions and Connections

- Ratio tables can also be used to connect to SOL 6.12.
- Students can use maps, labels on food items, and other items to find proportions.
- Students can do research on why there are different measurements for length, weight, and volume.
- Present the following extension problem to students:

  Airlines will charge extra if a bag weighs more than 50 pounds. A man wants to purchase the same gift for different family members before he goes home. If his bag already weighs 23 pounds and each gift weighs 2 kilograms, how many gifts may the man purchase before he is charged an extra fee? (1 pound = 0.454 kilogram)

Strategies for Differentiation

- Template Example: Use grid paper to assist students in lining up vertical columns.
- Pair students with a peer at the beginning of activities instead of waiting until step 5.
- Work out the airline bag problem with guided student input first. Then give students an additional, similar problem to solve independently or with a partner.

Note: The following pages are intended for classroom use for students as a visual aid to learning.

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Double Number Line

Pound

Ounce

Cup

Fluid Ounce

Feet

Mile

Miles

Kilometers

Pound

Kilogram

Gallons

Liters

What do you notice about these different double number lines?

Conversion Activity Answer Sheets

Question	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Question	Answer
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Conversion

2.2

1.

If 1 inch is about 2.54 centimeters, how many inches are in 16 centimeters?

64.65

2.

If 1 pound equals 16 ounces, how many ounces are in 13.35 pounds?

1.32

3.

Alex rode his bike 25 kilometers. If one kilometer is about 0.62 miles, how many miles did Alex ride?

62

4.

Stacia walked a total of 30,375 feet. If 2 miles is 10,560 feet, how far did Stacia walk?

6.3

5.

If 20 kilograms equals about 44 pounds, how many pounds is 1 kilogram?

15.29

6.

A recipe calls for 32 ounces of pasta to be used. How many pounds of pasta is that if 1 ounce equals about 0.06 pounds?

15.5

7.

In Canada, an American citizen purchased 5 liters of gasoline. If 13 gallons equals 49.21 liters, how many gallons of gas did the American purchase?

213.6

8.

Sammy went to London and has 50 British pounds. If $3 is about 2.32 pounds, how many dollars does Sammy have?

5.75

9.

One-half cup is 4 fluid ounces. How many fluid ounces will 7¾ cups be?

1.92

10.

Ryan walked 15 kilometers. Megan walked 9.5 miles. If 7 kilometers is about 4.35 miles, find out who walked farther and give your answer as Ryan or Megan's *distance* in the other unit.

Answer Key

Question	Answer
1	6.3
2	213.6
3	15.5
4	5.75
5	2.2
6	1.92
7	1.32
8	64.65
9	62
10	15.29