Title: Basic Metric Measurements Conversion

Objectives

- Students will be able to remember the order of metric units.
- Students will be able to convert basic metric measurements.

Time frame to Complete

30 minutes

NRS EFL

4

Stackable Certificate Documentation	*Technology*	*Study / Life skills*	*EL-Civics*	*Career Pathways*	Police	Paramedic	Fire Rescue	Medical Asst.	EKG / Cardio	Phlebotomy	Practical Nursing	Healthcare Admin	Pharmacy Tech	IMT	AMT	HVAC	Welding	Other:	STNA				
X						X		X	X	X	X	X	X						X				

Standard(s) Addressed in Lesson

Use Math to Solve Problems and Communicate

Benchmark(s) Addressed in Lesson

4.13 Convert fluently, within measurement systems (metric, customary, time), from one unit to another in order to solve contextual problems and express the conversions using appropriate unit labels.
4.15 Identify, extend and construct arithmetic/geometric patterns and sequences that are one-step and linear or exponential.
4.16 Evaluate and simplify algebraic expressions and solve equations.

Materials

- *How to Convert Basic Metric Measurements* worksheet
- Calculator (optional)

Learner Prior Knowledge

Place value
Basic multiplication and division by powers of ten

Activities

Step 1 Survey students, by a show of hands, about how many are familiar with the metric system. Volunteers may share what they know (they may be familiar with running a 5K or how some food packaging is labeled in grams, or they may only know that it is different than the measurements commonly used in the United States). Introduce the metric system as a measurement system that is based on units of ten.

Step 2 Distribute the worksheet *How to Convert Basic Metric Measurements*. Explain to students that the metric system of measurement is based on ten. If review is needed, share a few examples of multiplying and dividing by ten (with answers as both whole numbers and decimals).

Step 3 Share the mnemonic devices on the *How to Convert Basic Metric Measurements* worksheet with students as a means to remember the order of metric units: kilo, hecto, deka, unit (ones), deci, centi, milli. Write one sentence and the units on the board to use as a reference during the lesson.

Step 4 Explain and demonstrate the conversion process. Answer questions as needed.

Step 5 Students complete the second side of the sheet individually. As they work, the teacher can circulate to answer questions and check work as needed. When the class is finished, check answers together.

Assessment/Evidence

Students will solve equations and label metric conversions correctly.

Adaptations for Beginning Students

Beginning students could work in pairs and utilize a calculator.

Adaptations for Advanced Students

More advanced students could also write each expression using scientific notation.

Teacher Reflection/Lesson Evaluation

This lesson was created by Middletown ABLE.

The metric system is based upon units of ten.

Mnemonic devices These funny sentences can help you remember the order of metric units for common conversions. The first letter of each word is the same as the first letter of the metric prefix.

Kim Hit David [until] David Cried Mama!
King Henry Died [until] Drinking Chocolate Milk
King Henry Died [U] Didn't Care Much

The metric measurements are:

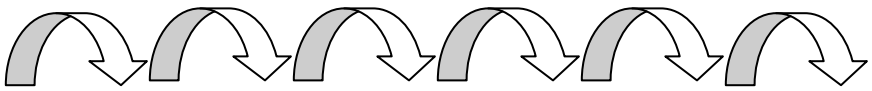
Kilo Hecto Deka [unit] Deci Centi Milli

A Shortcut to Converting from one unit to another:

1. Draw a line and label it with the prefixes as shown in the diagram below. "Unit" will be the unit of measurement you're working with (meter, gram, etc.)

- Kilo------Hecto-----Deka------[Unit]------Deci------Centi------Milli.

2. Draw an arrow from the prefix you have to the prefix you want to convert to, making stops at each unit of measure along the way. So if you want to change kilometers into millimeters, for example, then draw a series of arrows from "kilo" to "milli".



- Kilo------Hecto-----Deka------["Meters"]------Deci------Centi------Milli.
  1,000 100 10 1 0.1 0.01 0.001

3. Determine whether you are converting into a smaller or a larger unit. If the arrow is pointing right, you are converting from a larger unit into a SMALLER one. If the arrow is pointing left, you are going from a smaller unit into a LARGER one.

4. Move the decimal point one digit the same direction as the number of places you found in the previous step. If there is no decimal in the number, assume it's after the last digit in the number.

- For example, when converting from kilometers to millimeters, you will move the decimal point six places to the right. 1 kilometer = 1,000,000 millimeters
- To convert 5 centigrams to grams, you need to move the decimal point two places to the left. 5 centigrams = 0.05 grams

5. Add zeroes as necessary. Only do this if you have run out of digits in the number you were converting.

- For example, to convert 2.5 meters to millimeters, you have to move the decimal point to the right three places. There's only one more digit after the decimal point, so you would need to add two zeroes. Final answer: 2,500 millimeters.

Complete the table with ***equivalent*** measures:

larger units → → → → → → → → *smaller units*

K **kilo**	**H** **hecto**	**D** **deka**	**[unit]**	**D** **deci**	**C** **centi**	**M** **milli**
	0.01 hectograms		1 gram	10 decigrams		
0.002 kiloliters			2 liters			2,000 centiliters
	50 hectometers	500 dekameters			500,000 centimeters	

Mathematically, as you move the decimal point one place to the right (moving right on the chart), you are multiplying by 10.

1 meter x 10 = 10 decimeters

As you move the decimal point one place to the left (moving left on the chart), you are dividing by 10.

2 liters ÷ 10 = 0.2 dekaliters

Which is larger? (Circle the larger number in the following pairs.)

A) 1 decimeter OR 1 meter

B) 63 kilograms OR 18 grams

C) 1 liter OR 212 centiliters

D) 72 centigrams OR 41 dekagrams

Solve the equations.

A) A patient lost three liters of blood. How many dekaliters of blood will need to be replaced by transfusion?

B) Joe is required to limit the amount of sodium in his diet because of high blood pressure. He can have no more than 1000 milligrams each day. How many grams of sodium does this equal?

C) The doctor prescribes 500 mg of Amoxicillin to be taken every six hours. What is the maximum number of grams per day?

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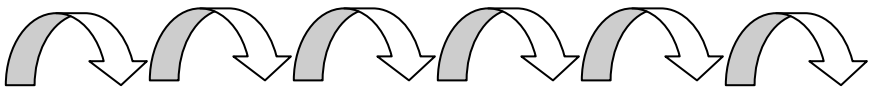

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Complete the table with ***equivalent*** measures:

larger units → → → → → → → → *smaller units*

K kilo	H hecto	D deka	[unit]	D deci	C centi	M milli
0.001 kilograms	0.01 hectograms	0.1 dekagrams	1 gram	10 decigrams	100 centigrams	1000 milligrams
0.002 kiloliters	0.02 hectograms	0.2 dekaliters	2 liters	20 decigrams	200 centigrams	2,000 centiliters
5 kilometers	50 hectometers	500 dekameters	5,000 meters	50,000 decimeters	500,000 centimeters	5,000,000 millimeters

Mathematically, as you move the decimal point one place to the right (moving right on the chart), you are multiplying by 10.

1 meter x 10 = 10 decimeters

As you move the decimal point one place to the left (moving left on the chart), you are dividing by 10.

2 liters ÷ 10 = 0.2 dekaliters

Which is larger? (Circle the larger number in the following pairs.)

A) 1 decimeter OR 1 meter

B) 63 kilograms OR 18 grams

C) 1 liter OR 212 centiliters

D) 72 centigrams OR 41 dekagrams

Solve the equations.

D) A patient lost three liters of blood. How many dekaliters of blood will need to be replaced by transfusion?
3 liters ÷ 10 = 0.3 dekaliters

E) Joe is required to limit the amount of sodium in his diet because of high blood pressure. He can have no more than 1000 milligrams each day. How many grams of sodium does this equal?
1000 mg ÷ 1000 = 1 gram

F) The doctor prescribes 500 mg of Amoxicillin to be taken every six hours. What is the maximum number of grams per day?
500 mg x 4 = 2000 mg 2000 mg ÷ 1000 = 2 grams