| MA 8B | Mathematics Embedded Credit |
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| Cape Career \& Technology Center | Last Update: April 2017 |
| Topic: Units of Measure | Focus: Conversion between Systems |


| Show-Me Standards: MA1, MA2 | MO Grade Level Expectations: M1A5, | NCTM Standards: 12A |
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## OBJECTIVE: Students will be able to use conversion information to solve problems between measurement systems.

## Introduction:

There are two primary systems that are used for measurement: U.S. Conventional and the Metric Systems. The following table describes the main units of measurement for the two systems.

| Unit of Measure | U.S. Conventional <br> Equivalent | Metric System Equivalent |
| :---: | :--- | :--- |
| Length | Inch, foot, yard, mile | Centimeter, meter, kilometer |
| Area | Square inch, square foot, acre | Square centimeter, square <br> meter, square kilometer |
| Volume | Cubic inch, cubic feet | Cubic centimeter, cubic meter |
| Capacity | Fluid once, cup, pint, quart, <br> gallon | Milliliter, liter, kiloliter |
| Weight | Once, pound, ton | Milligram, gram, kilogram |

LENGTH: the base quantity of distance.
AREA: the 2-dimensional measurement of a region.
VOLUME: the measurement of space occupied by a 3-dimensional object, such as a closed cardboard box.

CAPACITY: the measure of what is contained within an object, such as a liquid in a bottle. Also, the measure of how much an object can hold. Capacity is a measure of volume, in reality. Some references do not split the two categories. In general, volume refers to dry measure and capacity to fluid measure.

WEIGHT: the measure of how heavy something is.
CONVERSION FACTOR: the relationship used to change from one unit to another (i.e., 1 foot $=12$ inches).

## PROBLEMS:

Convert the LEFT column to the units requested in the RIGHT column.

| Original Unit: | Convert To: |
| :---: | ---: |
| $\mathbf{4 8}$ miles | Kilometers |
| $\mathbf{8 0}$ meters | Yards |
| $\mathbf{1 6}$ centimeters | Inches |
| $\mathbf{2 4}$ feet | Meters |
| $\mathbf{3 2}$ square feet | Square Meters |
| $\mathbf{1 8}$ square meters | Square Feet |
| $\mathbf{2 8 0}$ ounces | Grams |
| $\mathbf{1 2 5}$ pounds | Kilograms |
| $\mathbf{4 8}$ kilograms | Pounds |
| 36 liters | Gallons |

1. A tourist from the U.S. travels into Canada, where gasoline is sold by the liter. If fill-ups during the trip had been averaging 18 gallons, how many liters would be needed for the same amount of gasoline?
2. One of the children in your Daycare steps on the scale and finds her weight to be 25 kilograms. What is her weight in pounds?
3. The distance between Ironton, MO and Kansas City, MO is 321 miles. What is the distance between the two cities in kilometers?
4. The area of an office at the Career and Technology Center is 144 square feet. How many square meters of carpet would be needed for this office?
5. The volume of a swimming pool is 20,000 cubic feet. What is the volume of the pool in cubic meters?
