Topics:
- Convert between metric and household units
- Complete conversions in the metric system

Review common metric and household measures:

<table>
<thead>
<tr>
<th>Metric System Measures</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weight</strong></td>
<td><strong>Volume</strong></td>
<td><strong>Length</strong></td>
</tr>
<tr>
<td>1 kg = 1,000 g</td>
<td>1 L = 1,000 mL</td>
<td>1 m = 100 cm = 1,000 mm</td>
</tr>
<tr>
<td>1 g = 1,000 mg</td>
<td>1 mL = 1 cc</td>
<td></td>
</tr>
<tr>
<td>1 mg = 1,000 mcg</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Household System Measures</th>
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<tbody>
<tr>
<td><strong>Weight</strong></td>
<td><strong>Volume</strong></td>
<td><strong>Length</strong></td>
</tr>
<tr>
<td>1 kg = 2.2 lbs</td>
<td>1 tsp = 5 mL</td>
<td>1 inch = 2.5 cm</td>
</tr>
<tr>
<td></td>
<td>1 Tbsp = 15 mL</td>
<td>1 foot = 12 inches</td>
</tr>
<tr>
<td></td>
<td>1 oz = 30 mL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 cup = 240 mL</td>
<td></td>
</tr>
</tbody>
</table>

Methods of Conversion:

A. **Set up a Proportion**
Unit conversions can be done by setting up a proportion as follows:

\[
\frac{\text{Unit to convert}}{x \ (\text{unknown})} = \frac{\text{Unit equivalent}}{\text{Unit equivalent}}
\]

Note: For the unit equivalent on the right-hand side of the proportion, make sure that units match the left-hand side (i.e, top units are all the same, bottom units are all the same).

Example: Convert 138 lb into kilograms. Round the answer to the nearest hundredth.

Solution: We first set up a proportion as above.

\[
\frac{138 \ lb}{x \ (kg)} = \frac{2.2 \ lb}{1 \ kg}
\]

To solve the proportion, cross multiply and then isolate “x”.

\[
2.2x = 138 \times 1 \\
x = 138 \div 2.2 \\
x = 62.727272 \ldots
\]

\[
x = 62.73 \ lb \ (\text{rounded to the nearest hundredth})
\]
To use this method, multiply the quantity you are converting by the *conversion factor* such that the units cancel out.

\[
x (\text{unknown}) = \text{Unit to convert} \times \text{Conversion factor}
\]

Example from above: Convert 138 lb into kilograms. Round the answer to the nearest hundredth.

Solution: We first set up an equation as shown above. The conversion factor is 1 kg = 2.2 lb.

\[
x (kg) = 138 \text{ lb} \times \frac{1 \text{ kg}}{2.2 \text{ lb}}
\]

Note that the unit we want to be left with (kg) appears on top of the conversion factor and the unit we want to cancel out (lb) appears at the bottom.

Now, multiply the whole number by the fraction and then divide the numerator by the denominator.

\[
x (kg) = \frac{138 \times 1}{2.2}
\]

\[
x = 138 \div 2.2
\]

\[
x = 62.727272 \ldots
\]

\[
x = 62.73 \text{ lb} \text{ (rounded to the nearest hundredth)}
\]
METRIC & HOUSEHOLD CONVERSIONS

PNUR 145 – WEEK 5

Practice Exercises:

Change to equivalents

1) Weight
   a) 2 kg = _______ g
   b) 2 kg = _______ lbs
   c) 12 g = _______ mg
   d) 0.5 mg = _____ mcg
   e) 143 lbs = _____ kg
   f) 22.5 kg = ______ lbs
   g) 0.075 g = ______ mcg
   h) 23 mcg = ______ g
   i) 70,000 g = _____ kg
   j) \( \frac{7}{10} \) kg = _______ g

2) Volume
   a) 0.2 L = _______ mL
   b) 4.5 mL = _______ L
   c) 2 tsp = ______ mL
   d) 8 Tbsp = _____ mL
   e) 30 mL = ______ Tbsp
   f) 37.5 mL = ____ Tbsp
   g) 50 mL = ______ tsp
   h) 3 cups = ______ mL
   i) \( \frac{11}{4} \) cups = ______ mL
   j) 840 mL = ______ cups
   k) 2.4 tsp = ______ mL
   l) 4 oz = ________ mL
   m) 4 oz = _________ cups
   n) 2 cups = ______ oz
   o) 6 cups = _______ L
   p) 28 Tbsp = ______ oz
   q) 0.07 L = _______ mL
   r) 0.008 L = _______ cc
   s) 24 Tbs = ______ tsp
   t) 3,250 mL = _______ L

3) Length
   a) 1.5 m = __________ mm
   b) 0.25 m = __________ cm
   c) 1,600 mm = _______ m
   d) 90 cm = __________ m
   e) 12 cm = __________ inches
   f) 3.4 inches = _______ cm
   g) 0.008 m = ______ mm
   h) 7.2 cm = __________ mm
Metric & Household Conversions
PNUR 145 – Week 5
METRIC & HOUSEHOLD
CONVERSIONS
PNUR 145 – WEEK 5

Answers:

1.   
1a)  2,000 g   
1b)  4.4 lbs   
1c)  12,000 mg  
1d)  500 mcg  
1e)  65 kg

   f)  49.5 lbs  
   g)  75 mcg   
   h)  0.023 g  
   i)   70 kg  
   j)  2,700 g

2.   
2a)  200 mL   
2b)  0.0045 L  
2c)  10 mL   
2d)  120 mL  
2e)  10 tsp  
2f)   2 Tbsp   
2g)  2.5 Tbsp  
2h)  720 mL  
2i)  300 mL  
2j)  3.5 cups

   k)  12 mL   
   l)  120 mL  
   m)   0.5 cups 
   n)  15 oz   
   o)  1.44 L  
   p)   14 oz   
   q)  70 mL   
   r)   8 cc   
   s)   8 tsp   
   t)  3.25 L 

3.   
3a)  1500 mm 
3b)   25 cm  
3c)   1.6 m  
3g)   8 mm

   d)   0.9 m 
   e)  4.8 inches  
   f)   8.5 cm 
   h)   72 mm