Curriculum Outcome

M1 Demonstrate an understanding of the Système International (SI) by describing the relationships of the units for length, area, volume, capacity, mass and temperature.

M2 Demonstrate an understanding of the Imperial system by: describing the relationships of the units for length, area, volume, capacity, mass and temperature.

Student Friendly: How are lbs and kg related?

1) Calculate the conversion:

a) 24 oz= _____lb

b) 7890 lb= _____tn

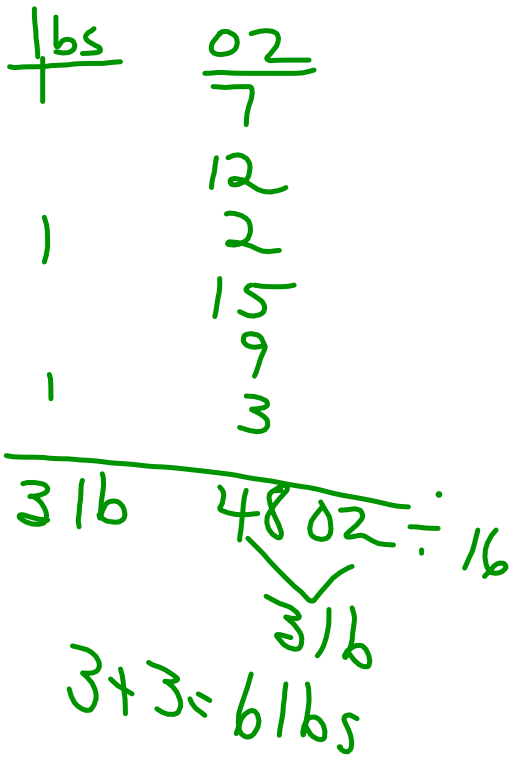
c) 54 oz= _____lb ___oz

d)6 lb 2 oz = ____oz

f) 4.54 tn = _____lb

f) 654 oz= _____lb ___oz

2) What is the total weight, in pounds and ounces of six books on a shelf if they weigh 1 lb 7 oz, 12oz, 1 lb 2 oz, 15 oz, 9 oz, and 1 lb 3oz.



3) A bakery uses a recipe for oatmeal cookies that calls for 1lb 4 oz of flour to make 9 dozen cookies, how many ounces of flour are needed to make 3 dozen cookies?

$$\frac{1\text{lb},4\text{oz}}{3} \rightarrow \frac{9\text{ dozen}}{3}$$

$$\frac{20}{3}$$

$$= 6\tfrac{2}{3}\text{ oz}$$

4) Kris needs to transport 5 slabs of concrete to an apartment work site. If each slab weighs 46 pounds, Kris weighs 195 pounds; and the truck weighs 1.5 tons, what is the total weight of the loaded truck in pounds?

$1.5 \text{ tn} \times 2000 = 3000$

$46 \text{ lbs} \times 5 = 230$

195

3425 lbs

5) Jamie is concerned about the weight that paint might add to a delicate structure he built. He estimates that he needs 1.5 gal of paint and that the structure can withstand 15 lbs of weight. The weight of a particular paint is 9lb/gal. When it dries, the weight is only 5.4lb/gal. Can Jamie paint his structure without having collapse?

$1.5 \text{ gal} \times \frac{9 \text{ lb}}{\text{gal}} = 13.5 \text{ lbs}$ (wet)

$\therefore$ dry would be ok. ↓ OK

6) U-Pick organic blueberries sell for $20.00 for a 12 pound box
   a) How much would 1 pound cost?
   b) How much would 12 ounces cost?

a) $\frac{20.00}{12} = \$1.67$

b) $\frac{\$1.67}{16} = 0.104 \times 12 = \$1.25$ for 12 oz.

$1.67 \times \frac{12}{16} = \$1.25$ or

7) What is the true cost per pound of a 10 pound box of oranges if the original price of the box was $12.99 and ¼ of them to be thrown away because they were moldy?

$\frac{\$12.99}{7.5} = \$1.73/lb$

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BUILD YOUR SKILLS

1. Choose the correct item to go with each weight. About how much do you think each of the other items weighs?

   a) About 1 ounce:

   i) pat of butter ii) loaf of bread iii) house cat

   b) About 1 pound:

   i) sofa ii) small basket of raspberries iii) gallon of water

   c) About 1 ton:

   i) refrigerator ii) large dog iii) blue whale

4. Which unit—ounce, pound, or ton—would you use to express the weight of the following? Give an alternate choice, if suitable, and justify your answer.

   a) brick — P

   b) plasma TV

   c) box of chocolates

   d) hippopotamus

   e) duck

   f) box of books

   g) tractor-trailer truck

3. At birth, Johan weighed 7 pounds 9 ounces.

   a) Why are newborns' weights given in pounds and ounces and not rounded to the nearest pound?

   b) What would Johan's weight be in ounces? 121 oz

   c) Why are newborns' weights not given in ounces alone?

   d) The nurse on the maternity ward told Dawn that her baby, Johan, would lose about 10% of his weight in the first week. Then the baby would likely gain about 5 ounces a week for the next four weeks. What should Dawn expect Johan to weigh at 5 weeks of age if he weighed 7 pounds 9 ounces at birth?

   e) How does Johan's weight at 5 weeks compare to his weight at birth?

   f) Would the comparison be different if he had weighed more or less at birth?

$(7 \times 16) + 9$

$129 \text{ oz} = 8 \text{ lb } 1 \text{ oz}$

8 oz or $\frac{1}{2}$ lb

7% more

$116 \times 87 \times 4 = 40368 \text{ in}^3 \times \left(\frac{1 \text{ ft}}{12 \text{ in}}\right)^3 = 23.4 \text{ ft}^2$

4. A contractor is building a patio behind Polli's house. The cement slab will be 9 feet 8 inches long, 7 feet 3 inches wide, and 4 inches thick. If the concrete weighs 150 pounds a cubic foot, what is the weight of the concrete in Polli's patio?

$V = 23.4 \text{ ft}^3$

$\therefore 23.4 \text{ ft}^3 \times \frac{150 \text{ lb}}{1 \text{ ft}^3} = 3504.2 \text{ lb}$

3d.) 7 lb, 90z = 1210z

10% lose = 12.1 0z

$$\begin{array}{r} 121 \\ -\ 12.1 \\ \hline 108.9\text{oz} \end{array}$$

Next 4 weeks − 5 oz each week = 20

$$\begin{array}{r} 109 \\ 20 \\ \hline 129\text{oz} \end{array} \rightarrow 8\text{lb } 1\text{oz}$$

5. Coffee is the second most highly traded commodity in the world. Jean owns a coffee shop in Caraquet, NB. He buys fresh fair-trade coffee beans because he knows that this helps protect the coffee farmer's income.

   The beans he buys weigh 35 pounds a cubic foot. After he roasts them, they weigh only 27 pounds a cubic foot. He sells his coffee for $17.95 a pound.

   a) What do you think is the most highly traded commodity in the world? Petroleum

   b) Assume that the farmer selling the beans got a market floor price of $1.35 a pound. If Jean buys 25 cubic feet of coffee beans, and sells it at $17.95 a pound after roasting, compare the income of the farmer with Jean's selling price.

before roasted

$25\ ft^3 \times \frac{35\ lb}{1\ ft^3} = 875\ lb$

$875\ lb \times \frac{\$1.35}{1\ lb} = \$\ 1181.25$

after roasted

$25\ ft^3 \times \frac{27\ lb}{1\ ft^3} = 675\ lb$

$675\ lb \times \frac{\$17.95}{1\ lb} = \$\ 12\ 116.25$

$\therefore$

$12\ 116.25 - 1181.25$

$= \$\ 10\ 935.00$

5.3 Mass in the Systeme International

- **Mass -** a measure of the quantity of matter in an object.
  - "the amount of *stuff*".
  - in the SI system the kilogram is the measure of mass.

  * use of the pound is commonly used as a measure of mass.

- **Weight -** a measure of the force of gravity on an object.
  - in the SI system the Newton is the measure of weight.

Copy down

1000 grams (g) = 1 kilogram (kg)

1000 milligrams (mg) = 1 gram

1 tonne (t) = 1000 kilograms

NOTES:

- 'kg' is the mass of one litre of water at 4C
- a tonne (t) IS NOT THE SAME as a ton (tn).
- a tonne is often referred to as a 'metric ton'.

Ton (tn) vs. Tonne (t)

American

Imperial System

1tn = 2000 lb

Canadian

Metric System

1 t = 1000 kg

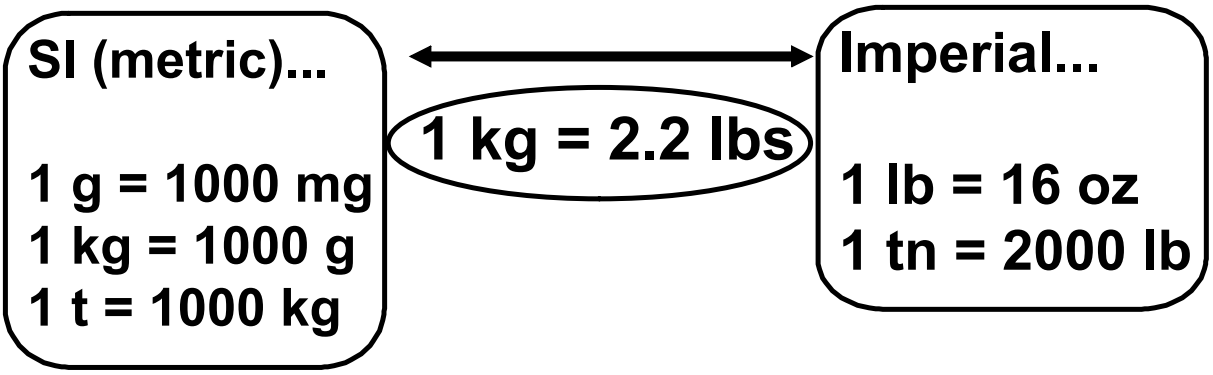
How many kg are in 1 tn?

$$1\ \cancel{tn} \times \frac{2000\ \text{lbs}}{1\ \cancel{tn}} \times \frac{1\ \text{kg}}{2.2\ \text{lbs}} = \mathbf{909.1\ kg}$$

How many pounds are in 1t ?

$$1\ \cancel{t} \times \frac{1000\ \text{kg}}{1\ \cancel{t}} \times \frac{2.2\ \text{lbs}}{1\ \text{kg}} = \mathbf{2200\ lbs}$$

Conversions...



EXAMPLE 2:

Mrs. Yummy is baking apple pies. According to her recipe, she needs 6 pounds of apples. The bag of apples she bought only shows the weight i kilograms. Can you help her out???

Solution is...

Remember... 1 kg = 2.2 lbs

$6\text{lbs} \times \frac{1\text{kg}}{2.2\text{lbs}} = 2.7\text{kg}$

NOTE: To estimate a conversion from pounds to kilograms you can think of a pound being about 1/2 kg.

EXAMPLE 3:

The cost of bananas at the Irving is $0.49/lb, but you see an advertisement for bananas on sale at Sobey's for $1.03/kg. **Which is a better buy?**

Solution is...

1.03/kg 0.49/lb

1.03 for 2.2 lb 0.49 → 1 lb

2.2

0.47/lb

Sobeys Cheaper

Work on these...

Worksheet - Converting Imp_Metric Masses.pdf

Questions 1 to 10

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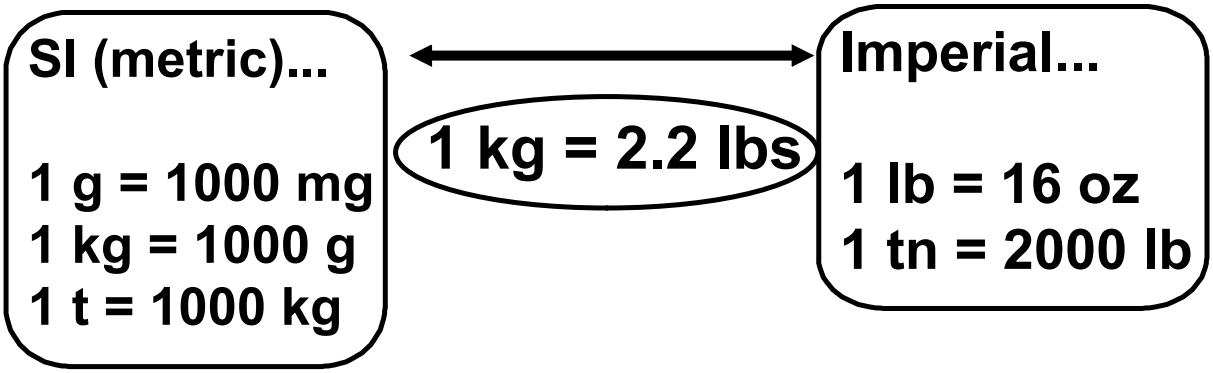
Remember...



Converting English and Metric

1)	_____	pounds	=	7.5	kilograms
2)	_____	ounces	=	18	grams
3)	13.5	pounds	=	_____	kilograms
4)	15	ounces	=	_____	grams
5)	_____	pounds	=	16	kilograms
6)	12.5	pounds	=	_____	kilograms
7)	8	ounces	=	_____	grams
8)	_____	ounces	=	14.5	grams
9)	_____	pounds	=	4	kilograms
10)	_____	ounces	=	18.5	grams
11)	_____	pounds	=	21.5	kilograms
12)	2.5	ounces	=	_____	grams
13)	_____	ounces	=	9.5	grams
14)	_____	ounces	=	19.5	grams
15)	20	pounds	=	_____	kilograms
16)	17	pounds	=	_____	kilograms
17)	6.5	pounds	=	_____	kilograms
18)	_____	pounds	=	7	kilograms
19)	8.5	ounces	=	_____	grams
20)	22	ounces	=	_____	grams

1. Choose the correct item to go with each measure of mass.

   a) About 1 gram

      i) a brick ii) a penny iii) a book

   b) About 1 kilogram

      i) this textbook ii) a dime iii) an MP3 player

   c) About 1 gram

      i) a thumbtack ii) a cat iii) a chair

   d) About 1 tonne

      i) a bull ii) two men iii) a laptop computer

How much to you think this chair weighs?

2. Read each statement and judge whether the estimate makes sense. If you disagree with the statement, justify your solution by estimating the approximate weight of the object.

   a) A loaded truck has a mass of about 500 kg.

   b) A small boy has a mass of about 100 g.

   c) A hockey puck has a mass of about 2 kg.

   d) A headache tablet has a mass of 1 mg.

   e) Two loaves of bread have a mass of about 1 kg.

   f) A piece of gum has a mass of about 1 g.

   g) A two-tonne truck weighs about 2200 pounds.

   h) A five-pound roast weighs about the same as a 5 kg roast.

3. Drugs come in different strengths, so the doctor decides what dosage to give you based on your symptoms, age, and weight. The drug penicillin V has a strength of 250 mg per pill, and you have been prescribed a dosage of 0.5 g three times a day for five days.

   a) How many pills will you have to take at one time?

   b) How many milligrams of the drug will you take over the five days?

   c) How many kilograms of the drug is this amount?

5. It is estimated that the air in a glass tank weighs 1.29 g a litre. The tank is 2.5 metres by 3.4 metres by 4.1 metres. What is the weight of the air in the tank?

6. You have a recipe for a cheese dip that calls for $1\frac{1}{4}$ lb of Stilton cheese. The store has packages that weigh 253 g, 421 g, 97 g, 398 g, and 124 g. Which packages will you purchase so that you have enough Stilton at the lowest cost?

Section 5.3 - Mass in a SI System

PRACTISE YOUR NEW SKILLS

HOMEWORK QUESTIONS???

1. Convert the following weights.

a) 2.5 t = _____ kg

b) 2.8 kg = _____ g

c) 125 g = _____ kg

d) 2.4 g = _____ kg

e) 1 t = _____ lb

f) 3.6 tn = _____ kg

2. How many tons are in 1 tonne?

3. What is the total weight in grams of 3 packages of nuts weighing 1.2 kg, 0.75 kg, and 1.5 kg?

4. Win weighs 78 kg and his dog weighs 18 kg. If his truck weighs 1.9 t and there are 5 boxes of books each weighing 9.8 kg in the truck, what is the total weight of the truck, including Win, his dog, and the books?

5. Karen is making a batch of potato soup. She needs 8 potatoes, and each potato weighs about 375 g. How many pounds of potatoes does she need?

6. If a 10-lb bag of grass seed costs $75.45, how much does the seed cost per kilogram?

7. How many quarter-pound (before cooking) hamburgers can you make from 1.9 kg of ground beef?

PRACTISE YOUR NEW SKILLS, P. 200

1. a) 2500 kg b) 2800 g
   c) 0.125 kg d) 0.0024 kg
   e) 2200 lb f) 3272.4 kg
2. 1 tonne (t) ≈ 1.1 tons (tn)
3. 3450 g
4. 2045 kg
5. 6.6 lb
6. $16.61/kg
7. 16 hamburgers

Attachments

5.3 Worksheet - Mass in a SI System.docx

Worksheet - Converting Imp_Metric Masses.pdf

Section 5.3 Detailed Solutions.pdf