Section 4.3

Mass in the Systeme International

Lesson 6:

Working with SI Units of Mass

In the **Systeme International (SI)**, the basic unit of *mass* is the **kilogram**, but it is often used for *weight* as well.

Grams and **milligrams** are smaller than kilograms, and **tonnes** are larger units of mass in SI.

The following is a small list of how these different mass units are related to each other, and the abbreviations we use for the units:

1000 grams (g) = 1 kilogram (kg)

1000 milligrams (mg) = 1 gram

1 tonne (t) = 1000 kilograms

Conversions:

kg → g (multiply by 1000)

$$2.7 \text{ kg} = 2.7 \times 1000 = 2700 \text{ g}$$

g → kg (divide by 1000)

$$12500 \text{ g} = \frac{12500}{1000} = 12.5 \text{ kg}$$

tonnes → kg (multiply by 1000)

$3.2 t = 3.2 \times 1000 = 3200 kg$

kg → tonnes (divide by 1000)

$20,150 kg = \dfrac{20150}{1000} = 20.15 t$

g $\rightarrow$ mg   (multiply by 1000)

72g = 72 × 1000 = 72 000 mg

mg $\rightarrow$ g (divide by 1000)

1257 mg = $\dfrac{1257}{1000}$ = 1.257 g

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<u>2 choices on how to proceed</u>:
1) Double each individual measurement and then add them up.
2) Add up the given measurements and then double it.

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Using choice #1:
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The doubling of the recipe will require 680 g of dry ingredients.

Check your understanding:

Build Your Skills
pg. 196
#1, 2, 3

1. What is the total weight of a loaded truck if the truck weighs 2.6 tonnes and it is loaded with 15 skids of boxes that weigh 210 kilograms each? Give your answer in tonnes.

Truck = 2.6 tonnes

Boxes = 15 x 210 kg = 3150 kg   (convert to tonnes)

1000 kg = 1 tonne
1000 kg x 3.15 = 1 tonne x 3.15
3150 kg = 3.15 tonnes

Total weight of the loaded truck = 2.6 tonnes + 3.15 tonnes
                                                        = 5.75 tonnes

2. Irène needs 1.6 kg of tomatoes to make her grandmother's recipe for ratatouille. She has baskets of tomatoes that weigh 256 g, 452 g, 158 g, and 320 g. How many more grams of tomatoes does she need?

How many grams does she have now?

$256 + 452 + 158 + 320 = 1186$ g

How many grams does she need for her recipe?

1.6 kg $= 1.6 \times 1000$ g $= 1600$ g

How many more grams does she still need?

1600 g $- 1186$ g $= 414$ g

3. Genoa salami sells for \$1.79/100 g at the deli.

a) How much will 350 g cost?

$$\frac{\$1.79}{100 \text{ g}} = \frac{x}{350 \text{ g}}$$

$$\frac{100x}{100} = \frac{626.5}{100}$$

$$x = \$6.27 \text{ for } 350 \text{ g}$$

b) What is the price per kilogram?

1000 g

$$\frac{\$1.79}{100 \text{ g}} = \frac{x}{1000 \text{ g}}$$

$$\frac{100x}{100} = \frac{1790}{100}$$

$$x = \$17.90 \text{ for } 1 \text{ kg}$$