

Is that your Mass or your Weight?

This morning I weighed 82 kg. Is this my mass or my weight? How do you know?



Weight: A measure of the force of gravity on an object. (As gravity changes so does your weight.)

Mass: A measure of the quantity of matter in an object. (Does not change when gravity changes)

On Earth, **weight & mass** are essentially the same.

Mass in the Imperial system

1 ton (tn) = 2000 lbs

1 pound (lb) = 16 ounces (oz)

Some basic units of weight in the imperial system:

1 ton (tn)	2000 pounds
1 pound (lb)	16 ounces (oz)

A. Converting pounds and ounces:

Example 1

The weight of two Sockeye salmon is 20 lb 7 oz and 21 lb 9 oz

~~9 oz~~. What is the total weight:

a) in pounds and ounces?

$$\begin{array}{r} 20 \text{ lbs} \quad 7 \text{ oz} \\ 21 \text{ lbs} \quad 9 \text{ oz} \\ \hline 41 \text{ lbs} \quad 16 \text{ oz} \end{array}$$

b) in pounds?

$$42 \text{ lbs}$$

B. Converting pounds and tons:**Example 2**Pounds → Tons

- A truck has a load maximum of 2.5 tons
- Cement slabs weigh 175 lb each
- How many slabs can be loaded?

$$175 \cancel{\text{lb}} \times \frac{1 \text{ (tn)}}{2000 \cancel{\text{lb}}} = 0.0875 \text{ tn}$$

$$\frac{2.5 \text{ tn}}{0.0875 \text{ tn}} = 28.6 \text{ slabs}$$

28 slabs could be safely loaded on the truck

Example 3

Tons → Pounds

- A car weighs 950 lb
- 5 passengers weigh approximately 0.375 ~~tn~~
- What is the total weight?

$$\begin{array}{r} 950 \text{ lbs} \\ + 750 \text{ lbs} \\ \hline 1700 \text{ lbs} \end{array}$$

$$\begin{array}{r} \cancel{1 \text{ tn}} \times \frac{2000 \text{ lbs}}{1 \text{ tn}} \\ = 2000 \text{ lbs} \\ - 1250 \text{ lbs} \\ \hline 750 \text{ lbs} \end{array}$$

C. Unit Pricing:

Products can come in different types of packaging and different methods of units of weight. We can compare the cost to find the better buy (recall Chapter 1).

Example 4

- A 14-ounce jar of jam costs \$4.50
- A 1.75 lb jar costs \$8.25
- Which is the better buy?

$$\frac{\$4.50}{14\text{oz}} = \$0.32142857/\text{oz}$$

$$1.75\text{lb} \times \frac{16\text{oz}}{1\text{lb}} = 28\text{oz}$$

$$\frac{\$8.25}{28\text{oz}} = \$0.29464/\text{oz}$$