

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:

The relationship between mass

[Mass in the Imperial System](#)

WARM-UP...

Chinook winds are known to cause great changes in temperature over a short period of time. The most extreme temperature change in a 24-hour period occurred in Loma, Montana, on January 17, 1972. The temperature rose from -54°F to 49°F .

a) What was the change in temperature in degrees Fahrenheit?

Solution?

$$54 + 49 = 103^{\circ}\text{F}$$

b) What was the maximum/minimum temperatures in degrees Celsius?

Solution?

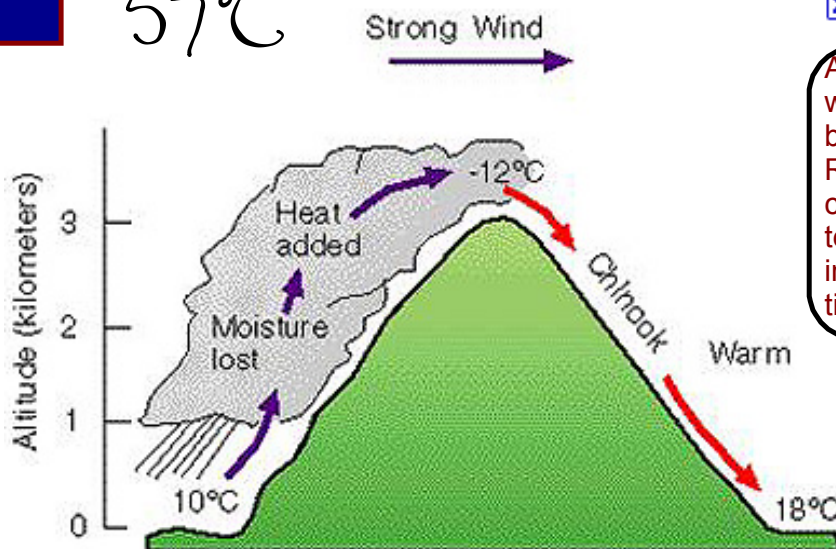
$$\begin{aligned} \text{Min: } & -54^{\circ}\text{F} \\ C &= \frac{5(F - 32)}{9} \\ &= \frac{5(-54 - 32)}{9} = -48^{\circ}\text{C} \end{aligned}$$

$$\begin{aligned} \text{Max: } & 49^{\circ}\text{F} \\ C &= \frac{5(F - 32)}{9} \\ &= \frac{5(49 - 32)}{9} \\ &= \frac{5(17)}{9} = 9^{\circ}\text{C} \end{aligned}$$

c) What was the change in temperature in degrees Celsius?

Solution?

$$57^{\circ}\text{C}$$



A Chinook wind is a warm, dry wind that blows east of the Rocky Mountains, often causing significant temperature increases in a short time in winter.

5.2 Mass in the Imperial System

- **Mass** - a measure of the quantity of matter in an object.
 - "the amount of *stuff*".
 - in an imperial system the 'slug' is a measure of mass. $1 \text{ slug} = 1 \frac{\text{lb}_F \cdot \text{s}^2}{\text{ft}}$
 - * use of the pound is commonly used as a measure of mass.

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



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

1 oz - a slice of bread
1 lb - football
1 tn - an adult bison

*** Compared to the SI system...

1 lb = 0.453 592 37 kg OR 1 kg = 2.2 lbs

Mass vs. Weight

Mass - a measure of the quantity of matter in an object.

Weight - a measure of the force of gravity on an object.

So does this mean your mass changes when you travel to the moon or does your weight change?



What does a scale measure?



Try these conversions:

Conversions Between Imperial Mass Units

16 oz = 1 lb

1 tn = 2000 lbs

250 oz = $\frac{15.63}{}$ lbs

75 lbs = $\frac{1200}{}$ oz

750 lbs = $\frac{0.38}{}$ tn

4 tn = $\frac{\quad}{}$ lbs

$250 \text{ oz} \times \frac{1 \text{ lb}}{16 \text{ oz}} =$

$75 \text{ lbs} \times \frac{16 \text{ oz}}{1 \text{ lbs}} = 1200 \text{ oz}$

$172 \text{ oz} = \frac{10}{16} \text{ lbs} = \frac{12}{16} \text{ oz} =$

$750 \text{ lbs} \times \frac{1 \text{ tn}}{2000 \text{ lbs}} = 0.375 \text{ tn}$

$4 \text{ tn} \times \frac{2000 \text{ lbs}}{1 \text{ tn}} = 8000 \text{ lbs}$

$10 \text{ lbs} \times \frac{16 \text{ oz}}{1 \text{ lbs}} = 160 \text{ oz}$

EXERCISE: Copy and Complete the following Conversions!

$$16 \text{ ounces (oz)} = 1 \text{ pound (lb)}$$
$$1 \text{ ton (tn)} = 2000 \text{ pounds (lb)}$$

$$48 \text{ ounces} = \underline{\quad 3 \quad} \text{ pounds}$$
$$4 \text{ pounds} = \underline{\quad 64 \quad} \text{ ounces}$$
$$1.5 \text{ pounds} = \underline{\quad 24 \quad} \text{ ounces}$$
$$2 \text{ tons} = \underline{\quad 4000 \quad} \text{ pounds}$$
$$6000 \text{ pounds} = \underline{\quad 3 \quad} \text{ tons}$$
$$80 \text{ ounces} = \underline{\quad 5 \quad} \text{ pounds}$$
$$8 \text{ pounds} = \underline{\quad 128 \quad} \text{ ounces}$$
$$1.5 \text{ tons} = \underline{\quad 3000 \quad} \text{ pounds}$$
$$64 \text{ ounces} = \underline{\quad 4 \quad} \text{ pounds}$$

*Class/Home-
work*

- 1) do all*
- 2)*
- 3)*

Section 5.2: Worksheet
Mass in the Imperial System

1) Calculate the conversions:

a. 24 oz = _____ lb

b. 7890 lb = _____ tn

c. 54 oz = _____ lb _____ oz

d. 6lb 2oz = _____ oz

e. 4.54 tn = _____ lb

f. 654oz = _____ 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?

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?

5) Jamie is concerned about the weight that paint might add to a delicate structure he built. He estimates that e 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?

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?

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 $\frac{1}{4}$ of them to be thrown away because they were mouldy?

Answers:

1a) 1.5 lbs b) 3.945 tn c) 3 lb 6 oz d) 98 oz e) 9080 lb f) 40 lb 14 oz

2) 6 lb 3) $6\frac{2}{3}$ oz 4) 3425 lb 5) paint weighs: 13.52 lbs so yes Jamie can paint it

6)a. \$1.67/lb b. \$1.25/12 oz 7) \$1.73/lb

Attachments

5.2 Worksheet - Mass in an Imperial System.docx

Section 5.2 Detailed Solutions.pdf

Worksheet -Section_5.2_ Mass in Imperial System .docx