

# Worksheet: Dimensional Analysis KEY

11/3

1.  $9 \text{ in} \rightarrow \text{cm}$

$$\frac{9 \cancel{\text{in}} \times 2.54 \text{ cm}}{1 \cancel{\text{in}}} = 9 \times 2.54 \text{ cm} = 22.86 \text{ cm} \rightarrow 20 \text{ cm}$$

1 sig. fig.

2.  $2916402 \rightarrow \text{kg}$

$$\frac{29.25 \cancel{\text{kg}} \times 0.45359 \text{ kg}}{1 \cancel{\text{kg}}} = 13.2675075 \text{ kg} \rightarrow 13.27 \text{ kg}$$

4 sig. fig.

3.  $210 \text{ cm} \times \frac{1 \text{ in}}{2.54 \text{ cm}} = 82.67 \text{ in} \rightarrow$

83 in  
2 sig. fig.

4.  $3.05 \cancel{\text{m}} \times \frac{39.37 \cancel{\text{in}}}{1 \cancel{\text{m}}} \times \frac{1 \text{ ft}}{12 \cancel{\text{in}}} = \frac{3.05 \times 39.37}{12} \text{ ft} = 10.003917 \text{ ft}$

10.0 ft  
3 sig. fig.

5.  $14 \cancel{\text{gal}} \times \frac{3.785 \text{ L}}{1 \cancel{\text{gal}}} = 52.99 \text{ L} \rightarrow$

53 L  
2 sig. fig.

6.  $2.5 \cancel{\text{L}} \times \frac{1 \text{ qt}}{0.9463 \cancel{\text{L}}} = 2.6 \text{ qt}$   
2 sig. fig.

This is less than 3 qt so it's not enough.

7.  $20 \cancel{\text{ha}} \times \frac{2.47 \cancel{\text{a}}}{1 \cancel{\text{ha}}} \times \frac{1 \text{ owl}}{3 \cancel{\text{a}}} = 16.4666667 \text{ owl} \rightarrow$

20 owl (1 sig. fig.)

8.  $8 \cancel{\text{a}} \times \frac{1 \cancel{\text{ha}}}{2.47 \cancel{\text{a}}} \times \frac{1 \text{ sheep}}{0.125 \text{ ha}} = \frac{8}{2.47 \times 0.125} \text{ sheep} =$   
 $25.91093117 \text{ sheep} \rightarrow 30 \text{ sheep (1 sig fig)}$

9.  $1 \text{ pk} = 34 \text{ g carbs}$   
 $6 \text{ days} \times \frac{1 \text{ pk}}{\text{day}} \times \frac{34 \text{ g carb}}{\text{pk}} \times \frac{16 \text{ oz}}{454 \text{ g}} = \frac{6 \times 34 \times 16}{454} \text{ oz carb} =$   
 $7.189427313 \text{ oz carb} = 7 \text{ oz carb (1 sig. fig.)}$

10.  $9 \text{ g fat} = 1 \text{ bar}$  ;  $1 \text{ pack} = 0.6 \text{ dbar}$  ;  $\text{a) ? oz fat}$   $\text{b) ? cal}$   
 $1 \text{ pack} \times \frac{0.6 \text{ dbar}}{1 \text{ pack}} \times \frac{10 \text{ bar}}{1 \text{ dbar}} \times \frac{9 \text{ g fat}}{1 \text{ bar}} \times \frac{1 \cancel{\text{lb}}}{453.6 \text{ g}} \times \frac{16 \text{ oz}}{1 \cancel{\text{lb}}} =$   
 $\text{a) } \frac{0.6 \times 10 \times 9 \times 16}{453.6} \text{ oz fat} = 1.904761905 \text{ oz} \approx 2 \text{ oz fat}$   
 $\text{b) } 0.6 \times 10 \times 9 \text{ g fat} \times \frac{9 \text{ cal}}{1 \text{ g fat}} = 0.6 \times 10 \times 9 \times 9 \text{ Cal} = 486 \text{ Cal}$   
 $500 \text{ cal (1 sig. fig.)}$

11.  $60 \text{ mg vitC} = 1 \text{ day}$  ;  $70 \text{ mg vitC} = 100 \text{ g orange}$  ;  $3 \text{ oz} = 1 \text{ orange}$   
 $1 \text{ week} \times \frac{7 \text{ days}}{1 \text{ wk}} \times \frac{60 \text{ mg vitC}}{1 \text{ day}} \times \frac{100 \text{ g orange}}{70 \text{ mg vitC}} \times \frac{16 \text{ oz}}{454 \text{ g}} \times \frac{1 \text{ orange}}{3 \text{ oz}} =$   
 $\frac{7 \times 60 \times 100 \times 16}{70 \times 454 \times 3} \text{ oranges} = 7 \text{ oranges (1 sig. fig.)}$

12.  $5 \text{ mg tar} = 1 \text{ cig}$  ;  $0.4 \text{ mg nic} = 1 \text{ cig.}$  ;  $20 \text{ cig.} = 1 \text{ pk}$   
 $80 \cancel{\text{g tar}} \times \frac{454 \cancel{\text{g}}}{1 \cancel{\text{oz}}} \times \frac{1 \cancel{\text{mg}}}{10^{-3} \cancel{\text{g}}} \times \frac{1 \cancel{\text{cig}}}{5 \cancel{\text{mg tar}}} \times \frac{1 \text{ pk}}{20 \cancel{\text{cig}}} = 40,000 \text{ pk}$   
 $1 \text{ sig. fig.}$

12. cont. How many packs of cig. = 1g nicotine

$$1 \text{ g/nic} \times \frac{1 \text{ cig}}{0.4 \text{ mg nic}} \times \frac{1 \text{ mg}}{10^{-3} \text{ g}} \times \frac{1 \text{ pk}}{20 \text{ cig}} =$$

$$\frac{1}{0.4 \times 10^{-3} \times 20} \text{ pk} = 125 \text{ pk} \rightarrow 100 \text{ pk (1 sig. fig.)}$$

13. 60 mi/hr. What dist. equals 1 sec.

1 sec  $\rightarrow$  dist (ft).

$$1 \text{ sec} \times \frac{1 \text{ min}}{60 \text{ sec}} \times \frac{1 \text{ hr}}{60 \text{ min}} \times \frac{60 \text{ mi}}{1 \text{ hr}} \times \frac{5280 \text{ ft}}{1 \text{ mi}} =$$

$$\frac{\cancel{60} \times 5280}{\cancel{60} \times 60} \text{ ft} = 88 \text{ ft} \rightarrow 90 \text{ ft (1 sig. fig.)}$$