ME1 Section 8.3: Weight and Mass

Vocabulary: **Weight**: how heavy an object is

Example: A female African elephant weighs ~7900 pounds

Mass: scientifically different from weight – how much stuff there is in an object

Example: A paper clip has a mass of about 1 gram

Tons: a customary unit for weight

Example: 1 ton = 2000 pounds

Pounds: a customary unit for weight

Example: 1 pound (lb.) = 16 ounces

Ounces: a customary unit for weight, different than fl. oz.

Example: A block of cheese could be 8 oz.

Grams: base for weight measure in metric system

Example: A cubic centimeter of water weighs 1 gram (g)

Example 1: $7900 \text{ lbs} \cdot \frac{1 \text{ ton}}{2000 \text{ lbs}} = \boxed{3.95 \text{ tons}}$

$7900 \text{ lbs} \cdot \frac{16 \text{ oz.}}{1 \text{ lb}} = \boxed{126,400 \text{ oz.}}$

Exploration 2: Larger weight ~~measures~~ units: kilogram, hectogram, dekagram
smaller weight units: decigram, centigram, milligram

Example 2: $3000 \text{ kg} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} = \boxed{3,000,000 \text{ g}}$

Problems: 1)

object	customary unit	metric unit
handful of grapes	ounces	grams
school bus	tons	kilograms
backpack	pounds	kilograms

2) a) $4500 \text{ lbs} \cdot \frac{1 \text{ ton}}{2000 \text{ lbs}} = \boxed{2.25 \text{ tons}}$

b) $40 \text{ oz.} \cdot \frac{1 \text{ lb.}}{16 \text{ oz}} = \boxed{2.5 \text{ lbs.}}$

c) $7 \text{ tons} \cdot \frac{2000 \text{ lbs}}{1 \text{ ton}} \cdot \frac{16 \text{ oz.}}{1 \text{ lb.}} = \boxed{224,000 \text{ oz.}}$

3) a) $300 \text{ mg} \cdot \frac{1 \text{ g}}{1000 \text{ mg}} = \boxed{.3 \text{ g}}$

b) $3 \text{ kg} \cdot \frac{1,000,000 \text{ mg}}{1 \text{ kg}} = \boxed{3,000,000 \text{ mg}}$

c) $10 \text{ g} \cdot \frac{10 \text{ dg}}{1 \text{ g}} = \boxed{100 \text{ dg}}$

4) $(7 \text{ lbs.} + 5 \text{ oz.}) \div 9 \text{ oz.}$

$7 \text{ lbs} \cdot \frac{16 \text{ oz}}{1 \text{ lb}} = 112 \text{ oz}$ $\qquad 112 \text{ oz} + 5 \text{ oz} = 117 \text{ oz}$

$\frac{117}{9} = \boxed{13 \text{ burgers}}$

5) $3625 \text{ lb} + 7800 \text{ lb} + 2375 \text{ lb} = 13800 \text{ lbs}$

$13800 \text{ lbs} \cdot \frac{1 \text{ ton}}{2000 \text{ lbs}} = \boxed{6.9 \text{ tons of rocks}}$

6) $49.8 \text{ kg} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} = 49,800 \text{ g}$

$52,632 \text{ g} > 49,800 \text{ g}$
Victoria Penelope

$$\begin{array}{r} 52632 \\ -\ 49800 \\ \hline 2832 \end{array}$$

Victoria weighs 2,832 g more than Penelope

7) a) P: $2.3 \text{ kg} \cdot \frac{1000 \text{ g}}{1 \text{ kg}} = 2300 \text{ g}$
C: 175 g
H: $970,000 \text{ mg} \cdot \frac{1 \text{ g}}{1000 \text{ mg}} = 970 \text{ g}$

$2300 + 175 + 970 = \boxed{3445 \text{ g}}$

b) Parker bought the most candy by weight

c) $P + H = 2300 \text{ g} + 970 \text{ g} = \boxed{3270 \text{ g}}$

8) $95000 \text{ mm} \cdot \frac{1 \text{ m}}{1000 \text{ mm}} \cdot \frac{1 \text{ km}}{1000 \text{ m}} = \boxed{0.095 \text{ km}}$