Unit 1 Part 13: EZPZ Review

This is called an "E-Z-P-Z" Review. This review only hits the basic and foundation of the unit. The extended and more difficult questions were on your QUEST homework so look there! ☺
This is just to make sure you at least know the **basics**!

1. Consider the results of three students who repeatedly weighed a lead block known to have a **true mass** of 10.00 g (indicated by the solid horizontal blue line on the graphs).

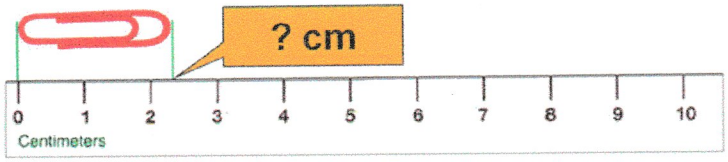
	Student A	Student B	Student C
Trial 1	10.49 g	9.78 g	10.03 g
Trial 2	9.79 g	9.82 g	9.99 g
Trial 3	9.92 g	9.75 g	10.03 g
Trial 4	10.31 g	9.80 g	9.98 g
Average	**10.13 g**	**9.79 g**	**10.01 g**
Range	0.70 g	0.07 g	0.05 g

a. Which student was both inaccurate and imprecise? A

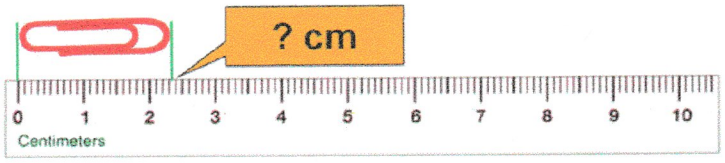
b. Which student was accurate and precise? C

c. Which student was inaccurate, but precise? B

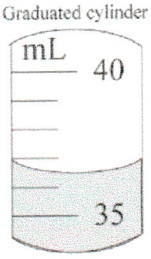
2. Measure or calculate to the correct number of significant figures:

a. 

2.3 cm

c. 

2.35 cm



b. 36.5 mL

d. 0.355 + 105.1 − 100.5820 = 4.9
(thousandths, tenths, ten thousandths)

e. (3.102 − 1.23) / 0.782 = 2.39
1.872 / 0.782
3 s.f. 3 s.f.

f. 2.345 + 0.07 + 2.9975 = 5.41
(thousandths, hundredths, ten thousandths)

g. 5.6 × 2.12 − 1.05 = 11
11.872 − 1.05
ones hundredths

h. 2.380 × 7.1 = 17
4 s.f. 2 s.f.

i. [(1.428 − 1.08)/0.288] + (2.83 × 0.360) = 2.2
0.348 / 0.288 + 1.0188
1.2 8333 + 1.0188
tenths hundredths

3. A student measured a mass to be 250. But the actual mass was 240. g. What is the percent error (in the correct number of sig figs)?

$$\frac{(240.\text{ g} - 250.\text{ g})}{240.\text{ g}} \times 100 = \frac{-10.\text{ g}}{240.\text{ g}} \times 100 = \boxed{-4.2\%\ \text{error}}$$

4. Convert:

a. 592 μm to mm

$592\ \mu m \times \frac{1\ m}{10^6\ \mu m} \times \frac{10^3\ mm}{1\ m} = \boxed{0.592\ mm}$

b. 2.31 kg to g

$2.31\ kg \times \frac{1000\ g}{1\ kg} = \boxed{2310\ g}$

c. 0.980 dL to cL

$0.980\ dL \times \frac{1\ L}{10\ dL} \times \frac{100\ cL}{1\ L} = \boxed{9.80\ cL}$

5. States of Matter: Matching! Label each property as solid (s), liquid (l), or gas (g). Some questions may have more than one correct answer! Each answer may be used more than once!

a. l,g Particles take the shape of their container.

b. aq Particles of the substance are dissolved in water. (for aqueous!)

c. s,l Particles have definite volume.

d. l Particles flow past each other.

e. g Particles have indefinite volume.

f. g Particles are the most compressible.

g. g Particles may easily be squished closer together.

h. l,g Particles have indefinite shape.

i. s Particles keep their own shape no matter what container they're in.

j. g Particles move all over.

k. s Particles have definite shape.

l. s One example is paper.

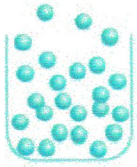
m. s Particles are the least compressible.

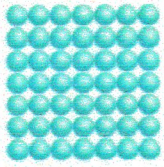
n. s,l Particles keep their own volume no matter what container they're in.

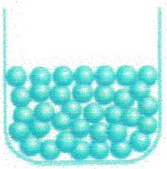
o. g Particles spread out to fill their entire container.

p. s Particles cannot be squished closer together. (liquids can be squished a tiny bit)

q. g Particles can compress to fit into a smaller container.

r. g 

s. s 

t. l 

6. Identify each of the following as: element (E), compound (C), heterogeneous (He) or homogeneous (Ho).

a. air Ho ($O_2 + N_2 + He$ + etc.)

b. chlorine (Cl_2) E

c. carbon dioxide (CO_2) C

d. granite He

e. salt water Ho ($NaCl + H_2O$)

f. liquid nitrogen (N_2) E

g. concrete He

h. apple juice Ho (sugars + H_2O + vitamins...)

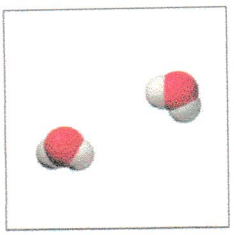
i. sand He

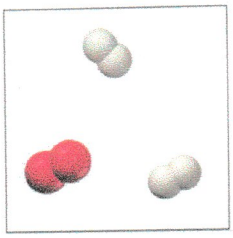
j. glucose C ($C_6H_{12}O_6$)

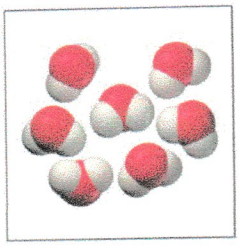
k. carbon (C) E

l. pure water C (H_2O)

7. Classify whether the picture is a **pure substance** (element/compound) or **mixture** (homo/hetero):







a. pure substance (compound)

b. mixture

c. pure substance (compound)

8. Determine whether each of the following is a physical or chemical change.

a. Iron rusts from exposure to the oxygen gas in the air, forming reddish brown flakes.

$Fe(s) + O_2(g) \rightarrow FeO_2(s)$ new Fe-O bonds

chemical

Oxidation is chemical. New substance is formed.

b. Delicious sugar (glucose) is dissolved into tea.

$C_{22}H_{18}O_{11}(aq) + C_6H_{12}O_6(s) \rightarrow C_{22}H_{18}O_{11}(aq) + C_6H_{12}O_6(aq)$

tea + sugar → tea + sugar

physical

Phase change only. No new substances are formed.

c. Hydrogen peroxide decomposes into hydrogen gas and oxygen gas.

$H_2O_2(l) \rightarrow H_2(g) + O_2(g)$ H-O bonds have broken

chemical

Decompositions are chemical. Bonds have broken, new substances form.

d. Ethanol evaporates.

$C_2H_6O(l) \rightarrow C_2H_6O(g)$

ethanol → ethanol

physical

Phase changes are physical. No new substances form.

9. Determine if it a physical OR a chemical property. Determine if it is an extensive OR an intensive property.

Property	Physical Property	Chemical Property	Extensive Property	Intensive Property
a. magnetism	✓			✓
b. malleability (can be hammered thin)	✓			✓
c. temperature	✓			✓
d. flammability		✓		✓
e. red color	✓			✓
f. reacts violently with sodium		✓		✓
g. length	✓		✓	
h. mass	✓		✓	
i. produces a different gas when heated (decomposition)		✓		✓
j. dissolves in water	✓			✓
k. rough texture	✓			✓
l. sweet taste	✓			✓
m. density	✓			✓
n. toxicity		✓		✓
o. sour taste	✓			✓
p. melting point	✓			✓
q. boiling point	✓			✓
r. hardness	✓			✓
s. luster (how shiny it is)	✓			✓
t. odor	✓			✓

10. Density:

a. Calculate the density of mercury if 1.00×10^2 g occupies a volume of 7.36 cm^3.

$$D = \frac{m}{V} = \frac{1.00 \times 10^2 \text{ g}}{7.36 \text{ cm}^3} = 13.5869 \approx \boxed{13.6 \text{ g/cm}^3}$$

TABLE 1.4 The Density of Some Common Substances at 20 °C	
Substance	**Density (g/cm^3)**
Charcoal (from oak)	0.57
Ethanol	0.789
Ice	0.917 (at 0 °C)
Water	1.00 (at 4 °C)
Sugar (sucrose)	1.58
Table salt (sodium chloride)	2.16
Glass	2.6
Aluminum	2.70
Titanium	4.51
Iron	7.86
Copper	8.96
Lead	11.4
Mercury	13.55
Gold	19.3
Platinum	21.4

b. A container is holding 212.1 g of water.

i. What is the volume of water in the container?

there are 2 ways to work!

$D = \frac{m}{V}$

$1.00 = \frac{212.1 \text{ g}}{V}$

$V = \boxed{212.1 \text{ cm}^3}$

OR

$212.1 \text{ g} \times \frac{1.00 \text{ cm}^3}{1.00 \text{ g}} = \boxed{212.1 \text{ cm}^3}$

ii. What is the density of water?

1.00 g/cm^3 ← scientific constant (infinite sig figs)

iii. Would charcoal float in water? (Use the chart to the right.)

Yes! Charcoal is less dense.

c. The mass of an unknown object is 115.92 g and the volume is 6.00 cm^3.

i. What is the density of the object?

$$D = \frac{m}{V} = \frac{115.92 \text{ g}}{6.00 \text{ cm}^3} = 19.32 \approx \boxed{19.3 \text{ g/cm}^3}$$

ii. Using the chart to the right, identify the unknown object.

Gold!