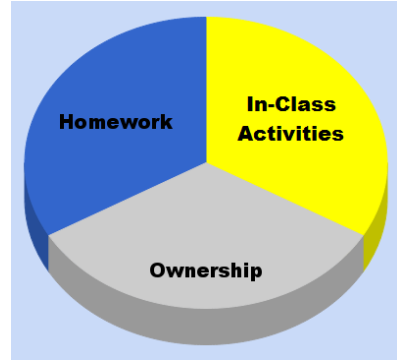


Worksheet L4X

_____ Student's Name



Directions: Complete the following prior to class. Be prepared to show your work on the board.

1) Convert 30 mL to oz, qt, L, gal.

2) Convert 16 oz to kg, lb, tons, g.

3) Convert 25.4 cm to inches, m, km, Mm.

4) Convert 39.37 inches to nm, pm, cm, m.

5) A sphere of diameter 5 cm has a mass of 10 g. Determine the density of the sphere.

6) A cylinder of height 12 cm, diameter of 12 cm has a mass of 5 g. Determine the density of the cylinder.

7) A piece of wood that measures 3.0 cm by 6.0 cm by 4.0 cm has a mass of 80.0 grams. What is the density of the wood? Would the piece of wood float in water?

- 8) A cup of gold colored metal beads was measured to have a mass 425 grams. By water displacement, the **volume** of the beads was calculated to be 48.0 cm^3 . Given the following densities, identify the metal.

Gold: 19.3 g/mL

Copper: 8.86 g/mL

Bronze: 9.87 g/mL

- 9) I threw a plastic ball in the pool for my dog to fetch. The mass of the ball was 125 grams. What must the **volume** be to have a **density** of 0.500 g/mL .

10) What is the mass of a cylinder of lead that is 2.50 cm in diameter, and 5.50 cm long. The density of lead is 11.4 g/cm^3 .

11) An ice cube measuring 5.80 cm by 5.80 cm by 5.80 cm has a density of 0.917 g/mL . What is the mass? (1 cc is approximately 1 mL)

12) Gasoline is a non-polar liquid that will float on water. 450 grams of gasoline is spilled into a puddle of water. If the density of gasoline is 0.665 g/mL , what volume of gasoline is spilled?

13) A little aluminum boat (mass of 14.50 g) has a volume of 450.00 cm³. The boat is placed in a small pool of water and carefully filled with pennies. If each penny has a mass of 2.50 g, how many pennies can be added to the boat before it sinks?

14) To the alchemists, gold was the material representation of purity. It is a very soft metal that can be hammered into extremely thin sheets. If a 1.10 gram piece of gold ($\rho = 19.32$ g/cc) is hammered into a sheet whose area is 40.0 sq ft, what is the average thickness of the sheet in mm?

15) Rocks are sometimes used along coasts to prevent erosion. If a rock needs to weigh 2,000 kilograms in order not to be shifted by waves, how what volume does it need to be? You are using basalt, which has a typical density of 3200 kg/m^3 .

16) You have a sample of granite with density 2.8 g/cm^3 . The density of water is 1.0 g/cm^3 . What is the specific gravity of your granite?

17) You have a sample of granite with density 174.8 lbs/ft^3 . The density of water is 62.4 lbs/ft^3 . What is the specific gravity of the granite now?

18) A cylinder of plastic is 100 mm long, and 50 mm in diameter. It has a mass of 1 kg. Determine its specific gravity and indicate whether it would float or sink in water.

19) A bar measures 12 mm x 20 mm x 1 m. It has a specific gravity of 2.78. Determine its mass.

20) A piece of unknown material has an intricate shape. It has a mass of 126 g. You submerge it to find it displaces 422 ml of water. What is the specific gravity of the piece?

21) Someone gives you a kilogram of aluminum and a kilogram of lead. Both objects are solid, rectangular blocks.

A) Which is *more massive* on the surface of the *earth*?

B) Which is *more massive* on the surface of the *moon*?

C) Which is *heavier* on the surface of the *earth*?

D) Which is *heavier* on the surface of the *moon*?

Explain your reasoning for each solution.

22) The density (d) of a substance is an intensive property that is defined as the ratio of its mass (m) to its volume (V). Considering that mass and volume are both extensive properties, explain why their ratio, density, is intensive.

23) Explain what an extensive property is:

24) Gold—in bricks, bars, and coins—has been a form of currency for centuries. In order to swindle people into paying for a brick of gold without actually investing in a brick of gold, people have considered filling the centers of hollow gold bricks with lead to fool buyers into thinking that the entire brick is gold. It does not work: Lead is a dense substance, but its density is not as great as that of gold, 19.3 g/cm^3 . What is the density of lead if a cube of lead has an edge length of 2.00 cm and a mass of 90.7 g?

25) A large piece of jewelry has a mass of 132.6 g. A graduated cylinder initially contains 48.6 mL water. When the jewelry is submerged in the graduated cylinder, the total volume increases to 61.2 mL.

(a) Determine the density of this piece of jewelry.

(b) Assuming that the jewelry is made from only one substance, what substance is it likely to be? Explain.