

LESSON 3 WORKSHEET
SURVIVAL SCIENCE

ANSWERS

INITIALS: _____

CALCULATING DENSITY

1. Find **Mass (weight)** of the following objects: (**Weights will vary – Scale variance AND..**)

100 PENNIES **250-300 grams** (250-300 grams) mostly old pennies were used

Per roll/50 Old pennies = 150 grams New pennies = 125 per roll

25 PENNIES **65-75 grams** (divide above by 4)

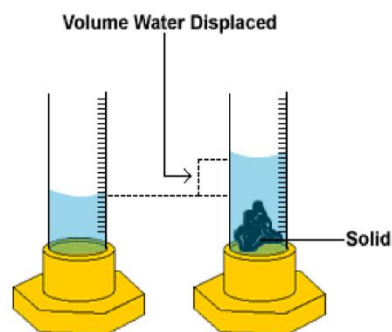
new pennies have less “15.4 grains = 1 gram”

48 grains prior to 1982; 38.6 grains after 1982

2. Measure the **volume** of the following objects:

- SPORT BALL **5 cc's or mL** (weight = 10 g)

- 25 PENNIES **10 cc's or mL**



This Photo by Unknown Author is

3. Calculate the Density:

$$\text{Density}(p) = \text{Mass}(m) / \text{Volume}(v) \quad p = m/v$$

SPORT BALL **10g/5 mL = 2 g/mL** (2 x denser than water)

PENNIES **65-75 g/10 mL = ~7 g/mL** (Zinc is 7.1 g/mL Copper is 8.96 g/mL)

4. Feel **Density** differences (using a perfect cube measuring 1 cm per side)

Specific Gravity Compares to 1 cm³ water

WEIGHT IN GRAMS	mL given in cc or cm ³	DENSITY RANKING (1-4)
Cu (copper) 8.96 g/1 mL = ~9 g/cm³	9 x denser than water	2
Fe (iron) 7.874 g/1 mL = ~8 g/cm³	8 x denser than water	3
Al (aluminum) 2.7 g/1 mL = ~2 ½ g/cm³	2.5 x denser than water	4
Pb (lead) 11.34 g/1 mL = ~11 ½ g/cm³	11.5 x denser than water	1

Which ELEMENT is most dense based on your density rank above: **Lead**

METALLURGY (less than 2000 degrees F or ~1100 degrees C temp or)

Tin = Sn Iron = Fe Copper = Cu Antimony = Sb Lead = Pb Al = Aluminum Zn = Zinc
Ag = Silver Au = Gold

BRONZE: Cu Copper 88% + Sn Tin 12%

PEWTER: Sn Tin 85% + Sb Antimony or Pb Lead (older pewter)

AMMO: Pb Lead + Sn Tin/Sb Antimony or BRASS = Cu + Zn (several options)