

Sig Fig Practice (#3)

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For **all** of the following questions, make sure you (1) show work and (2) use significant figures correctly. **From now on** all science work at GSIS must be in significant figures. In addition, you will lost **at least a letter grade** for not using units.

Speed equation: *speed = distance/time*

Density equation: *density = mass/volume*

1. What is the volume of object that is 83.6 cm long, 10.62 cm wide, and 1.2 cm thick?
2. What is the volume after 5.74 cm is cut off from the long edge?
3. Solve the following problems and express the results with the correct number of significant figures.
 - a. $3.894 \times 2.16 =$
 - b. $2.96 + 8.1 + 5.0214 =$
 - c. $2.17 + 4.32 + 401.278 + 21.826 =$
 - d. $485 \div 9.2317$
 - e. $2.46 \times 2 =$
 - f. $9.146 - 9.137 =$
 - g. $(5.12 \times 10^4) * (6.8726 \times 10^{-9}) =$
4. The mass of the sun is 1.989×10^{30} kg and the radius is 696000 km. More on the sun. What is the average density of the sun? [Hint; you will need to know the sun is a sphere... and then find a formula for that.]

5. In the opening scenes of the movie Raiders of the Lost Ark, Indiana Jones tries to remove a gold idol from a booby-trapped pedestal. He replaces the idol with a bag of sand of approximately equal volume. (Density of gold = 19.32 g/cm^3 ; density of sand 3 g/cm^3 .) {from Zumdahl, Chemistry, Saunders (1994).
- Did he have a reasonable chance of not activating the mass-sensitive booby trap? Show your calculations.
 - In a later scene he and an unscrupulous guide play catch with the idol. Assume that the volume of the idol is about 1.0 L. If it were solid gold, what mass would the idol have? Is playing catch with it plausible; explain.
6. The world record for the hundred meter dash was:
- * Men 9.79 s Maurice Greene
 - * Women 10.49 s Florence Griffith-Joyner
- What was each of their speeds?
7. The mercury concentration in a polluted lake is $0.0125 \mu\text{g/L}$, what is the total mass in μg (micrograms) of mercury in the lake if the lake is approximately circular with a diameter of 10,000 feet and an average depth of 50 ft? [Extra points for finding mass in kg also.]
8. A block of aluminum occupies a volume of 15.0 mL and weighs 40.5 g. What is its density?
9. Mercury metal is poured into a graduated cylinder that holds exactly 22.5 mL. The mercury used to fill the

cylinder weighs 306.0 g. From this information, calculate the density of mercury.

10. What is the weight of the ethyl alcohol that exactly fills a 200.0 mL container? The density of ethyl alcohol is 0.789 g/mL.
11. A rectangular block of copper metal weighs 1896 g. The dimensions of the block are 8.4 cm by 5.5 cm by 4.6 cm. From this data, what is the density of copper?
12. A flask that weighs 345.8 g is filled with 225 mL of carbon tetrachloride. The weight of the flask and carbon tetrachloride is found to be 703.55 g. From this information, calculate the density of carbon tetrachloride.
13. Calculate the density of sulfuric acid if 35.4 mL of the acid weighs 65.14 g.
14. Find the mass of 250.0 mL of benzene. The density of benzene is 0.8765 g/mL.
15. A block of lead has dimensions of 4.50 cm by 5.20 cm by 6.00 cm. The block weighs 1587 g. From this information, calculate the density of lead.
16. 28.5 g of iron shot is added to a graduated cylinder containing 45.50 mL of water. The water level rises to the 49.10 mL mark, From this information, calculate the density of iron.
17. If the density of silver is 10.5 g/cm³, what volume will weigh exactly 2500.0 g.