Name _____ _____ Date _____ Class _____

WORKSHEET 32 MATH IN SCIENCE | INTEGRATED SCIENCE

MATH SKILLS USED: Multiplication, Division, Decimals

Density

Calculate density, and identify substances using a density chart.

Density is a measure of the amount of mass in a certain volume. This physical property is often used to identify and classify substances. It is usually expressed in grams per cubic centimeters, or g/cm³. The chart on the right lists the densities of some common materials.

Densities of Substances

Substance	Density (g/cm³)
Gold	19.3
Mercury	13.5
Lead	11.4
Iron	7.87
Aluminum	2.7
Bone	1.7–2.0
Gasoline	0.66–0.69
Air (dry)	0.00119

EQUATION: $\text{density} = \frac{\text{mass}}{\text{volume}}$

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

SAMPLE PROBLEM: What is the density of a billiard ball that has a volume of 100 cm³ and a mass of 250 g?

$$D = \frac{250\ \text{g}}{100\ \text{cm}^3}$$

$$D = 2.5\ \text{g/cm}^3$$

Your Turn!

1. A loaf of bread has a volume of 2270 cm³ and a mass of 454 g. What is the density of the bread?

_____

2. A liter of water has a mass of 1000 g. What is the density of water? (Hint: 1 mL = 1 cm³)

_____

3. A block of wood has a density of 0.6 g/cm³ and a volume of 1.2 cm³. What is the mass of the block of wood? Be careful!

_____

4. Use the data below to calculate the density of each unknown substance. Then use the density chart above to determine the identity of each substance.

	Mass (g)	Volume (cm³)	Density (g/cm³)	Substance
Example:	4725	350	4725 ÷ 350 = 13.5	mercury
a.	171	15	_____	_____
b.	108	40	_____	_____
c.	475	250	_____	_____
d.	680	1000	_____	_____

BUOYANT FORCE

NAME_____
DATE_____
PER_____PAGE_____

Read pages 168-172 of the handout on Buoyant Force. Then complete the following questions in complete sentences where appropriate:

1. Define buoyant force:

2. _____ principle states that the buoyant force on an object in a fluid is an _____ force equal to the _____ of the volume of fluid that the object _____.

3. Buoyant force opposes _____.

4. When would an object in a fluid sink?

5. When would an object in a fluid float?

6. Why do so few substances float in air?

7. Give an example of a substance that floats in air:_____

8. How does a steel ship float?

9. How can a submarine travel both under water and at the surface of the water?

10. How does a bony fish's swim bladder work to allow it to remain at a certain water depth?

ANALYSIS:

1. How does the buoyant force compare with the weight of the displaced water?

2. Why does the volume of water always equal it's mass?

3. How did the buoyant force change between 14 washers and 20 washers? Why?

4. What would happen if you were to add even more washers to the container? Explain your answer in terms of the buoyant force.

5. What would happen if you put the washers into the water without the container?

6. What difference does the container's shape make? In other words, why do the washers float when you put them into the container?