

Name: \_\_\_\_\_ Pd: \_\_\_\_\_

1. Find the density of a wood block that has a volume of  $5.0 \text{ cm}^3$  and a mass of  $0.5 \text{ g}$ .  
 $0.1 \text{ g/cm}^3$
  
2. What volume would a rock occupy if it had a mass  $31.2 \text{ g}$  and a density of  $10.4 \text{ g/cm}^3$ ?  
 $2.0 \text{ cm}^3$
  
3. Calculate the mass of a wood block that is  $4.0 \text{ cm}$  long,  $2.0 \text{ cm}$  wide,  $6.0 \text{ cm}$  high, and has a density of  $0.50 \text{ g/cm}^3$ .  
 $24 \text{ g}$
  
4. Which has the greater mass.  $10 \text{ cm}^3$  of steel ( $D = 1.8 \text{ g/cm}^3$ ) or  $5 \text{ cm}^3$  of mercury ( $D = 13.6 \text{ g/cm}^3$ )?  
 $20 \text{ g}$ 
 $70 \text{ g}$
  
5. Suppose you mix:  $0.4 \text{ liter}$  of red tinted oil ( $D = 0.90 \text{ g/mL}$ ) with  $0.4 \text{ liter}$  of blue tinted seawater ( $D = 1.025 \text{ g/mL}$ ) in a one liter container. After sealing the container, you shake the mixture and come back in 1 hour. What do you see in the container?
  
6. An irregular-shaped object has a density of  $8.0 \text{ g/cm}^3$ . Its mass is  $72 \text{ grams}$ . How many cubic centimeters of water will it displace?  
 $9 \text{ cm}^3$
  
7. A cube of cork has a density of  $0.24 \text{ g/cm}^3$ . It floats in water. Suppose you cut a hole in the cork and place lead ( $D = 11.3 \text{ g/cm}^3$ ) inside. Now it sinks in water. Why does it sink? Have you changed the density of the substance cork? What have you changed?

**Solubility and Acids & Bases**

8. How does a solute differ from a solvent?
9. Give two examples of each a (solute and a solvent).
10. Describe how table salt dissolves in H<sub>2</sub>O.
11. What factors determine the rate at which a solute dissolves?
12. Briefly explain how each factor above effects the rate of dissolving for a solute in a liquid solvent.
13. How do temperature and pressure effect the solubility of a gas in a liquid?
14. Distinguish between an unsaturated and a saturated solution.
15. What is a supersaturated solution?
16. Identify the solute and the solvent in each of the following. a). ocean water, b). carbonated water, c) a beaker full of colored water, d). a sugar water solution
17. How can you determine whether a solution is saturated, unsaturated, or supersaturated?

**Solubility in g/100 g of Water at the Temperature Indicated**

Compound	1°C	20°C	60°C	99°C
NH <sub>4</sub> Cl	29.4	37.2	55.3	77.3
PbCl <sub>2</sub>	0.67	1.00	1.94	3.20
KBr	53.6	65.3	85.5	104
NaClO <sub>3</sub>	79.6	95.9	137	204

18. Use the data table above to determine whether the solutions below are saturated, unsaturated, or supersaturated.
  - a. 77.6 g of NH<sub>4</sub>Cl dissolved in 100g water at 99°C.
  - b. 0.70 g of PbCl<sub>2</sub> dissolved in 100g water at 60°C.
  - c. 65.3 g of KBr dissolved in 100g water at 20°C.
  - d. 70.5 g of NaClO<sub>3</sub> dissolved in 100g water at 1°C.
19. Provide a definition and an example of an acid.
20. Provide a definition and an example of a base.
21. Describe what happens in a neutralization reaction?
22. What does the pH scale measure?
23. Given the following pH values classify each substance. a). shampoo 5.8, b). blood 7.2, c). ammonia 11.5, d). vinegar 3.0, e). pure water 7.0, f). milk of magnesia 10.5

24. From the list below determine whether the description or property refers to an acid, a base, or both an acid and a base. Use the following key: A= Acid B= Base AB= Acid and Base.

- |                                       |  |
|---------------------------------------|--|
| a. sour taste                         | h. produces hydroxide ions in solution |
| b. bitter taste                       | i. can be detected with an indicator   |
| c. produces hydrogen ions in solution | j. HCl is an example                   |
| d. is an electrolyte                  | k. Ammonia is an example               |
| e. is slippery                        | l. exists in aqueous solution          |
| f. is often corrosive                 | m. soaps are examples                  |
| g. conducts electricity               |  |

Use the solubility curve to answer the following questions.

25. At about what temperature will 100 g of water would potassium chloride KCl and sodium sulfate (Na<sub>2</sub>SO<sub>4</sub>) have the same saturation point? What mass is represented at this point?
26. At about what temperature will about 132 g of both potassium nitrate (KNO<sub>3</sub>) and sodium nitrate (NaNO<sub>3</sub>) dissolved in 100 g of water.
27. If 100 g of sodium nitrate is dissolved in 100 g of water at 60°C, is the solution formed saturated, unsaturated, or supersaturated?
28. If 32 g of sodium chloride is dissolved in 100g of water at 47°C, is the solution produced saturated, unsaturated, or supersaturated?
29. How many grams of sodium nitrate must be added to form a saturated solution that currently contains 74.5 g of sodium nitrate at 40°C?
30. If a solution of potassium iodide (KI) at 20°C contains 105.3 g of potassium bromide, how much more of the solute must be added to form a saturated solution?

Solubility Curve

