

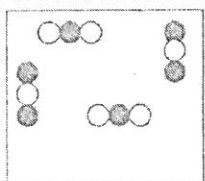
Name _____ Date _____

Matter: Pure Substances and Mixtures

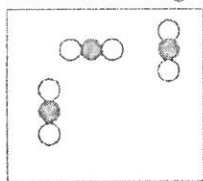
Part I: Directions: Classify each of the materials below. In the center column, state whether the material is a **pure substance** or a **mixture**. If the material is a pure substance, further classify it as either an **element** or **compound** in the right column. Similarly, if the material is a mixture, further classify it as **homogeneous** or **heterogeneous** in the right column

Material	Pure Substance	Element, Compound, Heterogeneous or Homogeneous
	Or Mixture	
Water		
Soil		
concrete		
sugar + pure water ($C_{12}H_{22}O_{11} + H_2O$)		
iron filings (Fe)		
limestone ($CaCO_3$)		
orange juice (w/pulp)		
chromium (Cr)		
Chex mix		
salt + pure water ($NaCl + H_2O$)		
benzene (C_6H_6)		
muddy water		
brass (Cu mixed with Zn)		
baking soda ($NaHCO_3$)		
Mint chocolate chip ice cream		

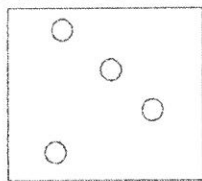
Part II: Directions: Match each diagram with its correct description. Diagrams will be used once.



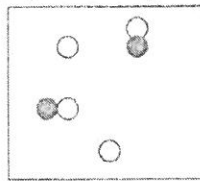
A



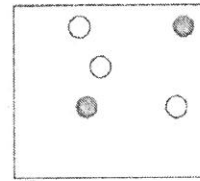
B



C



D



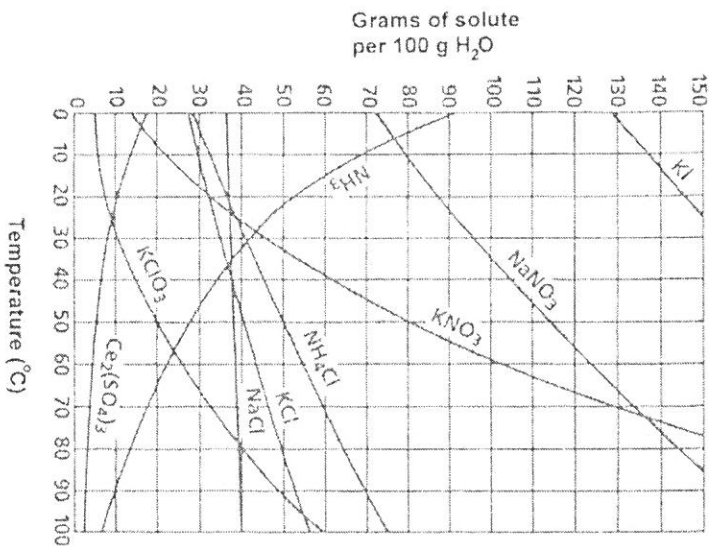
E

- ___ 1. Pure Element – only one type of atom present.
- ___ 2. Mixture of two elements – two types of uncombined atoms present.
- ___ 3. Pure compound – only one type of compound present.
- ___ 4. Mixture of two compounds – two types of compounds present.
- ___ 5. Mixture of a compound and an element.

SOLUBILITY CURVE WORKSHEET

Use your solubility curve graph provided to answer the following questions.

1. What are the customary units of solubility on solubility curves? _____
2. Define solubility. _____
3. According to the graph, the solubility of any substance changes as _____ changes.
4. List the substances whose solubility decreases as temperature increases. _____
5. Which substance is least affected by temperature changes? _____
6. How many grams of ammonium chloride (NH_4Cl) at 50°C ? _____
7. _____ and _____ have the same solubility at approximately 78°C .
8. Which compound is least soluble in water at 10°C ? _____
9. How many grams of KNO_3 can be dissolved at 50°C ? _____
10. Are the following solutions unsaturated, saturated, or supersaturated?
 - a. 45g of NaNO_3 in 100 g of water at 30°C . _____
 - b. 60g of KClO_3 in 100 g of water at 60°C . _____
11. How many grams of sodium chloride, NaCl are required to saturate 100 grams of water at 100°C ? _____
12. How many grams of NaNO_3 are required to saturate 100 grams of water at 90°C ? _____
13. How many grams of KI will saturate water at 20°C ? _____
14. At what temperature would 25g of potassium chlorate (KClO_3) dissolve? _____
15. At what temperature would 55g of NH_4Cl dissolve? _____
16. 89 g NaNO_3 is prepared at 30°C .
 - a) Will all of the salt dissolve? _____
 - b) What mass of NaNO_3 will dissolve at this temperature? _____
17. If 25 grams of NH_4Cl is dissolved at 50°C , how many additional grams NH_4Cl would be needed to make the solution saturated at 80°C ? _____
18. At 50°C , how many grams of KNO_3 will dissolve? _____
19. At 70°C , how many grams of cerium (III) sulfate ($\text{Ce}_2(\text{SO}_4)_3$) dissolve? _____
20. Determine if each of the following is unsaturated, saturated, or supersaturated.
 - a. 55g of NH_3 at 20°C . _____
 - b. 10g of $\text{Ce}_2(\text{SO}_4)_3$ at 10°C . _____
 - c. 125g of KNO_3 at 60°C . _____
 - d. 65g of NH_4Cl at 80°C . _____
 - e. 12g of NH_3 at 90°C . _____
 - f. 80g of NaNO_3 at 10°C . _____
 - g. 145g of NaNO_3 at 80°C . _____
 - h. 35g of NaCl at 100°C . _____



Name _____ Period _____ Date _____

Molarity – Ch. 13

(p.412-415)

Solve the following molarity problems. Show all work and include correct units and sig figs!

1. Find the molarity of a solution in which 58 g of NaCl are dissolved in 2.5 L of solution.

2. How many grams of KMnO_4 should be used to prepare 2.00 L of a 0.500M solution?

3. What volume of 0.25M solution can be made from 5.0 g of KCl?

4. Find the molarity of a 450 mL solution containing 13.7 g of ZnSO_4 .

5. How many grams of CuCl_2 are required to make 75 mL of a 0.20M solution?

Dilutions Worksheet

- 1) If I add 25 mL of water to 125 mL of a 0.15 M NaOH solution, what will the molarity of the diluted solution be?
- 2) If I add water to 100 mL of a 0.15 M NaOH solution until the final volume is 150 mL, what will the molarity of the diluted solution be?
- 3) How much 0.05 M HCl solution can be made by diluting 250 mL of 10 M HCl?
- 4) I have 345 mL of a 1.5 M NaCl solution. If I boil the water until the volume of the solution is 250 mL, what will the molarity of the solution be?
- 5) How much water would I need to add to 500 mL of a 2.4 M KCl solution to make a 1.0 M solution?

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Name _____ Date _____ Block _____

Solutions Review

1. Salt is often used to remove ice from roads and sidewalks. Explain how this process works in terms of colligative properties.
2. Which salt, NaCl or CaCl₂, has a greater effect on freezing point? Explain.
3. Which of the following compounds are electrolytes?
Ca(OH)₂ HC₂H₃O₂ NaBr C₂H₄ NF₃ HBr Mg₃N₂
4. You want to know if an unknown substance is polar or nonpolar. Describe what you could do to find out if you had a glass of water.
5. What pieces of information are needed to calculate a concentration?
6. Kool-aid is made from flavored powder, sugar and water. What are the following parts of Kool-aid? Solvent _____ Solute _____ Solution _____
7. How does temperature affect the solubility of most solids?
8. Polar substances can dissolve _____ (polar, nonpolar, any) substances.
9. Which will dissolve more rapidly?
a) Sugar cubes in cold water b) Sugar cubes in hot water
c) Powdered sugar in cold water d) Powdered sugar in hot water
10. Which will dissolve most slowly?
a) Large salt crystals in stirred water b) Large salt crystal in unstirred water
c) Small salt crystals in unstirred water d) Small salt crystals in stirred water

11. Which of the following will increase the solubility of most solid solutes?
a) decreasing the temperature
b) decreasing the amount of solvent at constant temperature
c) increasing the amount of solute at constant temperature
d) increasing the temperature

12. Which of the following are examples of a nonpolar compounds:
a) Water b) Carbon tetrachloride
c) benzene d) salt

Matching

Term	Definition
_____ supersaturated solution	A) a solution that has more dissolved solute than is predicted by its solubility
_____ solubility	B) a solution in which the parts do not separate into layers
_____ unsaturated solution	C) a solution that has so much solute that no more dissolves
_____ dilute solution	D) a solution that has a lot of solute
_____ concentrated solution	E) a measure of how much solute can dissolve in a solvent at a given temperature.
_____ immiscible	F) a solution in which more solute can be dissolved.
_____ solution	G) a solution in which the parts separate into layers
_____ saturated solution	H) another name for a homogeneous mixture
_____ miscible	I) a solution that has only a little solute

ELECTROLYTES

Name _____

Electrolytes are substances that break up (dissociate or ionize) in water to produce ions. These ions are capable of conducting an electric current.

Generally, electrolytes consist of acids, bases and salts (ionic compounds). Nonelectrolytes are usually covalent compounds, with the exception of acids.

Classify the following compounds as either an electrolyte or a nonelectrolyte.

Compound	Electrolyte	Nonelectrolyte
1. NaCl		
2. CH ₃ OH (methyl alcohol)		
3. C ₃ H ₅ (OH) ₃ (glycerol)		
4. HCl		
5. C ₆ H ₁₂ O ₆ (sugar)		
6. NaOH		
7. C ₂ H ₅ OH (ethyl alcohol)		
8. CH ₃ COOH (acetic acid)		
9. NH ₄ OH (NH ₃ + H ₂ O)		
10. H ₂ SO ₂		