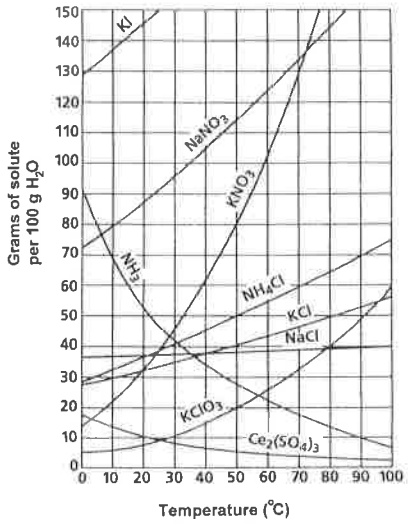
SOLUBILITY CURVE WORKSHEET

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 78oC.
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 ($Ce_2(SO_4)_3$) dissolve? _____
20. Determine if each of the following is unsaturated, saturated, or supersaturated.
    a. 55g of NH_3 at 20°C._____
    b. 10g of $Ce_2(SO_4)_3$ 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 _____ Date _____ Class _____

CHAPTER 15 STUDY GUIDE FOR CONTENT MASTERY

Section 15.2 Solution Concentration

In your textbook, read about expressing concentration and using percent to describe concentration.

Data related to aqueous solutions of sodium chloride (NaCl) and aqueous solutions of ethanol (C_2H_5OH) are provided in the table below. Use the table to answer the following questions. Circle the letter of the choice that best answers the question.

	Mass (g)			Volume (mL)	
Solution	NaCl	H_2O	Solution	C_2H_5OH	H_2O
1	3.0	100.0	5	2.0	100.0
2	3.0	200.0	6	5.0	100.0
3	3.0	300.0	7	9.0	100.0
4	3.0	400.0	8	15.0	100.0

1. What is the percent by mass of NaCl in solution 1?
a. 0.030% **b.** 2.9% **c.** 3.0% **d.** 33%

2. Which of the following solutions is the most dilute?
a. Solution 1 **b.** Solution 2 **c.** Solution 3 **d.** Solution 4

3. What is the percent by volume of C_2H_5OH in Solution 5?
a. 0.2% **b.** 1.9% **c.** 2.0% **d.** 22%

4. Which of the following solutions is the most concentrated?
a. Solution 5 **b.** Solution 6 **c.** Solution 7 **d.** Solution 8

In your textbook, read about molarity and preparing molar solutions.

Read the following problem and then answer the questions.

An 85.0-mL aqueous solution contains 7.54 g iron(II) chloride ($FeCl_2$). Calculate the molarity of the solution.

5. What is the mass of the solute? _____

6. What is the volume of the solution? _____

7. Write the equation that is used to calculate molarity.

_____

8. In what unit must the amount of the solute be expressed to calculate molarity? _____

9. In what unit must the volume of the solution be expressed to calculate molarity? _____

10. Write the expression needed to convert the volume of the solution given in the problem to the volume needed to calculate molarity. _____

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CHAPTER 16 STUDY GUIDE FOR CONTENT MASTERY

Energy and Chemical Change

Section 16.1 Energy

In your textbook, read about the nature of energy.

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word or phrase to make it true.

_____ 1. *Energy* is the ability to do work or produce heat.

_____ 2. The law of conservation of energy states that energy *can be* created and destroyed.

_____ 3. Chemical potential energy is energy stored in a substance because of its *composition*.

_____ 4. *Heat* is the flow of a warmer object to a cooler object.

_____ 5. A calorie is the amount of energy required to raise the temperature of *one gram* of pure water by one degree Celsius.

_____ 6. A *calorie* is the SI unit of heat and energy.

_____ 7. The *specific heat* of a substance is the amount of heat required to raise the temperature of one gram of that substance by one degree Celsius.

_____ 8. *Kinetic energy* is energy of motion.

_____ 9. Chemicals participating in a chemical reaction contain *only potential energy*.

_____ 10. One nutritional Calorie is equal to *100 calories*.

_____ 11. One calorie equals *4.184 joules*.

_____ 12. When a fuel is burned, some of its *chemical potential energy* is lost as heat.

_____ 13. To convert kilojoules to joules, *divide* the number of kilojoules by 1000 joules/1 kilojoule.

Answer the following question. Show all your work.

14. If the temperature of a 500.0-g sample of liquid water is raised 2.00°C, how much heat is absorbed by the water? The specific heat of liquid water is 4.184 J/(g·°C).

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CHAPTER 17 STUDY GUIDE FOR CONTENT MASTERY

Section 17.2 Factors Affecting Reaction Rates

In your textbook, read about the factors that affect reaction rates (reactivity, concentration, surface, area, temperature, and catalysts).

In the space at the left, write *true* if the statement is true; if the statement is false, change the italicized word to make it true.

_____ 1. *Decreasing* the concentration of reactants increases the collision frequency between reacting particles.

_____ 2. A *heterogeneous* catalyst exists in a different physical state than the reaction it catalyzes.

_____ 3. Increasing the *concentration* of a substance increases the kinetic energy of the particles that make up the substance.

_____ 4. Catalysts increase the rates of chemical reactions by *raising* the activation energy of the reactions.

_____ 5. *Increasing* the surface area of a reactant increases the rate of the reaction.

_____ 6. Raising the temperature of a reaction increases the rate of the reaction by increasing the *energy* of the collisions between reacting particles.

Answer the following questions.

7. A chemist heated a sample of steel wool in a burner flame exposed to oxygen in the air. He also heated a sample of steel wool in a container of nearly 100% oxygen. The steel-wool sample in the container reacted faster than the other sample. Explain why.

_____

_____

8. Would the chemist have observed the same results if he used a block of steel instead of steel wool? Explain your answer.

_____

_____

9. How would the reaction have differed if the steel wool was not heated?

_____

_____