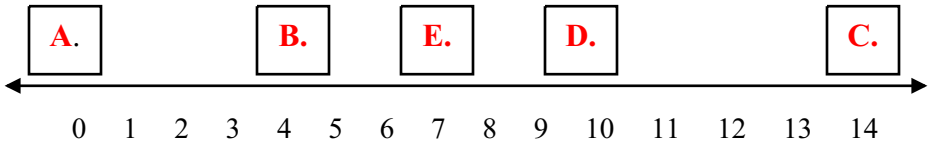
Name: _____ Date: _____ Physical Science Period: _____

Unit 12: Chapter 8 – Solutions, Acids, and Bases Study Guide Answer Key

1. Define:
   a. Solute - **a substance whose particles are dissolved in a solution.**
   b. Solvent - **a substance in which a solute dissolves.**
   c. Solution – **a mixture that forms when substances dissolve and form a homogeneous mixture.**
   d. Identify and explain what each part is for lemonade. **solvent - water; solutes - lemon juice & sugar, solution – lemonade**
   e. Saturated solution – **a solution that contains as much solute as the solvent can normally hold at a given temp.**
   f. Unsaturated solution – **a solution in which more solute can be dissolved at a given temperature.**
   g. Supersaturated solution – **a solution that contains more solute than the solvent can normally hold at a given temperature.**
2. List and describe three (3) ways we can increase the rate of dissolving of a solid.
   a. **Increasing temperature - heating**
   b. **Increasing surface area – smaller particles by crushing**
   c. **Stirring/shaking**
3. List and describe three (3) ways we can increase the rate of dissolving of a gas.
   a. **Decreasing temperature - cooling**
   b. **Increasing pressure**
   c. **Not stirring/shaking**
4. Does salt dissolve faster in hot water or in cold water? Why?
   Salt dissolves faster in hot water because salt is a solid and solid solutes dissolve faster when heated.

5. Draw a pH scale and label it with the following :
   a. strong acids b. weak acids c. strong bases d. weak bases e. neutral



6. Name five (5) properties of an acid.
   pH less than 7; sour taste; corrosive; electrolytes; turn litmus red; react with metals to form H2 gas

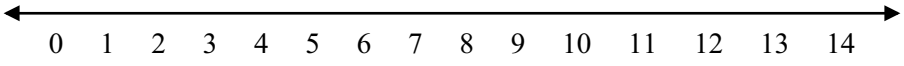
7. Give 3 examples of acidic items: **lemon juice**, **car battery acid**, **gastric juice**, **vinegar**

8. Name five (5) properties of a base.
   pH greater than 7; bitter taste; corrosive; electrolytes; turn litmus blue; feel slippery

9. Give 3 examples of basic items: **antacids/laxatives**, **detergents/soaps**, **bleach**

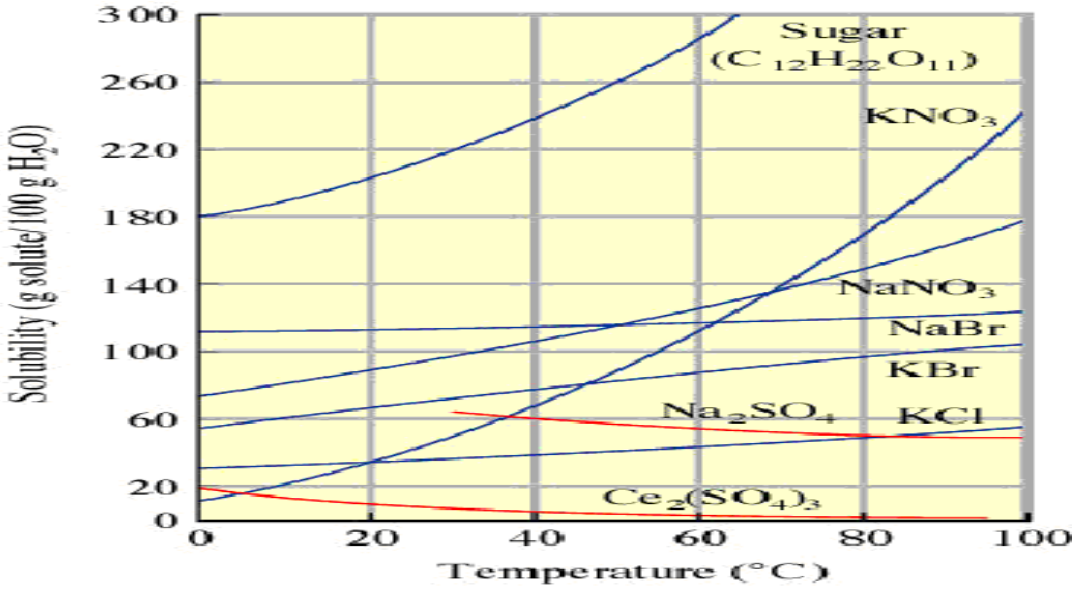
10. An acid is defined as a compound that produces **H_3O^+** or is a proton **donor**.
11. A base is defined as a compound that produces **OH^-** or is a proton **acceptor**.

*Label the following as **strong acids (SA), weak acids (WA), strong bases (SB), weak bases (WB),** or **neutral (N).***



12. Battery acid (hydrofluoric acid) pH=1 **SA**
13. Lye pH=13 **SB**
14. Orange juice pH=3 **WA**
15. Soap pH = 9 **WB**
16. Baking soda pH=8 **WB**
17. Lemon juice pH=2 **SA**
18. Lemon soap pH=6 **WA**
19. Pure water pH=7 **N**

20. A student dissolved 10g of salt in equal amounts of warm water, room-temperature water, and ice water. In which temperature of water would the salt dissolve the fastest? In which temperature would it dissolve the slowest?
The salt would dissolve the fastest in warm water. It would dissolve the slowest in ice water.



21. At what temperature would you have a saturated solution with 40g of KCl? **40ºC**
22. How would you classify a solution of 180g of sugar at a temperature of 20ºC? **unsaturated**
23. How many grams of sodium sulfate (Na_2SO_4) would form a saturated solution at 40ºC? **60g**
24. How would you classify a solution of 180g of KNO_3 at a temperature of 80ºC? **supersaturated**
25. One way to determine the degree of saturation of a solid-liquid solution is to drop a crystal of the solute into the solution. If the crystal sits at the bottom of the container, the solution is **saturated**.
26. A solution that contains more solute than it would normally hold at that temperature is said to be **supersaturated**.
27. **Solubility** is the maximum amount of a solute that will dissolve in a certain amount of solvent at a given temperature.

Compound	0° C	20° C	60° C	100° C
Ammonium chloride	29.4	37.2	55.3	77.3
Copper(II) sulfate	23.1	32.0	61.8	114
Lead(II)chloride	0.67	1.0	1.94	3.2
Potassium bromide	53.6	65.3	85.5	104
Sodium chlorate	79.6	95.9	137	204

28. Which substance is the most soluble at 100°C? **Sodium chlorate**
29. Which substance is the lease soluble at 100°C? **Lead (II) Chloride**
30. How would you classify a solution of copper (II) sulfate that has 35g at 20 °C? **supersaturated**
31. How much sodium chlorate can you dissolve at 100°C? **204g**
32. How would you classify a solution of copper (II) sulfate that has 35g at 60 °C? **unsaturated**
33. How much ammonium chloride can you dissolve at 20°C in 300g of water? ***37.2g * 3*** = **111.6g**
34. How would you classify a solution of lead (II) chloride that has 1.0g at 20 °C? **saturated**