Activity # 13

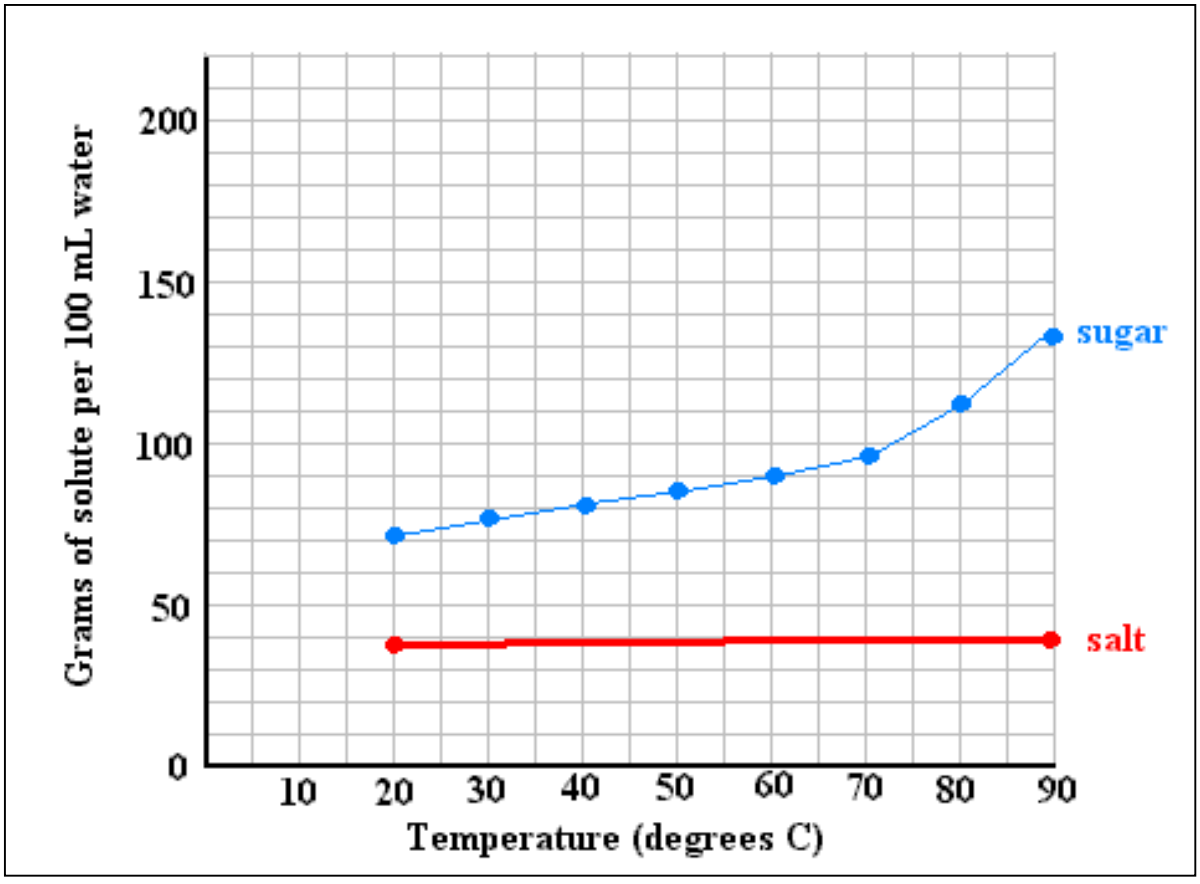
Title: Solubility Curves- Response Sheet-Teacher's Copy

1. Assigned temperature = Varies by team °C
   Solute (sugar or salt) = Varies by team
   Total grams of solute required for saturation = Varies by team g

2. Complete the following data table as lab teams report their findings: (Procedure Step #5)

Assigned temperature (degrees C)	Grams of salt required for saturation of 50 mLof water	Grams of salt required for saturation of 100 mL of water	Grams of sugar required for saturation of 50 mL of water	Grams of sugar required for saturation of 100 mL of water
20	17 (approx.)	34	36	72
30				
40				
50				
60				
70				
80				
90	20	40	66	132

3. Plot the grams of solute dissolved on 100 mL of water on the Y-axis and the temperature in °C on the X-axis for **each** solute tested in class as each individual lab team discloses its results. (Procedure Step #5)



Follow-up/Conclusions:

1. The saturation point was reached when no more solute could be dissolved. It merely settled to the bottom of the beaker.

2. One could subtract the weight of the empty beaker from the final mass of the beaker + solute MINUS 50 grams (which is the approximate mass of the 50 mL of water added to each beaker.

3. All of our solute masses had to be doubled.

4. As the temperature of the solvent (water) increases, the number of grams of solute required to saturate a solution increases (increases, decreases, remains the same).

5. No, the sugar is much more soluble than salt.

6. Temperature is the independent variable in this activity because we had control over its values throughout the lab.

7. Grams of solute dissolved is the dependent variable in this activity because its value changed as a result of a change in temperature.

8. If we allowed our water to boil, some would have vaporized, leaving less than 50 mL in the beaker. This would not allow as much solute to be dissolved as there would be with 50 mL of water.

9. If ice were used to cool the solution, additional water would be added to the beaker when it melted. This would allow more solute to eventually be dissolved than what would be expected with 50 mL of water.

10. KNO_3 and NaCl have nearly the same solubility in water at room temperature (approx. 20^{o}C).

11. About 130 grams of potassium nitrate (KNO_3) would precipitate out of solution if cooled from 100^{o}C to 60^{o}C. (240g – 110g = 130g)

12. The precipitated solute could be recovered by filtering and aspirating or by centrifuging and decanting.

13. The remaining dissolved solute could be recovered by gently boiling the solution in an evaporating dish to dryness.

14. At 45^{o}C, $NaNO_3$ is the most soluble (approx. 108 g/100 mL water) and would provide the greatest mass of remaining solute after evaporation of the solvent.