UNSATURATED, SATURATED & SUPERSATURATED SOLUTIONS LAB Name: _____ partner: _____

Follow the procedure below, and record all observations. Ignore the letters in ( ); they are for the follow-up questions.

1) Obtain a clean, unscratched test tube. Using a plastic pipet, add 1.3 mL of water (A). Weigh out and then add 0.10 g of $NaC_2H_3O_2$ (**sodium acetate**, which we will hereafter abbreviate **SA**) stopper and shake for 3 sec (B).

Observation: _____

2) Add 2.50 more grams SA but don't shake yet (C). Use a small rubber band to mark the top of the undissolved SA level. Stopper and mix for 3 sec, tilt back and forth to rinse any undissolved crystals off the sides, and note any changes (D).

Observation: _____

3) Move the rubber band to again mark the top of the undissolved solute level. Mix for another 5 sec and observe the changes, including feeling the test tube (E).

Observation: _____

4) Repeat step #3 until no more change occurs (F).

Observation: _____

Summary of SA additions

step:	add:
1	0.10 g
2	2.50 g
6	0.10 g
7	2.50 g
9	0.80 g

5) REMOVE STOPPER and rubber band! Heat test tube (in hot water) for 50-60 sec (while waiting, weigh out another 0.10 g of SA, but don't add it yet). Remove test tube from heat, stopper & shake for 10 sec (G).

Observation: _____

6) Now, while still hot, add the 0.10 additional grams of SA, stopper & shake for 10 sec (H)

Observation: _____

7) Add an additional 2.50 g of SA, stopper & mix for 10 sec (I).

Observation: _____

8) REMOVE STOPPER! Heat for 50-60 sec (while waiting, weigh out 0.80 g of SA, but don't add it yet), then remove the test tube from heat, stopper and mix for 10 sec (J).

Observation: _____

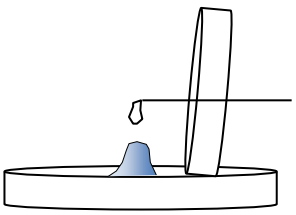
9) Add the 0.80 g of SA but don't mix (K). Cool immediately in 250 mL beaker of cool water (L). Observe all that occurs.

Observation: _____

10) Reheat the test tube until all crystals have dissolved (M), stopper and mix, and then cool in cold water for 50-60 sec (N), (If recrystalization occurs during cooling, then reheat to redissolve, then recool.)
Then add 1 tiny crystal SA & observe (O).

Observation: _____

11) Reheat until all crystals have dissolved and then an additional 30 sec (P), stir the solution and then wipe the rim of the test tube with a wet paper towel to get rid of any crystals that may be there. Do not stopper; place in cold water for 50-60 sec (Q). Place a crystal or two of SA on a clean petri dish lid. Then carefully, drop-by-drop, pour your solution out onto the crystal. Observe what happens (R). Advice: Don't allow the growing pillar to come too close to the mouth of the test tube... (The tallest <u>ten</u> pillars will receive bonus!)



Observation: _____

12) Clean up your lab area and equipment, leave it the way you found it, and place your final product in the sodium acetate recovery container.
NOTE: If you run out of time, you may come later to try again. Simply place 6.00 g of SA and 1.3 mL of water in a clean test tube and proceed to step #11.

QUESTIONS:

1. Consider each of the points throughout the procedure indicated by the letters (A-R) and decide whether at each particular moment, the test tube contained a solution that was unsaturated, saturated. or supersaturated. Hint: you should have only 2 supersat's, 5-6 sat's and the rest unsat's!

A ____ _____ J ____ _____

B ____ _____ K ____ _____

C ____ _____ L ____ _____

D ____ _____ M ____ _____

E ____ _____ N ____ _____

F ____ _____ O ____ _____

G ____ _____ P ____ _____

H ____ _____ Q ____ _____

I ____ _____ R ____ _____

2. If you were handed a solution and told to determine whether it was unsaturated, saturated or supersaturated, explain what you would do and what you would expect to see for each of three possible cases:

unsaturated: _____

saturated: _____

supersaturated: _____

3. A solution has some undissolved crystals sitting on the bottom. Could it be...

unsaturated? Y / N Explain: _____

saturated? Y / N Explain: _____

supersaturated? Y / N Explain: _____

4. Assuming water has a density of 1.00 g/mL, and assuming a single crystal has a negligible mass, what was the percent water content in your final supersaturated solution? _____ What was your percent water content in the pilar of SA you made? _____

5. Actually, the sodium acetate you used was sodium acetate trihydrate. So what was the actual percent water content in your final supersaturated solution?