

## Solubility and Rate of Solution

Name \_\_\_\_\_

This chapter we studied solutions of a solid in water. In this lab we will examine these factors that affect these rates. We will also study how the temperature changes as a solution is formed.

### Apparatus:

Balance	Test tubes, 2	Stoppers, 2	Mortar and pestle.
Test tube holder	Spatula	Graduated cylinders, 100 mL and 10 mL	

### Materials:

Sodium Thiosulfate pentahydrate, $\text{Na}_2\text{S}_2\text{O}_3$	Sodium hydroxide pellets, NaOH
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### Procedure:

1. Put approximately 3 mL of water into each test tube.
2. Add one heaping spatula of sodium thiosulfate pentahydrate to one test tube. Stopper the test tube and shake vigorously. Describe what happens to the temperature

*Observations:*

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3. Using the spatula, transfer 4 or 5 of the NaOH pellets to the second test tube.

**CAUTION:** NaOH is caustic. do not allow it to touch your skin. If it does wash it immediately with water and notify the teacher.

Stopper the test tube and shake GENTLY. Describe what happens to the temperature.

*Observations:*

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**CAUTION:** Immediately dispose of the NaOH solution by pouring it down the drain and diluting it with a large amount of water.

4. Using filter paper, weigh out four 1.0 gram portions of sodium thiosulfate pentahydrate. Put 100 mL of water in an Erlenmeyer flask. For steps 5-8, determine the time needed to completely dissolve 1.0 grams portions of sodium thiosulfate pentahydrate under the conditions specified.

5. Place 1.0 grams of sodium thiosulfate pentahydrate in the flask. DO NOT STIR.

*Time:* \_\_\_\_\_

6. Place 1.0 grams of sodium thiosulfate pentahydrate in the same flask and swirl continuously.

*Time:* \_\_\_\_\_

7. Crush 1.0 grams of sodium thiosulfate pentahydrate using the mortar and pestle. Return the crushed crystals to the filter paper and then transfer to the flask. Swirl continuously.

*Time:* \_\_\_\_\_

8. Get 100 mL of warm water from the front of the room. Add Place 1.0 grams of sodium thiosulfate pentahydrate in the flask. DO NOT STIR.

*Time:* \_\_\_\_\_

9. Place a heaping spatula of sodium thiosulfate pentahydrate in a test tube with 3 mL of water. Shake vigorously. Do all of the crystals dissolve?

*Observations:*

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10. If all of the crystals do dissolve add another spatula full of sodium thiosulfate pentahydrate and shake. Is the solution saturated?

*Observations:*

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**Questions:**

1. Explain why grinding the solid increases the rate of solution.

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2. Why does stirring increase the rate of solution?

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3. Why does increasing the temperature increase the rate of solution?

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4. Describe the factors that increase the rate of solution.

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