

Lab Station D: Surface Area to Volume Effects... Which Shape Can Dissolve the Fastest?

Purpose

One of the characteristics of nanosized objects is that the surface area to volume ratio is much greater than bulk sized objects. The purpose of this lab investigation is to compare the effects of varying the surface area to the volume ratio for two samples of the same substance and mass, but different particle size, on the rate of dissolving in water.

Safety Precautions

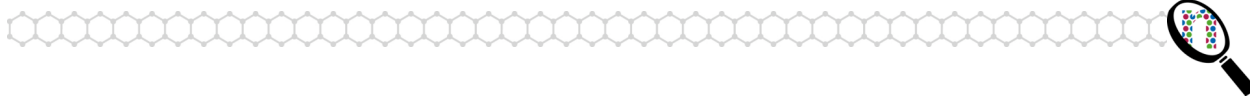
- Do not eat or drink anything in lab.
- Use caution when handling glassware.
- Wear safety goggles.

Materials

- Two sugar cubes per group
- Granulated sugar, about a cup per class
- A digital balance or scale, with readout to 0.1 gram. A standard laboratory balance can be used instead.
- Two 250-mL Erlenmeyer flasks
- A 100-mL graduated cylinder
- A grease marker
- Tap water, about 50-mL
- A clock or watch with a second hand

Procedures

1. Using a grease marker, label one Erlenmeyer flask #1 and the other #2. (These may have already been marked. No need to mark twice.)
2. Set the scale to zero, after placing a square of paper on top of the scale (this is called “**taring**”).
3. Measure and record the mass of two cubes of sugar. Put the sugar cubes into flask #1.
4. Measure and record a mass of granulated sugar equal to the mass of the two sugar cubes.
5. Put the granulated sugar into flask #2.
6. Using your graduated cylinder, add 100.0 mL of tap water to each flask.
7. Gently swirl each flask exactly 60 seconds.



8. Record the relative amount of sugar that has dissolved in each flask on your lab sheet.
9. Swirl each flask for another 60 seconds.
10. Record the relative amount of sugar that has dissolved in each flask on your lab sheet. Answer the questions asked about the rates of dissolving.

Teacher Notes

You may vary this lab by:

- Using salt rather than sugar. Salt comes in chunky crystals in rock salt and regular granulated salt.
- Varying the types of sugar to also include superfine and/or powdered sugar.

If you use any additional substances or variations in concentration, you will have to adjust the directions and the materials needed accordingly.