

Classroom Chemistry – Alka-Seltzer and Particle Size

Will the rate of a chemical reaction be increased by decreasing the size of the reactants?

Materials:

- 3 clear glasses / cups
- 3 Alka-Seltzer tablets
- Water
- Stop watch
- Mortar & Pestle
- Graph paper
- Measuring cup



Procedure: (Remember to have your parent’s permission and have them watch and help you.)

- Put one whole Alka-Seltzer tablet into one of the cups and pour exactly 250 ml of room temperature or lukewarm water into the clear cup. Have someone use the stop watch to measure how long it took the tablet to dissolve and record the results.
- Repeat the previous step but this time break the Alka-Seltzer tablet into 8 pieces. Break the tablet in half, then break each of these halves in two and then each of these quarters in half (just like pirates’ “pieces of eight”).
- Grind the third tablet into a powder (use the mortar & pestle, or coffee bean grinder or put the tablet into a zip locked bag, cover it with a towel and hit it with a hammer). Repeat the first step of the experiment.

What's happening?

The rate of a chemical reaction is affected by the physical size of the reactants since the particles of the reactants must come into physical contact with each other. Decreasing the size of the Alka-Seltzer particles increases the number of particles and therefore the amount of exposed surface area to the water is increased. Smaller particle size results in an increase in the rate of reaction because more Alka-Seltzer particles are exposed to the water allowing for more reactions. Since this experiment would give the same result time and time again anywhere in the world, we can generalize the results into a “Law of Dissolving: As the particle size decreases the rate of reaction increases”. This replication and validation of experimental results are how scientists move a “theory” into a “law”. Scientific laws are treated as a fact (like the Law of Gravity).

Extension:

Graph the data (particle size versus time to fully dissolve) to show the effect of particle size on the rates of reaction. Connect the data points with a line. Do you notice a pattern to the line? This is called an inverse relationship and the pattern can be used to predict the results for particle sizes that weren’t tested. Try it!

This activity is based on our “Classroom Chemistry” kit that is currently under development. The source for this lab is: http://www.alka-seltzer.com/as/student_experiment.html. Our teaching kits (described on our website) are loaned out FREE to provide classroom teachers and parents of home schooled children an opportunity to explore Science in interesting ways. Please consider volunteering as a classroom speaker or allow your business as a field trip location.

Lorne Cooper, Regional Executive Director

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