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Reaction Rates Lesson Guide

Lesson Guide | Description

Instructor: Darius Todd
Grade Level: 8 - 12
Subject: Physical Science

Students will investigate how chemical reactions are affected by the shape of medications.

Wonder How:

Have you ever wondered why pills come in different shapes and sizes?



Goal:

Students will use antacid effervescent tablets (Alka-Seltzer) to model the connection between temperature and surface area on chemical reaction rates.

Lesson Guide Agenda:

- ❖ Vocabulary
- ❖ Fun Facts
- ❖ Materials List
- ❖ Activity Instructions
- ❖ Challenge!
- ❖ Additional Resources
- ❖ Oklahoma Academic Standards

Lesson Guide | Vocabulary

Chemical Reaction – The process by which one or more substances change to produce one or more different substances.

Reactants – A substance or molecule that participates in a chemical reaction.

Products – A substance that forms in a chemical reaction.

Reaction Rate – The rate or speed a chemical reaction takes place.

Collision Theory – The number of new compounds or products formed in a chemical reaction is equal to the number of molecules that collide.

Surface Area – The sum of the outside area of a substance.

Reaction Rates: Why Aren't All Pills Shaped the Same?

Materials Needed:

- Alka-Seltzer or effervescent antacid tablets
- 4 Water bottles numbered 1 – 4 (2 for each experiment)
- 1 Cup of water for each water bottle
- 4 Balloons (2 for each experiment)
- 1 Timer
- 1 Measuring tape
- Reaction Tracker Worksheet found on HomeRoom

Watch the “Reaction Rate: Why Aren’t Pills Shaped the Same” video before continuing to the challenge!

Be sure to print the Reaction Tracker Worksheet found on HomeRoom to record the data.

If you have any questions throughout this lesson, please email teachers@oerb.com. We would love to hear from you!

Experiment 1:

1. Pour 1 cup of ice water into plastic water bottle #1.
2. Add 4 halves of a tablet into the cold water and cap the bottle with a balloon.
3. Start the timer.
4. Swirl the bottle once and time the reaction for 30 seconds.
5. Record the circumference of the balloon and all observations on the Reaction Tracker Worksheet (fizzing, change in temperature of the bottle, etc.).

Lesson Guide | Activity Instructions

6. Pour 1 cup of warm water into plastic water bottle #2.
7. Add 4 halves of a tablet into the warm water and cap the bottle with a balloon.
8. Start the timer.
9. Swirl the bottle once and time the reaction for 30 seconds.
10. Record the circumference of the balloon and all observations on the Reaction Tracker Worksheet (fizzing, change in temperature of the bottle, etc.).

Experiment 2:

1. Pour 1 cup of water into water bottles #3 and #4.
2. Add 3 halves of the tablets into water bottle #3 and cap the bottle with a balloon.
3. Start the timer.
4. Swirl the bottle once and time the reaction for 30 seconds.
5. Record the circumference of the balloon and all observations on the Reaction Tracker Worksheet (fizzing, change in temperature of the bottle, etc.).

Lesson Guide | Activity Instructions

6. Crush or break 3 halves of the tablets into very small pieces.
7. Add the pieces into water bottle #4 and cap the bottle with a balloon.
8. Start the timer.
9. Swirl the bottle once and time the reaction for 30 seconds.
10. Record the circumference of the balloon and all observations on the Reaction Tracker Worksheet (fizzing, change in temperature of the bottle, etc.).

Challenge!

Replicate this experiment at home!

If you have any questions about this challenge,
please email teachers@oerb.com.
We would love to hear from you!

WANT TO WIN A PRIZE?

Share videos or pictures of your experiments with us by emailing teachers@oerb.com and on Facebook/Instagram by tagging us @oerbok.

Be sure to include your name, grade, school, and teacher!

The teacher with the most student submissions will win a \$100 Amazon Gift Card!

Check out these additional resources!

1. Science | State Department of Education
<https://sde.ok.gov/science>

Lesson Guide | Oklahoma Academic Standards

PS.PS1.5 Apply Scientific Principles and evidence to provide an explanation of the effects of changing the temperature or concentration of the reacting particles on the rate at which the reaction occurs.

To learn more about the Oklahoma Academic Standards for Science click [here](#).