



Classroom Teacher Preparation

Chemistry 12: Conservation of Matter

Please use the following to prepare for the next SfS lesson.

Description:

Students work in pairs to plan and conduct an experiment with baking soda and vinegar to prove that when substances are changed in a chemical reaction, the total amount of matter is conserved.

Lesson Objectives – SWBAT (“Students Will Be Able To...”):

3rd-4th

- Use experimental evidence to explain that matter is conserved in a chemical reaction.

5th

- Design and carry out an experiment demonstrating conservation of matter
- Explain that a closed system captures all of the matter after a chemical reaction has occurred.

Disciplinary Core Idea (DCI)

PS1 Matter and its interactions

- (3rd-5th) PS1.A: *Structure of Matter* – Because matter exists as particles that are too small to see, matter is always conserved even if it seems to disappear. Measurements of a variety of observable properties can be used to identify particular materials.

Science & Engineering Practice (SEP)

Planning and Carrying Out Investigations

- (3rd-5th) Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

Crosscutting Concept (CCC)

Scale, Proportion, and Quantity

- (3rd-5th) Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.

Preparation:

This lesson is meant to be an introduction to the topic of conservation of matter (and closed systems for 5th grade).

Room Set Up for Activities:

Students will work in partners at a desk or table.



Safety:

Students will be required to wear safety glasses/goggles.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Matter**. Modules include:

Chemistry 2: Chemical Identification – Students investigate the physical and chemical properties of six similar-looking—but chemically different—substances, and use these observations to attempt to identify the substances.

Chemistry 4: Separation of Substances – Students design and implement a multi-step purification process for a mixture of rice, sand, and iron.

Chemistry 5: Acids and Bases – Students determine the pH values of acids and bases using common household liquids and investigate what happens when they add an acid and/or a base to a solution and learn about a chemical reaction between acids and bases.

For other module sequences and groups, look here: www.sciencefromscientists.org/sequences

Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: www.sciencefromscientists.org/standards/

Lessons are matched to both national NGSS and local state standards.

After Our Visit:

Extend this lesson by visiting http://home.utah.edu/~u0577548/Conservation%20of%20Matter/sum_of_parts.htm to test your knowledge of how matter is conserved.

Access this Extension activity by visiting the Classroom Post found on our website at sciencefromscientists.org/cohorts. Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at sciencefromscientists.org/open-response-questions. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

- An informative video on conservation of matter (4:08): <https://www.youtube.com/watch?v=3IHhOiTdmK4>