

Science Bowl 2025



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Experiment: Overview

Students will complete an experiment to illustrate the Law of Conservation of Mass. They will observe the mass of various substances prior to combining them, then compare that with the mass afterwards. The mass of all substances should be equal, however the states of matter may change.

Experiment: Supplies

- 150 grams of Vinegar
- 15 grams of Baking Soda (approx 1 tablespoon)
- 2 bowls
- A funnel
- A balloon
- Empty, clean water bottle
- scale

Experiment: Procedure

Step one: Note Masses

- Measure the mass of the water bottle without the lid. Make sure to write this down on your paper.
- Measure the mass of the balloon without air in it. Make sure to write this down on your paper.
- Label and measure the mass of the bowl #1. Make sure to write this down on your paper.
- Label and measure the mass of the bowl #2. Make sure to write this down on your paper.

Step Two: Vinegar

- Place bowl #1 on your scale, and zero it out. This will insure you get 150 grams of vinegar, rather than the mass of your bowl and an undetermined amount of vinegar.
- Using the funnel, carefully pour the vinegar into the water bottle. Make sure to seal it off. Dry the funnel.

Step Three: Baking Soda

- Place bowl #2 on your scale, and zero it out. This will insure you get 15 grams of baking soda, rather than the mass of your bowl and an undetermined amount of baking soda.
- Stick the funnel into the balloon. It must be completely dry.
- Using the dry funnel, carefully pour the baking soda into the balloon. Make sure to not spill the contents.

Experiment: Procedure

Step Four:

- Take the lid off of the water bottle that is holding the vinegar.
- CAREFUL TO NOT SPILL, put the mouth of the balloon over the opening of the water bottle.
- Once you have ensured the balloon has covered the opening of the water bottle, lift the end of the balloon so that the baking soda falls into the vinegar.
- Gently rotate the water bottle to ensure that the baking soda and vinegar react completely.

Step Five:

****DO NOT TAKE BALLOON OFF OF THE BOTTLE**

- Measure the mass of the final contraption. Make sure to write the mass down.
- subtract the mass of the water and balloon from the mass of contraption.
- Your final mass should be equal to the mass of the vinegar and baking soda combined (165 grams)

Common Errors

- Not discounting the mass of the bowl when measuring out vinegar or baking soda
- Pouring the baking soda into the vinegar before the balloon is covering the opening of the water bottle
- Funnel is not completely dried, causing a reaction

Individual Round: National Geographic

National Geographic: The Conservation of Matter During Physical and Chemical Changes: *Matter makes up all visible objects in the universe, and it can be neither created nor destroyed*

Related Topics: [Vocabulary Doc](#)

Law of Conservation of Mass

Solvent

Solute

Solution

Rock Cycle

Water Cycle

Physical Change

Chemical Change

States of Matter

Mass

Chemical Reaction

Subscript

SI Units

Stoichiometry

Margin of error

Elements and substances to be familiar with

Carbon

Hydrogen

Sodium

Oxygen

Sodium Bicarbonate

Water

Carbon Dioxide

Acetic Acid

Sodium Acetate

Practice Questions

34. At the beginning of a chemical reaction, you have 235 oxygen atoms. At the end of the experiment, you should have ...

- a. More oxygen atoms
- b. The same amount of oxygen atoms
- c. Less oxygen atoms
- d. No oxygen atoms, they were used up

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Practice Questions

12. What elements make up Sodium Bicarbonate (Baking Soda) NaHCO_3
- a. Sodium, Hydrogen, Carbon, Oxygen
 - b. Sodium, Carbon
 - c. Sodium, Hydrogen, Bicarbon, Oxygenate
 - d. Sodium, Bicarbon, Oxygenate

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Practice Questions

21. Matter cycles through the universe ----

- a. in different forms
- b. As a solid
- c. As a liquid
- d. As a solid and a liquid only

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Practice Questions

30. If you are creating hummingbird food, and you combine 250 grams of sugar to 500 grams of water. How many grams should be in the final mixture?

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- b. 500 grams
- c. 750 grams
- d. 1000 grams

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18. When Carbon Dioxide and Water combine to create sugar and oxygen, it is considered a --- change.

- a. Chemical
- b. Physical
- c. Nocturnal
- d. Conservation

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