

Baking Soda - Stoichiometry LAB

(40 min)

name _____

When you heat up baking soda, gas is given off. But do you know which chemical reaction occurs? During this lab, you will decompose baking soda, also known as sodium hydrogen carbonate, by heating it up in an evaporating dish with a Bunsen burner. When you're done, you will know which of the possibilities listed below happened.

You'll use stoichiometry 3 times, on the 3 possible reactions, and compare your experimental data to this math, and discover which reaction happens in our oven.

Baking soda is often called by its old-fashioned name: sodium bicarbonate, but we won't call it that. The old naming protocol has been abandoned by real chemists, but not by food scientists or dieticians.

Procedure: Put on your goggles first. Then, set up a ring stand, get your Bunsen burner ready. Get a clean and dry evaporating dish. Mass the empty dish. Measure out exactly 3.40 grams of the sodium hydrogen carbonate and make sure it's ALL INSIDE the dish - not on the scale.

Heat the dish for 26 minutes under moderate heat. Your teacher should check the intensity. We don't need to burn the heck out of it, but we need to decompose it all. Then we will cool the dish, and mass it.

Clean up: put the salt into trash, then warm soapy water for the evaporating dishes and hands.

The reason that this is such a cool lab is that you will know what will happen from math because chem is perfect and you are approaching perfection yourselves.



Which of these happened in your evaporating dish?

- A. baking soda decomposes into sodium hydroxide solid + carbon dioxide gas
- B. baking soda decomposes into sodium oxide solid + carbon dioxide and water gas
- C. baking soda decomposes into sodium carbonate solid + carbon dioxide and water gas

Data	Measure on the scale	Mass
A	empty evaporating dish	grams
B	dish + sodium hydrogen carbonate	grams
C	sodium hydrogen carbonate alone	grams
D	dish and salt after heating for 26 minutes	grams
E	leftover salt (D minus A =)	grams

Lab Questions, to be done on loose leaf paper, in order, neatly, with plenty of space to write you back some fun notes and hints on how to think more.

1. Write the balanced chemical equation for possible reaction A.
2. If you used 3.40 g of sodium hydrogen carbonate, how many grams of sodium hydroxide should form?
3. Write the balanced chemical equation for possible reaction B.
4. If you used 3.40 g of sodium hydrogen carbonate, how many grams of sodium oxide should form?
5. Write the balanced chemical equation for possible reaction C.
6. If you used 3.40 g of sodium hydrogen carbonate, how many grams of sodium carbonate should form?
7. How many grams of solid formed in your lab experiment? Which of these 3 reactions do you think happened? Use evidence from your lab experiment to explain why you choose A, B, or C.
I want to understand if you understand or if you are guessing.
8. Calculate your percent error from your measured salt and the stoichiometry math from A, B or C.
A sign and proper SF are necessary.
9. The mass of the solid product is noticeably less than the mass of the solid reactant that you began with.
Explain how this could be considering the Law of Conservation of Matter?
10. Why is baking soda an ingredient in cake recipes? (box cake mixes include in the mix for you)

Points for this lab

Cover: a title, optional diagram/picture, mandatory descriptive sentence. (2)

Lab questions (20)

Conclusion (3) in five-part harmony. ☺

- Name the 5 kinds of chemical reactions you know already.
- Explain what the letters of TOPIC-B stand for.
- Write out the entire Law of Conservation of Matter.
- Name 6 kinds of phase changes and put a simple indicator to show you know what each one means (like this: melting $S \rightarrow L$)
- Draw a full-sized copy of the Stoichiometry Island map, with the bridge tolls (conversion equalities), the mole ratio tunnel, and the shark.