RDS PRIMARY SCIENCE FAIR

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WHAT ARE THE ALKALINE AND ACIDIC REACTING AGENTS USED TO CREATE HANDHELD FIRE EXTINGUISHERS?

We asked ourselves the following questions

- What is an acid and what is a base?
- What is inside a fire extinguisher that quenches fire?
- Can we create something similar in our classroom?
- How could we make sure that our fire extinguishers contain the correct gas? (Carbon Dioxide)

Here is the equipment we used in our first experiment to test for the presence of Carbon Dioxide

Graduated cylinder, vinegar, baking soda, tealights, limerwater.

1. We mixed the alkaline (baking soda) and the acidic (vinegar) agents together in a graduated cylinder to cause a reaction.
2. We know that Carbon dioxide should be heavier than the air around us.
3. When solution settled, we light a tealight.
4. We were careful not to pour the liquid over the candle.
5. We poured gas out of the graduated cylinder.
6. The candle quenched even though nothing visible touched it!
7. We knew that carbon dioxide had poured out of the graduated cylinder and therefore, must be present in the mixture.

1. We also tested for the presence of Carbon Dioxide by using limewater.
2. We poured limewater into our solution of alkaline (baking soda) and acidic (vinegar) reacting agents.
3. The liquid turned really milky, proving that carbon dioxide was present in the mixture.

Our results showed that when we mixed vinegar and baking soda, the reaction created carbon dioxide.

Carbon dioxide quenches fire by eliminating oxygen.

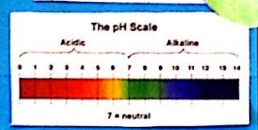
We know that oxygen fuels fire. Now we can create our own fire extinguishers

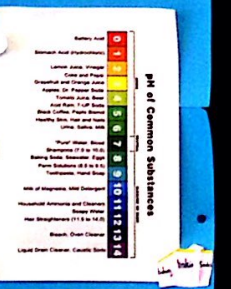
PH Scale

We learned all about acids and bases.

When you mix an acid and base, we know they do not mix well together.

This causes a chemical reaction.





1. We emptied a teabag of it's tealeaves and replaced it with baking soda.
2. We then filled our bottles to the bottom of the label with vinegar.
3. We hung the teabags by their string just over the vinegar level, and closed the cap.
4. We shook the bottle, to mix the acid and base, and cause a reaction.
5. The agents did not mix properly. We discovered the teabag was too thick for the baking soda to easily mix with the vinegar.
6. We then decided to wrap the baking soda in a very thin layer of tissue paper. This would allow immediate mixing.
7. The agents reacted very well. When we popped the cap of the bottle, carbon dioxide foam came shooting out of the bottle, in a similar way that a real fire extinguisher works!

Here is the equipment we used in our second experiment to create handheld fire extinguishers.

Bottle with cap, vinegar, baking soda, tissue, teabags, basins, spoons.

Results

After swapping and changing some parts of our experiment, we successfully created handheld, homemade carbon dioxide fire extinguishers.

Safety issues

We had to be very careful when working with acidic and alkaline material, and fire.

We worked together in nine small groups.

We had to make sure that when shaking the bottle, we did not aim it at anyone, as there was a lot of pressure.

Our experiment was also very messy! We conducted our second experiment outside, where we could make as much mess as we wanted.