

A pop rocket experiment

Introduction

Okay scientists, it's time to have some fun! Today you are going to be using your chemistry skills to make your own pop rockets!

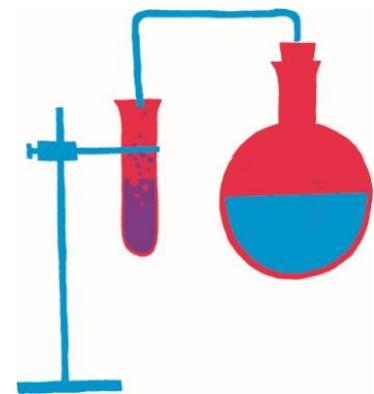
This pop rocket experiment is all about the chemical reaction between the Alka-Seltzer tablet and water. When the two are mixed, carbon dioxide gas is created and, eventually the pressure is too great and the film canister will forcibly fly into the air.

Your challenge as the scientist is to collect experimental data comparing whether hot or cold water causes a faster chemical reaction.

Which will make the rocket blast-off faster?!

Equipment Required

- A pack of Alka-Seltzer tablets
- A film canister
- Safety glasses
- Water (hot and cold)
- Stop watch
- Pen or pencil
- BioLAB workbook



Experiment method

1. Put on your safety glasses.
2. Quarter one Alka-Seltzer tablet into four equal pieces.



3. Half fill the film canister with cold water.
4. Place one of the quarters of Alka-Seltzer tablet into the film canister and close the lid.



5. Invert (turn upside down) so the film canister is lid down on a flat surface and stand back.
6. Using a stop watch, time how long it takes for your pop rocket to blast-off.
7. Record this result in your workbook.
8. Repeat Steps 1-7 another four times with cold water, and then 5 times with hot water.

Hypothesis

Circle your prediction below to complete your hypothesis:

I believe that **hot** / **cold** water will result in a faster chemical reaction. This is because:

Data Entry

Record in seconds (secs) how long it takes for each of the pop rockets to blast-off.

Table 1. Cold water results

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Cold Water					

Table 2. Hot water results

	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5
Hot Water					

Data Analysis

- a) Record the **total time** taken for the pop rockets to blast off using table one and two results.

$$\text{Total time} = \text{Trial 1} + \text{Trial 2} + \text{Trial 3} + \text{Trial 4} + \text{Trial 5}$$

Table 3. Total blast-off time

	Total blast-off time
Cold Water	
Hot Water	

b) Record the average time taken for the pop rockets to blast-off.

$$\text{Average time} = \text{Total Time} \div 5$$

Table 3. Average blast-off time

	Average blast-off time
Cold Water	
Hot Water	

c) Using the data collected in table three and table four, conclude as to whether hot or cold water made your pop rocket explode fastest? Explain your answer using data.

d) Do you think scientist be more interested in analysing total time or average time when reporting about this experiment? Explain your answer.

e) How could scientists and engineers use this pop rocket experiment in the design of a real rocket?

Engineering challenge

Using this experiment as a guide, design your own experiment using pop rockets.

Ideas could include - using the slow motion capture function on any smart device and record how high you can get your pop rocket to fly. Be as creative as possible!

You must include:

- An introduction with the equipment required.
- Write down your own detailed method so anyone can follow your experiment easily.
- Include a hypothesis.
- Record all results.
- Analyse the data.
- Conclude if your results match your prediction.

