

Science investigation



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# **Fizz Pop Rockets**

Investigating a



chemical reaction

using a fizz-pop rocket

There is a chemical reaction if vitamin C tablets are added to water. The reaction gives off a gas

.

**Fizz Pop Rocket Challenge**

**Given some vitamin C tablets and water, your challenge is to investigate how changing the surface area of the tablets changes the speed of the reaction between them and the water.**



This gas can be used to launch a ‘fizz-pop’ rocket



**1. Surface Area**



There is a chemical reaction if vitamin C tablets



are added to water. The reaction gives off a gas.

This gas can be used to launch a ‘fizz-pop’ rocket.

Given some vitamin C tablets and water, your challenge is to investigate how changing the surface area of the tablets changes the speed of the reaction between them and the water.

This will affect how quickly the rocket is launched.

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**What’s going on here?**

Another name for vitamin C is ascorbic acid. The vitamin C tablets contain other chemicals as well such as citric acid and sodium hydrogencarbonate. When water is added to a tablet it fizzes.

**Why?**

Ascorbic acid, citric acid and sodium hydrogen carbonate all dissolve easily in water. The acids and the sodium hydrogencarbonate then react chemically together to produce a gas called carbon dioxide. It is this gas being made that makes the tablet fizz.

**How does it manage to launch the ‘rocket’?**

The chemicals are trapped together inside the film canister. As more and more gas is made, the pressure inside builds up. Eventually it builds up to such an extent that the cap blows off and the reaction to this propels the canister into the air like a rocket.

**What you must do now**:

Carry out the experiment by following the instructions on the Experiment card. Record your findings on the next pages.

**Fizz Pop Investigation**



**Variable: Surface Area**

**What you need:**

* + Vitamin C tablets (effervescent type)
  + Some plastic 35mm film cans with lids



* + Some small measuring cylinders or some 5 cm3 syringes
  + Eye protection
  + A stop clock or other suitable timer



* + A large basin or plastic container
  + A beaker of water
  + Some 100 cm3 beakers
  + Some’ blue tack’

**What you do:**

1. Measure out 5 cm3  of water and place it

in the film can.

1. Stick some ‘blue tack’ to the lid of the can.
2. Press the tablet into the blue tack until it sticks.
3. Place the lid on the can, quickly invert it and place it in the basin.

Start the stop clock at the same time.

1. Time how long it takes for the ‘rocket’ to be launched.

Repeat the experiment three more times with fresh water but with a tablet cut in half, then into three and finally into quarters.

My investigation is to see if changing

changes

To make it a fair experiment I will need to keep these variables the same

A table of my results

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Space for any rough working

A graph of my results:

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Number of pieces of tablet

Conclusion:

What happens to the speed of the chemical reaction as the number of pieces increases?

What things may have affected how accurate you were able to do the experiment?

If you do the experiment again, how could you improve it?

Investigating a



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There is a chemical reaction if vitamin C tablets are added to water. The reaction gives off a gas

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**Given some vitamin C tablets and water, your challenge is to investigate how changing the temperature of the water changes the speed of the reaction between them and the water.**



This gas can be used to launch a ‘fizz-pop’ rocket



**Fizz Pop Rocket Challenge**



**2. Temperature**



There is a chemical reaction if vitamin C tablets



are added to water. The reaction gives off a gas.

This gas can be used to launch a ‘fizz-pop’ rocket.

Given some vitamin C tablets and water, your challenge is to investigate how changing the surface area of the tablets changes the speed of the reaction between them and the water.

This will affect how quickly the rocket is launched.

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**How does it manage to launch the ‘rocket’?**

The chemicals are trapped together inside the film canister. As more and more gas is made, the pressure inside builds up. Eventually it builds up to such an extent that the cap blows off and the reaction to this propels the canister into the air like a rocket.

**What you must do now**:

Carry out the experiment by following the instructions on the next page. Record your findings on the pages following.

**Fizz Pop Investigation**



**Variable: Temperature**

**What you need:**



* + Vitamin C tablets (effervescent type)
  + A selection of plastic 35mm film cans with lids
  + Some small measuring cylinders or some 5 cm3 syringes



* + Eye protection
  + A stop clock or other suitable timer
  + A large basin or plastic container
  + Some 100 cm3 beakers
  + A large beaker of hot water (ideally 50-60oC)
  + A thermometer

**What you do:**

1. Stick some ‘blue tack to the lid of the can.
2. Press the tablet into the blue tack until it sticks.
3. Measure out 5 cm3  of water and place it

in the film can. Measure and record its temperature.

1. Place the lid on the can, quickly invert it and place in the basin.

Start the stop clock at the same time.

1. Time how long it takes for the ‘rocket’ to be launched.

Repeat the experiment three more times with fresh water but

at three different temperatures. (e.g. 40oC, 30oC and 20oC)

My investigation is to see if changing

changes

To make it a fair experiment I will need to keep these variables the same

A table of my results

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Space for any rough working

A graph of my results:



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Temperature of the water (oC)

Conclusion:

What happens to the speed of the chemical reaction as the temperature increases?

What things may have affected how accurate you were able to do the experiment?

If you do the experiment again, how could you improve it?

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**Fizz Pop Rocket Challenge**

**Given some vitamin C tablets and water, your challenge is to investigate how changing the surface area of the tablets changes the speed of the reaction between them and the water.**



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**3. Concentration**



There is a chemical reaction if vitamin C tablets



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Given some vitamin C tablets and water, your challenge is to investigate how changing the surface area of the tablets changes the speed of the reaction between them and the water.

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**How does it manage to launch the ‘rocket’?**

The chemicals are trapped together inside the film canister. As more and more gas is made, the pressure inside builds up. Eventually it builds up to such an extent that the cap blows off and the reaction to this propels the canister into the air like a rocket.

**What you must do now**:

Carry out the experiment by following the instructions on the Experiment card. Record your findings on the next pages.

**Fizz Pop Investigation**



**Variable: Concentration**

**What you need:**

* + Vitamin C tablets (effervescent type)
  + Some plastic 35mm film cans with lids



* + Some small measuring cylinders or some 5 cm3  syringes
  + Eye protection
  + A stop clock or other suitable timer



* + A large basin or plastic container
  + A beaker of water
  + Some 100 cm3 beakers
  + Some’ blue tack’

**What you do:**

1. Measure out 5 cm3  of water and place it

in the film can.

1. Stick some ‘blue tack’ to the lid of the can.
2. Press the tablet into the blue tack until it sticks.
3. Place the lid on the can, quickly invert it and place it in the basin.

Start the stop clock at the same time.

1. Time how long it takes for the ‘rocket’ to be launched.

Repeat the experiment three more times with fresh water but with half a tablet, then a third of a tablet and finally a quarter of one.

My investigation is to see if changing

changes

To make it a fair experiment I will need to keep these variables the same

A table of my results

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Space for any rough working

A graph of my results:

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Size of tablet piece (0.5, 0.33, 0.25 etc)

Conclusion:

What happens to the speed of the chemical reaction as the concentration increases?

What things may have affected how accurate you were able to do the experiment?

If you do the experiment again, how could you improve it?