



Fuel for the rocket

Rockets

time

65 minutes

learning outcomes

To:

- discover that a chemical reaction can produce new substances
- know that sometimes you can detect gas by the presence of bubbles

end product

- a rocket that is launched by means of a chemical reaction

materials needed

- 12 containers
- 12 35mm film canisters
- 12 teaspoons
- 12 rulers
- 12 sachets of baking powder (12 x 2 tablespoons of baking powder)
- 12 effervescent tablets (Alka-Seltzer or equivalent)
- sturdy paper or thin card
- sticky tape
- scissors
- glue
- vinegar
- toilet paper
- diet cola
- water
- Mentos mints

Preparation

For the activity **Make a rocket** you will need to place the following items into each of 12 containers: a film canister, sturdy paper or thin card, scissors, sticky tape, glue, vinegar, baking powder, toilet paper, and a teaspoon.



What is a reaction? 10 min.

Ask the children if they know what a chemical reaction is. Explain that when you mix two substances together, a chemical reaction can occur. When this happens two substances react together to produce new substances. The children demonstrate this by completing [Task 1](#) on the worksheet. They can see that the chemical reaction causes small bubbles. Explain that the vinegar and the baking powder react with each other and a gas (carbon dioxide) is formed. You can tell that gas has been formed by the bubbles that are produced.



The children make a rocket that is launched by means of a chemical reaction.



Make a rocket 20 min.

In Task 1 the children learned that if you mix baking powder and vinegar, a gas is produced. Explain that they are going to use this gas as fuel for their rocket. They can design the body of the rocket themselves. Organise the children into pairs and give each pair a container with the items they need for their rocket. Read through the worksheet with the children so they know what a rocket needs in order to work.



Organise the children into pairs. Explain that their rocket will be launched by the gas that is formed when the baking powder reacts with the vinegar. The children complete Task 2 of the worksheet.

Make sure the children know to keep a safe distance while their rocket is launching.



What is the correct proportion? 20 min.

The children investigate the most effective proportion of baking powder to vinegar. Then they repeat the test using the new proportions. Is there a relationship between the proportion of baking powder to vinegar and the height the rocket reaches? Which proportion results in the highest launch? The children complete Task 3 on the worksheet. Decide beforehand how many times they may repeat the experiment. Discuss the results.



How high did your rocket go? 15 min.

The children can try out two other kinds of rocket fuel: a mixture of diet cola and a Mentos mint, or water and an effervescent tablet. Encourage the children to find out which fuel results in the highest launch.



Fuel for the rocket

1 What is a chemical reaction?



What do you need?

- teaspoon
- vinegar
- baking powder

What do you need to do?

- 1 Pour a few drops of vinegar onto your teaspoon.
- 2 Add a small amount of baking powder.

a What can you see happening?

This is an example of a chemical reaction. The baking powder and the vinegar react to form a new substance.



You are going to make a rocket that is launched through a chemical reaction.

2 Make a rocket



What do you need?

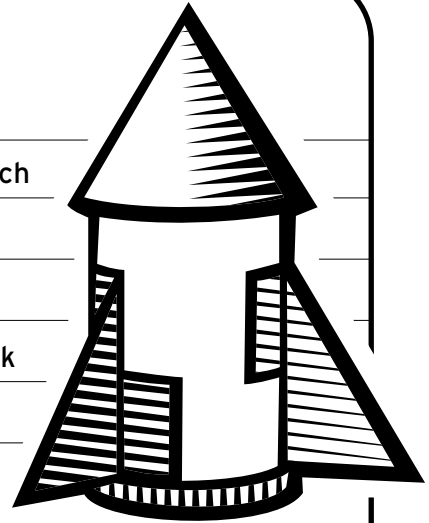
- look at other items in the container

What do you need to do?

- 1 Look at the drawing of the rocket on the next page.

Your rocket must meet the following requirements

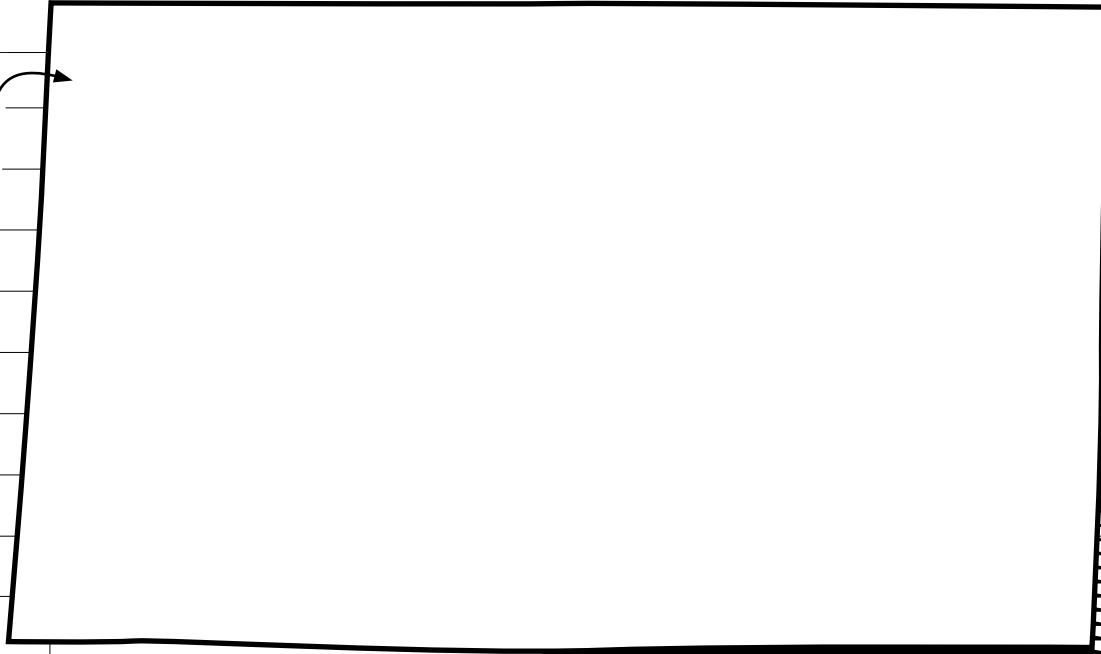
- it must be strong so it doesn't break during the launch
- it must be built around the film canister
- it must be light enough to be launched
- you must be able to carry out steps 1 to 11 of this task with it



Draw a rocket that meets these requirements in the box below.

Write down which materials from the container you are going to use.

draw your
rocket
HERE

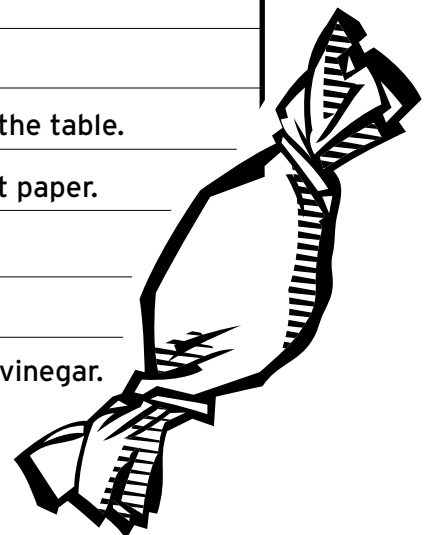


2 Your design is ready. Now you can make your rocket.



When your rocket is finished you can make the fuel.

- 3 Open the film canister and fill it half full with vinegar.
- 4 Take one layer of a sheet of toilet paper and place this on the table.
- 5 Put a teaspoon of baking powder in the middle of the toilet paper.
- 6 Twist the toilet paper to make a closed packet,
as shown in the drawing here.
- 7 Put the packet of baking powder into the canister with the vinegar.



8 Quickly put the lid on the canister.

9 Briefly shake the canister and then put the rocket on the ground with the lid downwards.

10 Stand at a safe distance and watch what happens! You might have to wait a little.

11 Estimate how high your rocket travelled.

Tip.

Do not lean over the rocket while launching.

3 What is the best proportion?



1 Test the best proportion of vinegar to baking powder.

Change the amount of vinegar, but keep the amount of baking powder the same. Fill in the table below.

My fuel mixture

I used a half a teaspoon of baking powder.

I filled the canister	<input type="checkbox"/> a quarter	<input type="checkbox"/> three-quarters	full of vinegar.
My rocket travelled	<input type="checkbox"/> higher	<input type="checkbox"/> less high	than the first launch.

I filled the canister	<input type="checkbox"/> a quarter	<input type="checkbox"/> three-quarters	full of vinegar.
My rocket travelled	<input type="checkbox"/> higher	<input type="checkbox"/> less high	than the first launch.

2 Now use the same amount of vinegar but change the amount of baking powder. Fill in the table below. Did your rocket travel higher or not?

My fuel mixture

I filled my canister half full of vinegar.

I used	<input type="checkbox"/> a quarter	<input type="checkbox"/> three-quarters	of a teaspoon of baking powder.
My rocket travelled	<input type="checkbox"/> higher	<input type="checkbox"/> less high	than the first launch.

I used	<input type="checkbox"/> a quarter	<input type="checkbox"/> three-quarters	of a teaspoon of baking powder.
My rocket travelled	<input type="checkbox"/> higher	<input type="checkbox"/> less high	than the first launch.

4 How high did your rocket go?

a Fill your rocket with diet cola and a Mentos mint. How high did your rocket travel?



b Did it work better than the baking powder and vinegar?

yes / no

CIRCLE
the correct
answer

c Fill your rocket with an effervescent tablet and water.

How high did your rocket travel?

d Did it work better than the baking powder and vinegar?

yes / no

CIRCLE
the correct
answer

e Which do you think is the best fuel for your rocket?