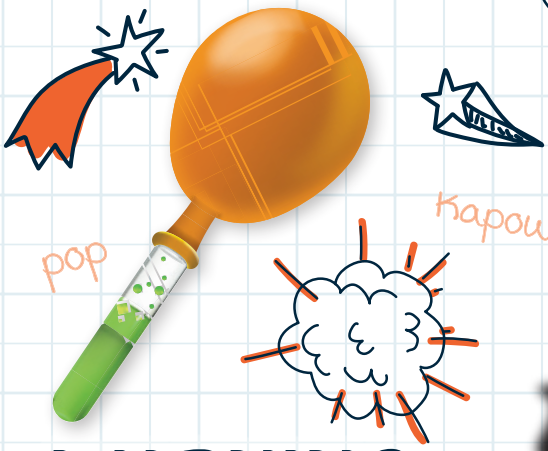
nickelodeon

USER MANUAL

SCIENTISTS + KIDS = FUN!

EXPERImake

CREATED BY SCIENTISTS. FUN FOR KIDS!



WARNING

Not suitable for children under 8 years. For use under adult supervision. Contains some chemicals which present a hazard to health. Read the instructions before use, follow them and keep them for reference.
Do not allow chemicals to come into contact with any part of the body, particularly the mouth and eyes. Keep small children and animals away from experiments. Keep the experimental set out of reach of children under 8 years. Eye protection for supervising adult is not included. **Warning.** Children under eight years can choke or suffocate on uninflated or broken balloons. Adult supervision required. Keep uninflated balloons from children. Discard broken balloons at once. It is advisable to wash the balloons before using them and to use an air pump to fill them. Warning. Gloves and balloons are made of natural rubber latex.

EXPLOSIONS AND ERUPTIONS

FUN FACTS INSIDE

Addo Play Ltd. Bucks, HP10 8EG, UK. Tel: +44 (0) 1494 917250

Addo

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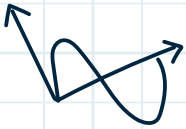
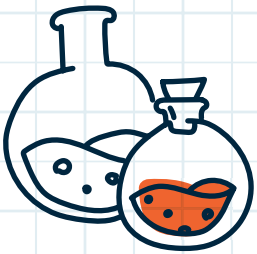


Advice for Supervising Adults



- Read and follow these instructions, the safety rules and the first aid information, and keep them for reference.
- The incorrect use of chemicals can cause injury and damage to health. Only carry out those experiments which are listed in the instructions.
- This experimental set is for use by children over 8 years.
- Because children's abilities vary so much, even within age groups, supervising adults should exercise discretion as to which experiments are suitable and safe for them. The instructions should enable supervisors to assess any experiment to establish its suitability for a particular child.
- The supervising adult should discuss the warnings and safety information with the child or children before commencing the experiments. Particular attention should be paid to the safe handling of acids, alkalis and flammable liquids.
- The area surrounding the experiment should be kept clear of any obstructions and away from the storage of food. It should be well lit and ventilated and close to a water supply. A solid table with a heat resistant top should be provided.
- Substances in non-reclosable packaging should be used up (completely) during the course of one experiment i.e. after opening the package.
- This set contains colourings which can stain. Keep away from objects and delicate fabrics.

Safety Rules

- Read these instructions before use, follow them and keep them for reference.
- Keep young children, animals, and those not wearing eye protection away from the experimental area.
- Always wear eye protection.
- Store this experimental set out of reach of children under 8 years.
- Clean all equipment and surfaces before and after use.
- Make sure that all containers are fully closed and properly stored after use.
- Ensure that all empty containers and/or non-reclosable packaging are disposed of properly.
- Wash hands before and after carrying out experiments.
- Do not use any equipment which has not been supplied with the set or recommended in the instructions for use.
- Do not eat or drink in the experimental area.
- Do not allow chemicals to come into contact with the eyes or mouth.
- Do not replace foodstuffs in the original containers. Dispose of immediately.
- Do not aim projectiles/rockets at eyes or face.
- Take care handling hot water and hot solutions.
- Discard all food used in carrying out experiments.

Contents

Protective goggles
Protective gloves
Sodium Hydrogen Carbonate (30g)
Citric acid (10g)
Red food colouring (10ml)
Iron powder (3g)
4 coloured paper sheets
Small measuring cup with lid
Pipette
Wooden spatula
2 balloons
3 round filter papers
Test tube
Volcano mould

Chemicals Supplied and Warnings

Keep all containers tightly closed. Store in a cool, dry place.

Substance/ID	Hazard and Precautionary Statements
Red Food Colouring (E129) CAS # 25956-17-6	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.
Iron Powder (Fe) CAS # 7439-89-6	**Warning.** Flammable solid. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Do not ingest. Avoid contact with eyes and mouth. Use only according to directions. 
Sodium Hydrogen Carbonate (Baking Soda - $NaHCO_3$) CAS # 144-55-8	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.
Citric Acid ($C_6H_8O_7$) CAS # 77-92-9	**Warning.** Causes serious eye irritation. Wear eye protection. Avoid contact with eyes and mouth.. If in eyes: rinse with water for several minutes. Remove contact lenses if present and easy to do so. Continue rinsing. 

Disposal of Used Chemicals and Packaging

When you need to dispose of chemical substances, it is necessary to refer to the national and/or local regulations. Never throw chemicals into sewers and garbage. For more details please refer to a competent authority. For disposal of packaging make use of the specific collection points.

Please recycle all packaging where possible.

General First Aid Information

- **In case of eye contact:** Wash out eye with plenty of water, holding eye open if necessary. Seek immediate medical advice.
- **If swallowed:** Wash out mouth with water, drink some fresh water. Do not induce vomiting. Seek immediate medical advice.
- **In case of inhalation:** Remove person to fresh air.
- **In case of skin contact and burns:** Wash affected area with plenty of water for at least 10 minutes.
- In case of doubt, seek medical advice without delay. Take the chemical and its container with you.
- In case of injury always seek medical advice.

In case of emergency dial:

UK 999 • **Europe** 112
USA 911 • **Australia** 000

Write the telephone number of the national poison information centre or local hospital below.

They may provide you with information about measures to take in case of intoxication.

Welcome to the Wonderful World of Science!

EXPERIMAKE science sets have been designed by scientists to encourage **learning** through **play**.

Science, Technology, Engineering & Maths (STEM) education is important and each set will enable the development of at least two of these skills.

The **skills** and **knowledge** gained are essential for children's learning.

EXPERIMAKE sets not only support education but are fun and enjoyable for parents too.

When having fun, or making discoveries, a neurotransmitter called **dopamine** is released. Dopamine helps control the brain's **reward centre**.

When we have a positive experience and dopamine is released, we are more likely to remember it.

So, if learning is a positive experience it will stimulate the brain to help develop various skills.

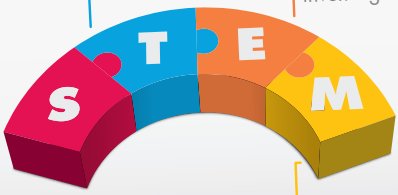
EXPERIMAKE sets are **educational toys** that combine **science** and **creativity** by fostering curiosity and experimentation.

We hope you enjoy exploring the wonderful world of science through our EXPERIMAKE range.

Inventive, creative and imaginative, STEM toys are educational, teaching new skills and knowledge and are (most importantly) lots of fun!

Technology
Encouraging problem solving and methodology skills.

Engineering
Encouraging design, building, and inventing skills.



Science
Encouraging a curiosity for the world around us.

Maths
Exploring different ways of getting children to think about numbers.

Why not share your results with us?

@AddoPlay AddoPlay hello@addoplay.com

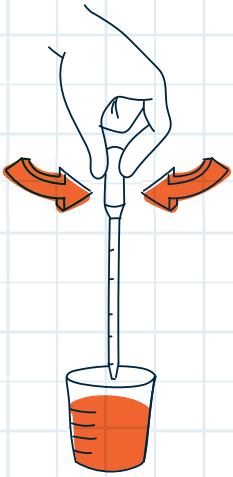
Before You Start...

How to Use Your Pipette

A pipette is used to collect liquid in small amounts and move from one container into another. It lets you control the amount of liquid you are adding by releasing a drop at a time. Before you begin with the experiments, you should practice using a pipette. The soft and squidgy end is called the **bulb** and the other end is called the **tip**.

1. Fill a small container with water, squeeze the bulb and place the tip into the water.
2. Slowly release the bulb until you see water filling up the tube.
3. Now that you have collected the liquid you can release it again in small drops. To do this, remove the pipette tip from the liquid and press the bulb lightly. You will see the drops come out one by one.

1.



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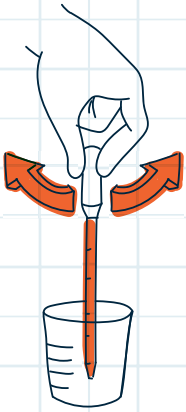

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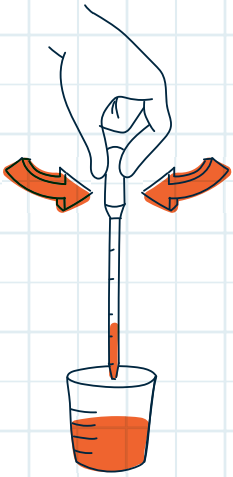


Tip: To avoid contamination, always use the same pipette for the same solution.

1. Erupt a Volcano

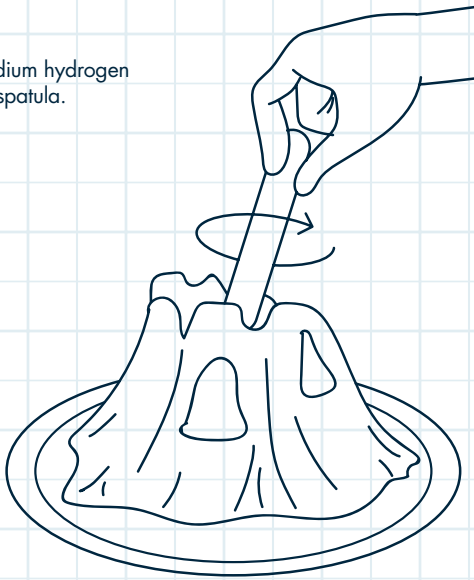
You will need

Protective goggles, protective gloves, red food colouring, sodium hydrogen carbonate, citric acid, volcano mould, small measuring cup, pipette, wooden spatula, teaspoon (not included), deep plate (not included).

Citric Acid: Warning!
Causes serious eye irritation. Wear eye protection.

Steps

1. Put on your protective gloves and goggles.
2. Place the volcano mould in the centre of the deep plate.
3. Add half a teaspoon of citric acid and half a teaspoon of sodium hydrogen carbonate into the volcano mould and mix with the wooden spatula.
4. Measure 15ml of water in the small measuring cup and using pipette add 4 drops of red food colouring.
5. Slowly pour the solution in the cup inside the volcano and observe the results.



Explanation

You have simulated what happens during a volcanic eruption with a chemical reaction. This chemical reaction is an acid-base reaction, where sodium hydrogen carbonate (a base) reacts with the citric acid, to release carbon dioxide (CO_2).

This phenomenon is called effervescence – the release of gases in liquid.

Please note: this is not what happens inside a volcano. This experiment is to show what a volcanic eruption looks like.

Suggestion

For a different volcanic eruption, you could try adding half a teaspoon of flour into the volcano mould at step 3 (as above), and mix well. This adds viscosity to the lava which simulates what happens during an effusive eruption through a chemical reaction.

2. Fizzy Bombs

Learn how to create a fizzy bomb that can also be used as fuel to launch your rocket.

You will need

Protective gloves, small measuring cups, sodium hydrogen carbonate, wooden spatula, citric acid, pipette, red food colouring, table salt (not included), small plate (not included), cup (not included).

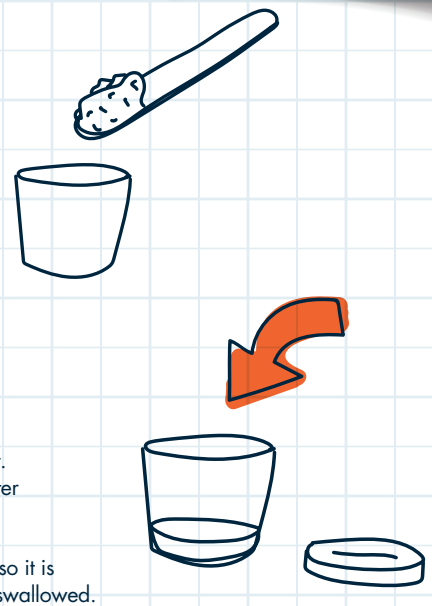
Citric Acid: Warning!
Causes serious eye irritation. Wear eye protection.

Steps

1. Put on your protective gloves, measure 5 ml of citric acid into a small measuring cup.
2. Using the pipette, add 5 drops of red food colouring to the cup.
3. Add a small amount of table salt to the cup and stir well using the wooden spatula.
4. Add 5ml of sodium hydrogen carbonate into the cup, stir again with the wooden spatula.
5. Pour a third of the mixture into the small measuring cup (about 5ml). Firmly press the mixture into the bottom of the measuring cup, using your thumb to compress. Turn the measuring cup upside down onto a plate and tap on the bottom to release the fizzy bomb.
6. If this does not work, return the mixture to the cup, add one drop of water and repeat step 5, ensuring adequate pressure is applied.
7. Repeat steps 5 and 6 for the remaining mixture.
8. For best results, let your fizzy bombs dry overnight. However, if you can't wait fill a clear cup with water and carefully drop one fizzy bomb in.
9. Observe the results.
10. Once complete, immediately dispose of the liquid so it is not mistaken for a drink. This would be harmful if swallowed.
11. Save the other fizzy bombs for the next experiment.

Explanation

When in contact with the water, a chemical reaction occurs between the sodium hydrogen carbonate and the citric acid, releasing carbon dioxide. The release of this gas can be seen by the development of small bubbles in the liquid, creating effervescence!



$$3NaHCO_3 + C_6H_8O_7 \rightarrow 3NA + C_6H_5O_7 + 3H_2O + CO_2$$

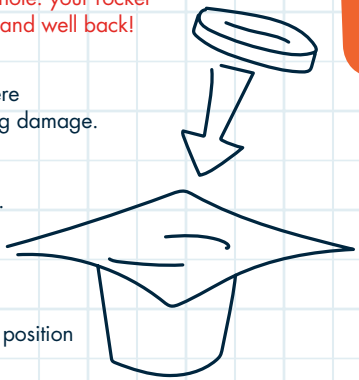
3. Explosive Rocket

Have explosive fun launching rockets!

You will need

Protective goggles, protective gloves, fizzy bomb (experiment 2), small measuring cup and lid, toilet paper or tissue at least 5x5cm square (not included), scissors (not included), warm tap water (not included).

⚠ Attention! Ask an adult for help, wear protective gloves. Please note: your rocket will explode very forcefully and therefore you must take care and stand well back!

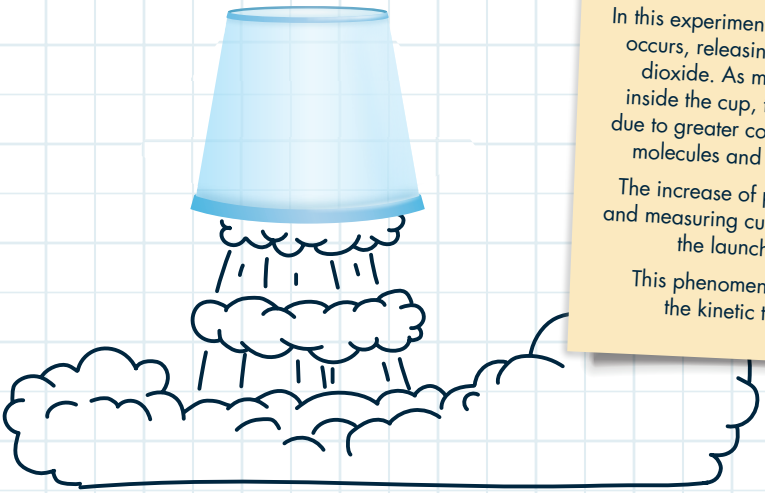


Steps

1. Protect your launch area with a waterproof cover and ensure there is a clear space above so your rocket can launch without causing damage. You might prefer to do this experiment outside.
2. Put on your protective gloves and goggles.
3. Add 10ml of warm water into your rocket (small measuring cup).
4. Place the tissue over the end of your rocket as shown.
5. Carefully place the fizzy bomb on the tissue.
6. Put the lid on the rocket. Make sure it is completely closed (you will hear a click) otherwise it will not launch.
7. Count to 3 and quickly place the rocket lid-side down, in launch position on the protected surface and stand well back.
8. Observe the results.

Suggestion

Repeat the experiment with a friend and see whose rocket launches highest.



Explanation

In this experiment an acid-based reaction occurs, releasing a gas called carbon dioxide. As more gas is produced inside the cup, the pressure increases due to greater collision between the gas molecules and the walls of the cup.

The increase of pressure forces the lid and measuring cup to separate, creating the launch of the rocket.

This phenomenon is explained by the kinetic theory of gases.

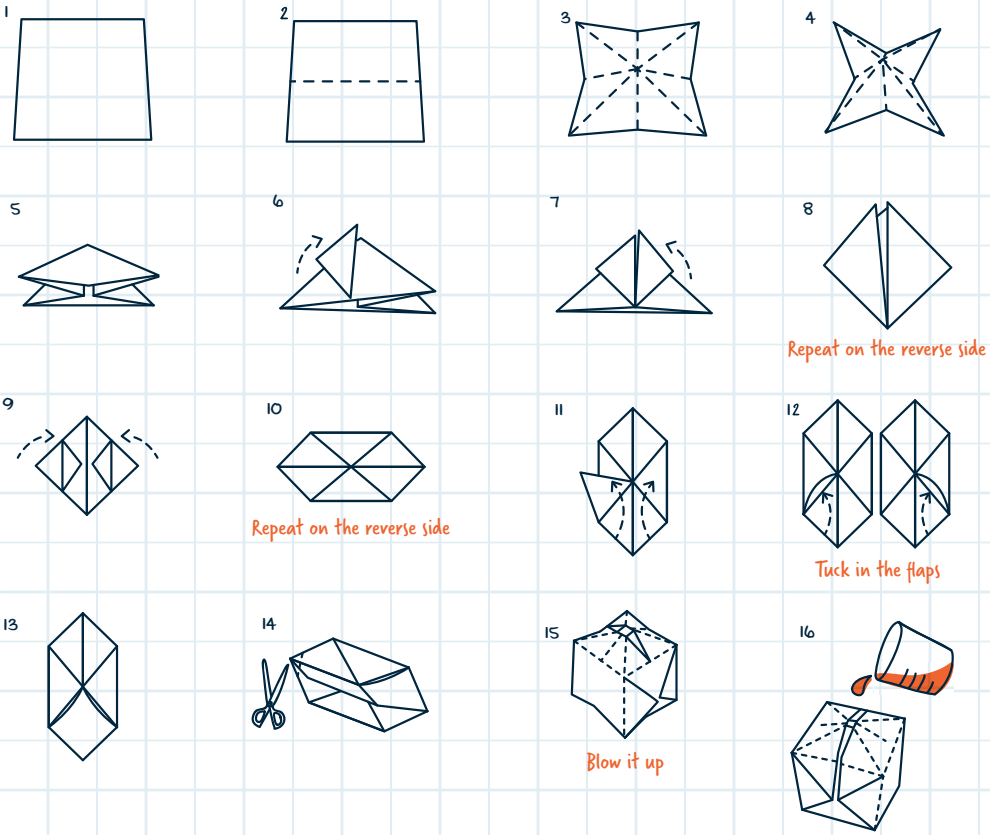
4. Water Bombs

You will need

Coloured paper sheet, small measuring cup, water (not included).

Steps

Fold the coloured paper sheet as illustrated below.



16. Pour water into your mini bomb. Hold it from below so that it doesn't get damaged while filling it.

Now have fun! Throw it against an outside wall and observe the result.

5. Self Inflating Balloon

You will need

Protective goggles, protective gloves, balloon, sodium hydrogen carbonate, citric acid, test tube, small measuring cup, water (not included).

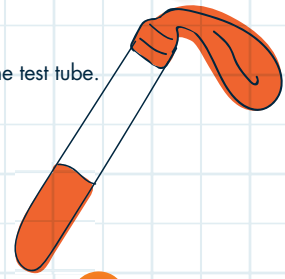
Citric Acid: Warning!
Causes serious eye irritation. Wear eye protection.

Steps

1. Put on your protective gloves and goggles.
2. Put 5ml of citric acid into the test tube.
3. Half fill the test tube with water, cover the end with your thumb and shake carefully to mix.
4. Measure 5ml of sodium hydrogen carbonate in the small measuring cup and pour into the balloon.
5. Roll the neck of the balloon over the top of the test tube (as shown). Be careful not to drop any sodium hydrogen carbonate into the test tube.
6. Lift up the balloon to enable all of the sodium hydrogen carbonate to fall into the test tube.
7. Observe the results.
   Shaking the test tube will speed up the reaction.

Explanation

Sodium hydrogen carbonate and citric acid react to produce the gas carbon dioxide. Gas takes up more space than solids, therefore when the chemicals turn into gas more space is required and the balloon inflates.



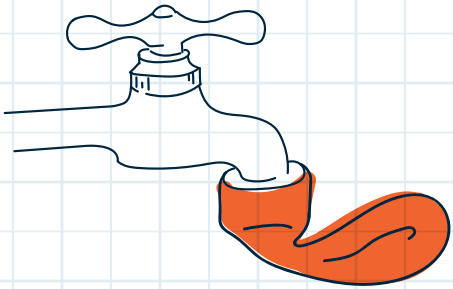
6. Fireproof Balloon

You will need

Balloon, small measuring cup, candle (not included), cold water (not included), matches (not included).

Steps

1. Half fill the balloon with water from the tap.
2. Blow up the balloon with the water inside, but not too full.
3. Tie a knot in the end of the balloon.
4. Put on your protective goggles and keep a safe distance while you observe the experiment.
5. Ask an adult to light the candle and hold the balloon over it.
6. Observe the results.



Explanation

Although you would expect the balloon to burst, it doesn't, because the water inside in the balloon is a great absorber of heat. The temperature of the flame is distributed across the balloon and into the water, which means the balloon can withstand a much higher temperature than if it was just filled with air.

7. Sparklers

You will need

Protective goggles, iron powder, candle (not included), metal spoon (not included), match or lighter (not included).

Steps

1. Put on your protective goggles and keep a safe distance while you observe this experiment.
   Ask an adult to complete the following steps:
2. Light a candle.
3. Pour a small amount of iron powder onto the metal spoon.
4. Carefully and slowly sprinkle the iron powder over the flame, keeping a safe distance of about 10cm.

$Fe(s) \quad Fe^{2+} \quad 2e \quad 2H_2O$

$O_2 \quad 4e \quad 4OH \quad O_2$

$2Fe \quad 2H_2O \quad 2Fe(OH)_2$

Explanation

Iron reacts with oxygen forming iron powder. As the iron combusts, yellow stars are created.

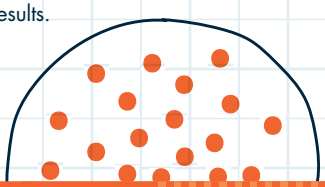
8. Colour Explosion

You will need

Filter paper, pipette, coloured felt tip pens (not included), water (not included).

Steps

1. Make sure your surfaces are protected.
2. Draw multi coloured dots all over the filter paper. Make sure you use non-primary colours i.e. not yellow, red or blue.
3. Using the pipette, carefully apply water droplets allowing each drop to disperse before applying more. Be careful not to overwet the paper as you could wash the colour out.
4. Observe the results.



Explanation

This process is called chromatography. Chromatography is a physical-chemical method used to separate homogeneous mixtures. This separation is possible because the components have different weight, mass and density.

Complex colours (secondary) are broken down into primary colours. This happens because the primary colours have different weights and therefore remain in different positions on the paper. The water can move the lightest colours the furthest distance.

9. Bubbling Lava

You will need

Protective gloves, sodium hydrogen carbonate, red food colouring, pipette, small measuring cup, clear cup (not included), cooking oil (not included), vinegar (not included), hot water from a tap (not included), teaspoon (not included).

Steps

1. Put on your protective gloves.
2. Pour 35ml of hot water from a tap into a cup, and add 10ml of vinegar.
3. Using the pipette and 5 drops of red food colouring.
4. Add 40ml of oil to the mixture.
5. Add 1 teaspoon of sodium hydrogen carbonate to the mixture and observe the results.

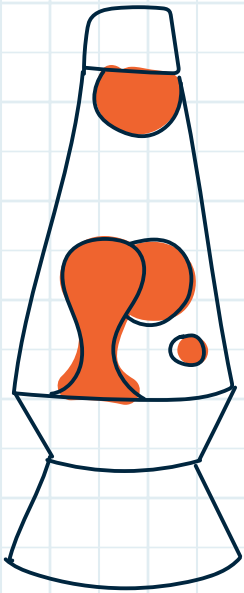
Explanation

The sodium hydrogen carbonate moves slowly in the oil until reaching the vinegar. It then reacts with the acetic acid in the vinegar giving off carbon dioxide. This gas creates the effervescent bubbles that you can see in the liquid. As it is a gas it bubbles through the liquid of the solution.

Suggestion

Once the reaction has finished, if there is still some sodium hydrogen carbonate in the bottom of the cup, mix well so that all the chemical reacts.
Stir well to try to get the oil and water to mix and observe the results.

Now try adding 35ml of washing up liquid into the cup and stir well. Observe the results.



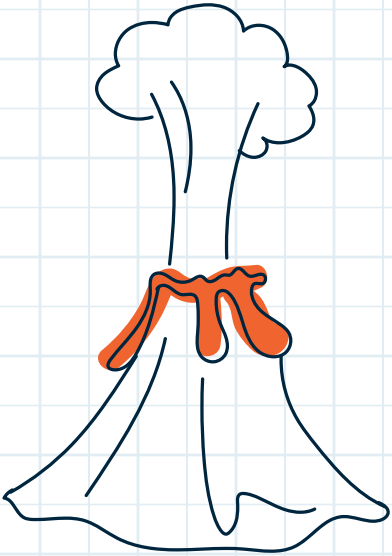
Explanation

Detergent molecules are attracted to both oil and water molecules and therefore help enable the oil and water to mix. The resultant liquid is called an emulsion.

FUN FACTS

An explosion is the result of a rapid and uncontrolled release of energy! This symbol is used to indicate places where the danger of explosion exists.

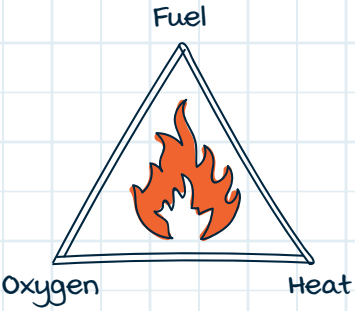
A volcano is an opening on Earth's surface. Volcanic eruptions can be caused by the Earth's internal movements which cause a great accumulation of molten rock inside the magma chamber of the volcano. The build-up of pressure causes the magma to ascend to the surface and erupt as lava which flows down the volcano. Carbon dioxide is one the gases released into the atmosphere by volcanoes.



The violence of an explosion depends upon the velocity in which the energy is released. There are several factors that can affect the velocity of a chemical reaction, e.g. the reagents concentration, the contact surface area to react that is available, the temperature, the pressure and presence of catalysts. Catalysts are substances that increase the rate of a chemical reaction.

Three elements need to be present to create fire:

In the absence of one of these elements, the chemical reaction will stop.



EXPERIMAKE

TOKEN

Congratulations! You are on your way to achieving your **experimake certificate.**

To claim your certificate collect **3** of these tokens and send them to us.

The colour of a flame indicates its intensity. A hob flame is blue and a candle flame is yellow. A blue colour means that the flame is more intense than the yellow one.

Water is not always capable of putting out fires.
For instance, we should never pour water onto a fire that started in cooking oil. In this case, the water will just 'feed' the fire! This is because water is denser than oil and will stay under the oil, where the temperature is higher. This means the water quickly turns to steam, and the explosion of steam will force the oil to expand and spurt out.

FUN FACTS

One of the most important combustion reactions occurs in our bodies. Cellular respiration is the combustion of oxygen and glucose (the sugar present in food). They react to release the energy we need to survive.

glucose + oxygen = carbon dioxide + water + energy

Please ask your parent or guardian to complete:

Name _____ **Age** _____

Home Address _____

_____

Email Address _____

Please send **3** tokens to Addo to receive your **experimake certificate**

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*Subject to Availability

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