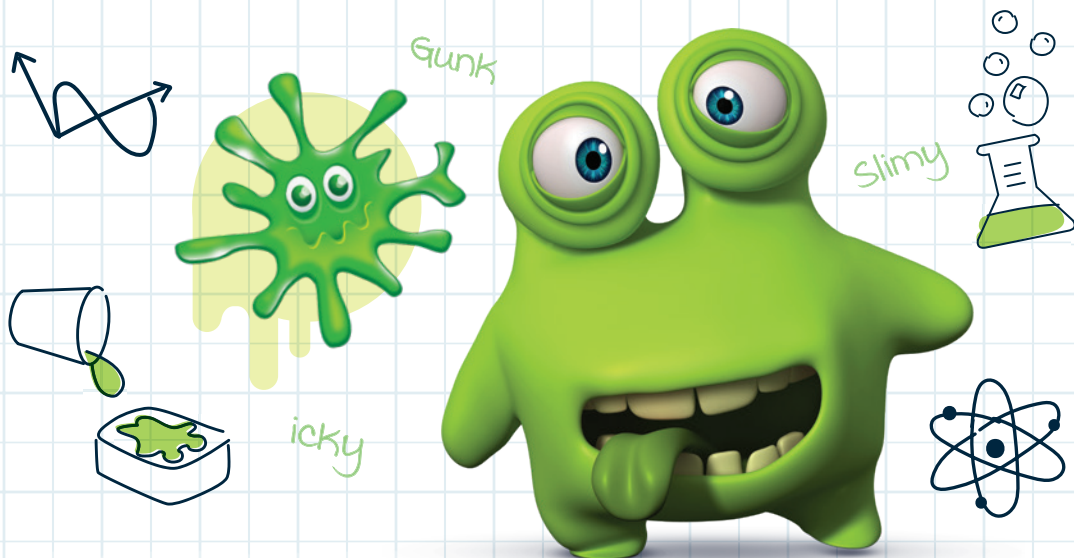


SCIENTISTS
KIDS = FUN!



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.

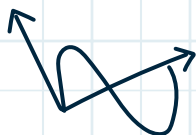
Warning. Gloves are made of natural rubber latex.

SLUDGE AND SLIME

FUN
FACTS
INSIDE

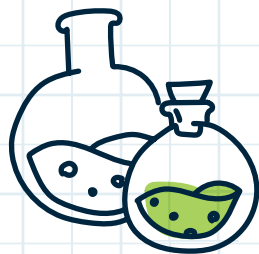
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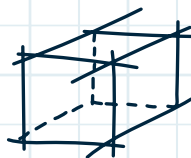
Advice for Supervising Adults

- 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 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.
- Discard all food used in carrying out the experiments.
- Take care handling hot water and hot solutions.



Contents

- Protective goggles
- Protective gloves
- Cornflour (300g)
- Sodium alginate (2g) in a 120ml bottle
- Green food colouring (10ml)
- Red food colouring (10ml)
- Calcium chloride (5g)
- Monster mould
- Large measuring cup
- 2 small measuring cups with lids
- 3 pipettes
- 2 wooden spatulas
- Plastic box
- 2 test tubes with lids
- Pot with lid



Chemicals Supplied and Warnings

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

Substance/ID	Hazard and Precautionary Statements
Sodium Alginate (C ₆ H ₇ O ₆ Na) _n CAS # 9005-38-3	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.
Calcium Chloride di-hydrate CaCl ₂ · 2H ₂ O CAS # 10035-04-8	Warning Causes serious eye irritation. Wear eye protection.
Green Food Colouring (E142) CAS # 3087-16-9	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.
Red Food Colouring (E129) CAS # 25956-17-6	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.
Corn Flour CAS # 9005-25-8	Do not ingest. Avoid contact with eyes and mouth. Use only according to directions.



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.

Periodic Table

																13		14		15		16		17		18	
1 H Hydrogen 1.008																	2 He Helium 4.003										
3 Li Lithium 6.941	4 Be Beryllium 9.012												5 B Boron 10.811	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.180									
11 Na Sodium 22.990	12 Mg Magnesium 24.305												13 Al Aluminum 26.982	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.066	17 Cl Chlorine 35.453	18 Ar Argon 39.948									
			3	4	5	6	7	8	9	10	11	12															
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.867	23 V Vanadium 50.942	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.631	33 As Arsenic 74.922	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 84.798										
37 Rb Rubidium 84.468	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.95	43 Tc Technetium 98.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.711	51 Sb Antimony 121.760	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.294										
55 Cs Cesium 132.905	56 Ba Barium 137.328	57-71 Lanthanides		72 Hf Hafnium 178.49	73 Ta Tantalum 180.948	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.217	78 Pt Platinum 195.085	79 Au Gold 196.967	80 Hg Mercury 200.592	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.980	84 Po Polonium 209	85 At Astatine 209	86 Rn Radon 222.018									
87 Fr Francium 223.020	88 Ra Radium 226.025	89-103 Actinides		104 Rf Rutherfordium [261]	105 Db Dubnium [262]	106 Sg Seaborgium [266]	107 Bh Bohrium [264]	108 Hs Hassium [269]	109 Mt Meitnerium [268]	110 Ds Darmstadtium [269]	111 Rg Roentgenium [272]	112 Cn Copernicium [277]	113 Uut Ununtrium unknown	114 Fl Flerovium [289]	115 Uup Ununpentium unknown	116 Lv Livermorium [293]	117 Uus Ununseptium unknown	118 Uuo Ununoctium unknown									

Alkali Metal	Alkaline Earth	Transition Metal	Basic Metal	Semimetal	Nonmetal	Haloge	Noble Gas	Lanthanide	Actinide
--------------	----------------	------------------	-------------	-----------	----------	--------	-----------	------------	----------

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.

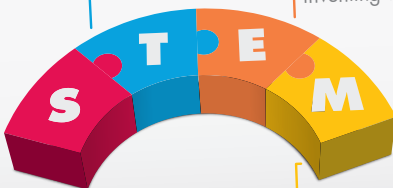
Inventive, creative and imaginative, STEM toys are educational, teaching new skills and knowledge and are (most importantly) lots of fun!

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

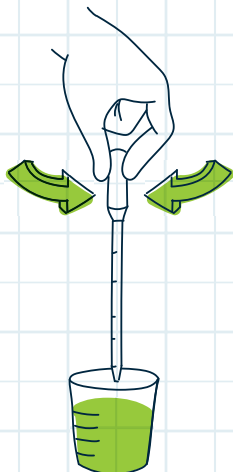
Before You Start...

How to Use Your Pipette

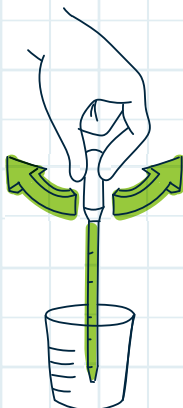
A pipette is used to collect liquid in small amounts and move from one container into another. It lets you control the amount of liquid you are adding by releasing a drop at a time. Before you begin with the experiments, you should practice using a pipette. The soft and squidgy end is called the **bulb**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

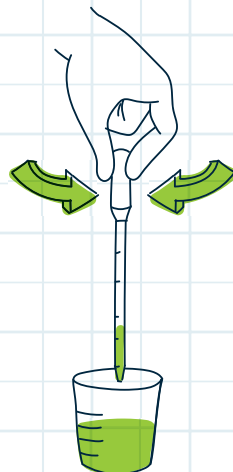
1.



2.



3.



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

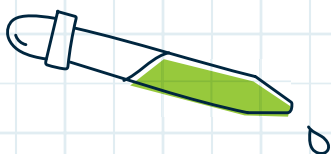
Prepare Your Chemicals

Sodium Alginate solution

steps:

1. Put on the protective goggles and gloves.
2. Add 100ml of warm water into the sodium alginate bottle.
3. Replace the cap securely on the bottle and shake it for at least 20 minutes. If you find that some of the powder is stuck to the bottom of the flask use a pipette to loosen it.
For optimal results, leave the solution overnight.
4. Your sodium alginate solution is ready.

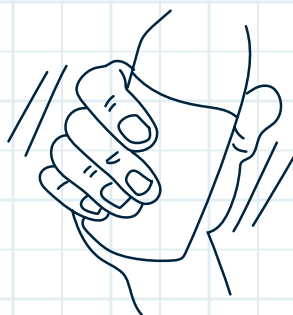
Note: Throughout the experiments shake the bottle before use.



Sodium Alginate solution

You will need:

- Protective goggles
- Protective gloves
- Sodium alginate
- Warm water (not included)



calcium chloride solution

You will need:

- Protective goggles
- Protective gloves
- Calcium chloride
- Small measuring cup
- Warm water (not included)

calcium chloride solution

steps:

1. Put on the protective goggles and gloves.
2. Add 30ml of warm water to the calcium chloride bottle.
3. Replace the cap securely and shake the bottle until the calcium chloride is completely dissolved.
4. Your calcium chloride solution is ready.

Note: Throughout the experiments shake the bottle before use.



Calcium Chloride: **Warning!**
Causes serious eye irritation

calcium chloride dilution steps:

1. Put on the protective goggles and gloves.
2. Add 30ml of warm water into the plastic box.
3. Using the pipette, measure 3ml of the calcium chloride solution into the plastic box and stir.
4. Your calcium chloride dilution is ready.

Note: Keep this pipette for use ONLY for calcium chloride solution.

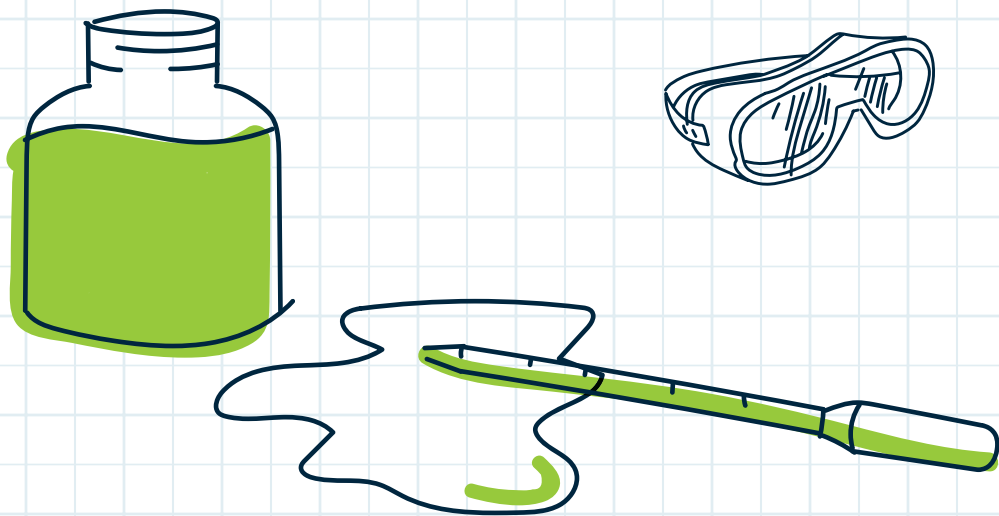


Calcium Chloride: **Warning!**
Causes serious eye irritation

calcium chloride dilution

You will need:

- Protective goggles
- Protective gloves
- Calcium chloride solution
- Small measuring cup
- Large measuring cup
- Pipette
- Plastic box
- Warm water (not included)



Please note: there are enough chemicals to work through all the experiments once.

EXPERIMENTS

1. Multiplying Slime Balls

You will need

Protective goggles, protective gloves, **sodium alginate solution***, green food colouring, small measuring cup, wooden spatula, pipettes, pipette used for calcium chloride solution, **calcium chloride dilution*** in the plastic box, test tube with lid.

*From Prepare Your Chemicals page 7-8



Calcium Chloride: **Warning!**
Causes serious eye irritation

Steps

1. Put on your protective goggles and gloves.
2. Pour 5ml of **sodium alginate solution*** into the small measuring cup.
3. Using a pipette, add 3 drops of food colouring to the small measuring cup. Mix well with the wooden spatula.
4. Using a pipette, transfer 3ml of **calcium chloride dilution*** from the plastic box into the small measuring cup.
5. Swirl the cup to mix the liquids and wait a few seconds.
6. Observe the results.
7. Pour the excess liquid back into the plastic box, using the wooden spatula to keep your slime ball in the cup.
8. Tip your slime ball into your hand and observe.
9. Then, squeeze the slime ball over the plastic box as shown in the diagram and observe.
10. Use the test tube to store your slime balls.

Explanation

When you squeeze the big ball, tiny little balls are formed. This happens because you break the ball when you compress it. However smaller balls form because the remaining solution of calcium chloride and sodium alginate interact as before, creating a polymer.

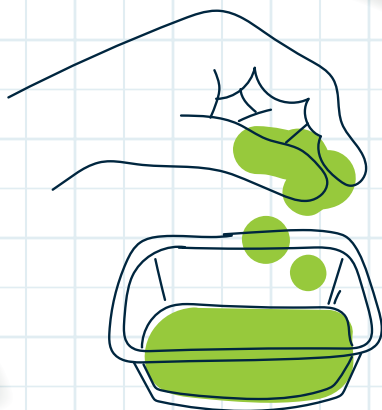
Explanation

The calcium in the solution bonds with the alginate molecules, starting from the outside of the ball, forming a layer that covers the sphere. This is why the interior of the ball is 'gelatinous'.

This happens because the calcium chloride interacts with the ions of the sodium alginate, forming a gel as the sodium ions (Na^+) are exchanged with calcium ions (Ca^{2+}) and the polymers become crosslinked.

The calcium ions are able to crosslink the alginate polymers because they can form two bonds, as opposed to monovalent ions such as sodium, which can only form one bond.

Slowly, the calcium chloride enters inside the ball, hardening the gelatinous content, as more crosslinks are formed.



2. Slimy Snakes

You will need

Protective goggles, protective gloves, green food colouring, red food colouring, **calcium chloride dilution***, **sodium alginate solution***, test tube with lid, small measuring cups, large measuring cup, wooden spatulas, pipette used for calcium chloride solution, pipettes.

***From Prepare Your Chemicals page 7-8**



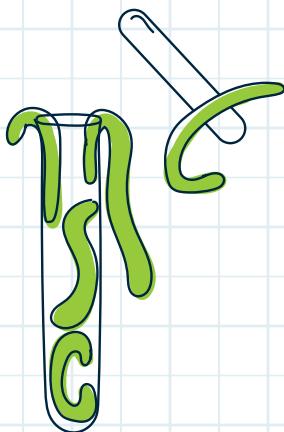
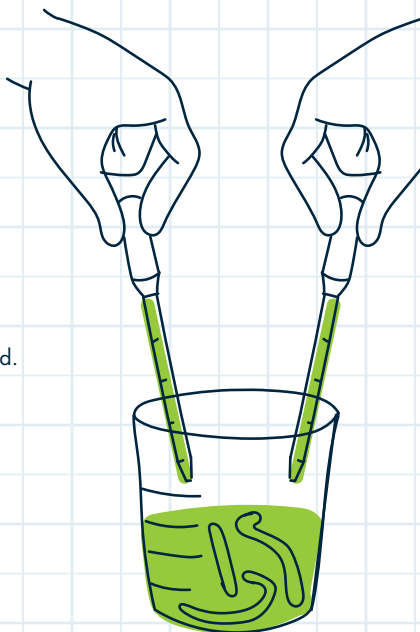
Calcium Chloride: **Warning!**
Causes serious eye irritation

Explanation

This is the same effect seen in the previous experiment – the reaction between the sodium alginate and calcium chloride results in the formation of 'slimy snakes'.

Steps

1. Put on your protective goggles and gloves.
2. Pour 15ml of **sodium alginate solution*** into each small measuring cup.
3. Using the pipette, add 5 drops of green food colouring into one small measuring cup and mix well. Then add 5 drops of red food colouring into the other cup and mix well.
4. Pour 30ml of **calcium chloride dilution*** into the large measuring cup.
5. Fill the pipettes with their coloured solutions. Place the tip of the pipette just above the calcium chloride dilution in the large measuring cup (ensure the pipette does not touch the calcium chloride dilution as this can cause the pipette to block).
6. Squeeze the bulb whilst quickly swirling the tip just above the liquid. Don't let it touch!
7. Observe the results.
8. Use a wooden spatula to help scoop out your slimy snakes and store in a test tube.



3. Invisible Monster

You will need

Protective goggles, protective gloves, **calcium chloride solution***, **sodium alginate solution***, pipette used for calcium chloride solution, pipettes, small measuring cups, wooden spatula, plastic box.

*From Prepare Your Chemicals page 7-8



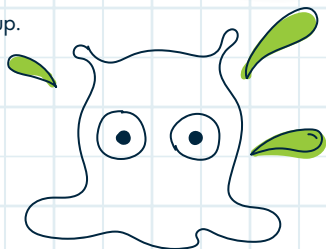
Calcium Chloride: **Warning!**
Causes serious eye irritation

Steps

1. Put on your protective goggles and gloves.
2. Prepare another **calcium chloride dilution*** (refer to page 8) in the plastic box.
3. Measure 20ml of **sodium alginate solution*** in the small measuring cup.
4. Using a clean pipette, start adding all the content from the small measuring cup into the plastic box, without allowing the tip of the pipette to touch the **calcium chloride dilution***.
5. With the wooden spatula, see if you can catch the invisible monster hiding in the plastic box.

Explanation

The sodium alginate solution has reacted with the calcium forming a thermo irreversible gel (it doesn't return to liquid state when heated).



4. Monster Blood or Slimy Bogies

You will need

Protective goggles, protective gloves, **sodium alginate solution***, red or green food colouring, small measuring cup, pipettes, wooden spatula, milk (not included). *From Prepare Your Chemicals page 7-8

Steps

1. Put on your protective goggles and gloves.
2. Measure 10ml of **sodium alginate solution*** in the small measuring cup.
3. Using the pipette, add 6ml of milk to the cup.
4. Add 20 drops of red or green food colouring (red for the monster blood or green for the monster bogies). Mix well.
5. Hold it in your hands (always using your protective gloves).
6. Observe the results.

! Attention! When you have finished the experiment, throw away all used food.



Explanation

Sodium alginate is a polymer extracted from seaweed. It is soluble in water (hydro soluble) and will create a viscous solution when mixed with the milk.

5. Sludgy Goo

You will need

Cornflour, green or red food colouring, small measuring cup, pipette, wooden spatula, water (not included), bowl (not included).

Steps

1. Put 100ml of cornflour into the bowl.
2. Add 30ml of water to the cornflour.
3. Using a pipette, add 5 drops of green or red food colouring into the bowl. Mix well using the wooden spatula.
4. Observe the results.

If you tilt the bowl slowly the sludgy goo will behave like a liquid. If you apply pressure to the sludgy goo it will become a solid.

Suggestion

Try forming a ball by rolling the sludgy goo in your fingertips, then quickly pick it up and drop it onto a protected surface. Observe the results.

Explanation

The sludgy goo does not follow Newton's law of viscosity and is known as a non-Newtonian fluid. This means it is a fluid where the viscosity is variable depending on the force that is exerted on it. When a sudden force is applied, it becomes a solid. However, once the force is released, it becomes a liquid again.

6. Sludge Monster

You will need

Protective goggles, protective gloves, cornflour, food colouring, small measuring cup, large measuring cup, pot with lid, monster mould, washing up liquid (not included), cooking oil (not included), tablespoon (not included).

Steps

1. Put on your protective goggles and gloves.
2. Add 2 rounded tablespoons of cornflour to the large measuring cup.
3. Add 20ml of cooking oil.
4. Stir well until the mixture becomes homogeneous.
5. Measure 15ml of washing up liquid into the small measuring cup.
6. Slowly mix in small amounts to the cornflour and oil until you have a sticky consistency (you may not need all the washing up liquid).
7. Add a few drops of food colouring and continue to stir.
8. Sprinkle some cornflour into your hands and pour out the mixture. Sprinkle a small amount of cornflour onto the top of the mixture and roll in your hands until it reaches a dough consistency. Press the mixture into the monster mould and carefully peel out.
9. Observe the results.

Suggestion

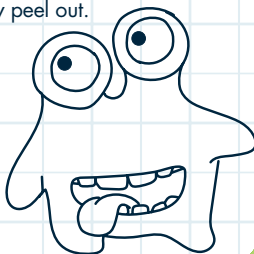
Why not have fun throwing your monster at a window and observe the result?

You can store your dough in the pot with a lid to keep it fresh.

Please note: The finished products should not be used if they change their appearance, colour or scent.

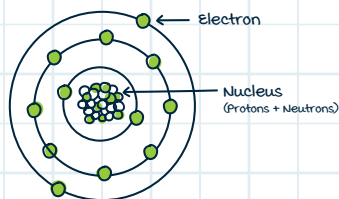
Explanation

In this experiment, you have made a polymer of cornflour molecules. Contrary to the Sludgy Goo, the washing up liquid made this dough a sticky polymer, that you can mould and allows it to stick to a wall.



Atoms and molecules

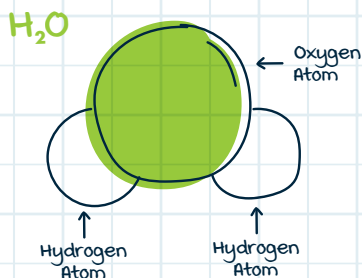
Everything around us is made up of tiny particles called **atoms**. Each atom is composed of a **nucleus**, formed by protons and neutrons, and also by electrons that spin around the nucleus, forming a cloud of electrons known as an electron cloud.



Protons have a positive charge, **electrons** have a negative charge, and **neutrons** have no charge at all. When atoms bond together, through chemical connections, molecules are formed.

These molecules can be very simple or complex. For example, water molecules are formed by two atoms of hydrogen bound to one atom of oxygen (H_2O). There are millions of water molecules in a single drop.

Chemical elements are substances formed by only one type of atom, such as iron or gold. However, **chemical compounds** are chemical substances formed by atoms of different types of elements, such as water.

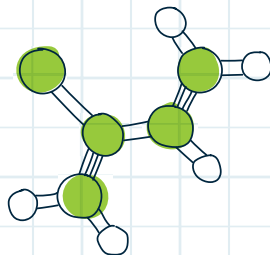


Slime is a **polymer**. The word "polymer" comes from the Greek word polimeres, which means "to have many parts". Polymers are very large molecules formed by the repetition of small chemical units called monomers (mono in Greek means "one").



Polymers in every day life:

Apart from metals and organic compounds, everything you see around you is made from polymers, from our skin to our clothing, to the food we eat.



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

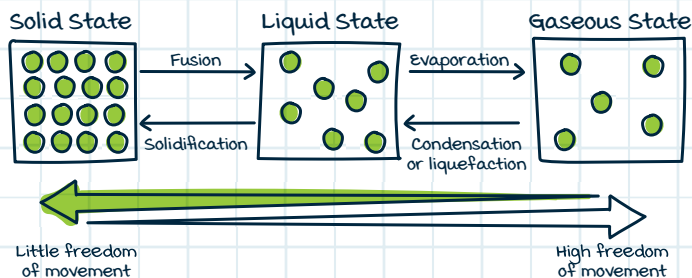
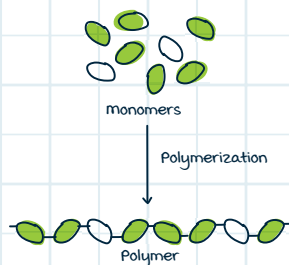
To claim your certificate collect **3** of these tokens and send them to us.



Physical state of matter:

Everything is made up of matter. There are different states of matter known as solid, liquid or **gas**.

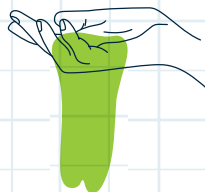
In a solid, atoms are close together, bound by powerful forces that keep them in fixed positions. The molecules are arranged in regular, repeating patterns. In a liquid, the molecules are further apart and have weaker forces which are constantly being broken. In a gas, the molecules are so widely dispersed and apart from each other that there is practically no interaction between them and therefore their shape and volume easily varies.



viscosity is a property of fluids (liquids and gases) which determines their ability to resist changing shape.

For example, cold olive oil has a high viscosity as it flows very slowly, but water has a lower viscosity level and flows much more easily.

As **slime** is a polymer, its long chains move slowly and therefore flows slowly. The larger the chains are, the slower the flow will be and consequently the slime will be more viscous. This is why some polymers look like **mucus** and **drool**! The more viscous they are, the funnier it is to play with them!



Please ask your parent or guardian to complete:

Name _____

Age _____

EXPERImake

Home Address _____

Email Address _____

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

Send to: Addo Play Ltd. Bucks, HP10 8EG, UK

We confirm that information disclosed to Addo Play will be held in accordance with our privacy policy, a copy of which is available on our website www.addoplay.com

31910101-N



Also Available...



*Subject to Availability

Why not share your results with us?

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hello@addoplay.com

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