

SCIENCE!

Activity Pack



Potential Plus UK Activity Packs

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SCIENCE

Activity Pack

Here at **Potential Plus UK**, we recognise gifted and talented children require stimulation to explore their creative minds. If it's a rainy day or you're sitting at home over the weekend, we have created this 'Science' activity pack to provide your child and their friends with fun, challenging ideas to keep them entertained. Designed to cater for the needs of Key Stages 1 and 2 children; these are the 20 activities contained in this pack:

1. Crack me!
2. Food Boogie
3. Yeast Balloon
4. Flower Dye
5. Hover Egg
6. Light me up!
7. Invisible Ink
8. Bottled Eggs
9. Chromatography
10. Barometer
11. Bio-Domes
12. Sink or Skin?
13. Spill the Beans
14. Fish for Ice
15. Balloon Race
16. React!
17. Eruption!
18. Pocket Rocket
19. Enzymes
20. Book Lift

Disclaimer

The activities in this booklet are suggestions for use in the home. Potential Plus UK cannot be held responsible for any incidents that may arise as a consequence, so please take care.

Crack me !

Activity 1

WHAT DO I NEED?

- 1 Raw Egg
- Vinegar
- Glass cup

WHAT DO I DO?

Pour vinegar into the cup until it is about $\frac{3}{4}$ full.

Carefully, lower the egg into the cup.

RECORD what you see! (Bubbles will rise from the egg!).

Leave the egg in the cup for one day.

...One day later! Remove the egg and feel the egg shell.



WHAT NEXT...?

1. What makes an egg shell hard?
2. The shell of the egg went rubbery after putting it in vinegar. Why?
3. Leave the same egg on a table for another day. Now feel the egg again. The shell should have hardened again> why is this?

Food Boogie

Activity 2

WHAT DO I NEED?

- Raisins
- Glass Cup
- Vinegar
- Baking Soda

WHAT DO I DO?

Pour water into the cup until it is about $\frac{3}{4}$ full.

Dissolve a teaspoon of baking soda into the water.

Gently, add vinegar until it is almost full. Allow time for the fizzing to stop!

Now add the raisins, and watch them boogie!

TOP TIP! Add a bit more vinegar if they don't dance.



WHAT NEXT...?

1. Why do my raisins boogie? What can you see that might be causing them to rise and fall?

Why not try different items such as chocolate chips, rice, and dried peas.

Yeast Balloon

Activity 3

WHAT DO I NEED?

1 Packet of Yeast
Clear Plastic Bottle
Sugar
Warm Water
Small Balloon

WHAT DO I DO?

Fill the bottle with one inch of warm water.

Empty the yeast packet into the bottle and gently swirl.

Add 1 teaspoon of sugar and swirl some more.

Give your balloon a stretch by blowing it up a few times.

Place the neck of the balloon over the neck of the bottle.

NOW SIT AND WATCH the balloon gradually inflate! (You may need to wait around 20 minutes, so be patient!)



WHAT NEXT...?

1. Why does adding yeast blow up my balloon? What causes a balloon to blow up?

Flower Dye

Activity 4

WHAT DO I NEED?

White Flowers (e.g. white carnations)

Water

Food Colouring

Vase / Plastic Container

WHAT DO I DO?

Fill a plastic container with water.

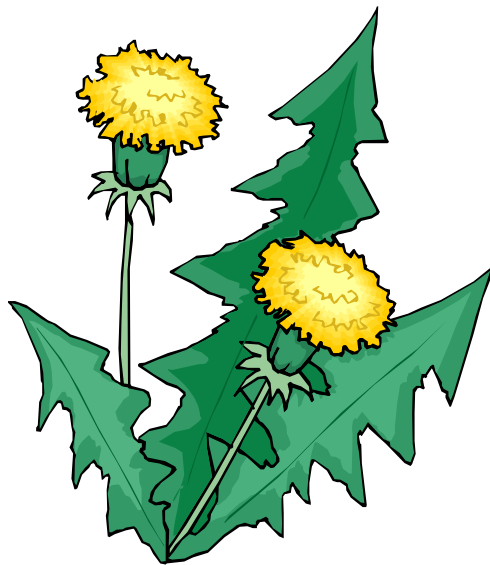
Add a few drops of food colouring.

Give the stem of the flower a quick trim (ask an adult to help).

Place the stem in the plastic container with coloured water.

NOW WAIT! Check your flower every few hours and gradually observe the petals of the flower change!

By the next day, your white flower will have changed completely!



WHAT NEXT...?

How did the plant change colour?

Keep a record of the colour changes by taking a photo every few hours and put these in a scrapbook!

Carry out some of your own research into the structure of a plant. Find out which part of a plant water travels up.

Hover Egg

Activity 5

WHAT DO I NEED?

Glass Cup
Egg
Salt

WHAT DO I DO?

Place the egg into the cup.

Pour water into the cup until it is $\frac{1}{2}$ full.

Add a teaspoon of salt and observe.

Continuing adding one teaspoon of salt at a time until you see the egg begin to float in the glass.



WHAT NEXT...?

Why does my egg elevate in the salt solution?

By adding more salt to the water, it becomes harder for the salt particles to find a space to fit in, when there is no more space in the water, the water is known to be 'saturated' and 'dense' solution.

Before the experiment the egg is heavier (denser) than the water, so it sinks. But now the solution is denser than the egg, so your egg elevates.

Why not try adding different materials that dissolve in water instead of salt such as sugar. Does this make a difference?

Light me up!

Activity 6

WHAT DO I NEED?

Dark Room

Fluorescent Light Bulb

Comb



WHAT DO I DO?

Take your comb and light bulb into a dark room.

Run the comb through your hair 20 times.

Now place the comb on the metal end of the light bulb and watch the filament light up!

WHAT NEXT...?

1. Why does the bulb light up?

Why not try rubbing your comb along different materials, such as wood, plastic, woolly scarves and see if they pass on electrons to light up the bulb!

Invisible Ink

Activity 7

WHAT DO I NEED?

Half a Lemon
Water
Cotton Bud
White Paper
Lamp
Cup

WHAT DO I DO?

Squeeze the juice of the lemon into a cup and add a few drops of water.

Use the cotton bud to give it a stir.

Now you are ready to write your secret message on a piece of white paper!

Wait for the juice to dry completely so it becomes invisible.

When you are ready, give this note to someone to read closely under a lamp.



WHAT NEXT...?

1. Why does my secret message reveal itself under the light?

Why not try other substances to write your message, such as onion juice, honey, milk orange juice and see if the same thing happens!

Bottled Eggs

Activity 8

WHAT DO I NEED?

Hard-Boiled Egg

Matches

Adult

Water

Wide Mouth Glass Bottle (milk bottles work well)

WHAT DO I DO?

Peel off the shell of a hard-boiled egg. Make sure the egg is cool before handling.

Place the bottle on a table. Make sure there are no flammable objects surrounding it.

Ask an adult to light 3 matches and place them into the bottle all at once.

Quickly, pop the egg on the top of the bottle.

NOW WAIT! The egg will wriggle around before being sucked into the bottle!



WHAT NEXT...?

1. Why did the egg get sucked into the bottle? Think about what forces suck things, and where they may have come from in this experiment.

Chromatography Activity 9

WHAT DO I NEED?

5 Different Black Pens (not ballpoint)
Paper Towels
Scissors
Bowl
Water
Tape
Ruler



WHAT DO I DO?

Cut the paper towel into 5 strips that are one inch wide.

Using one pen per strip, draw a big dot one inch from the bottom. (Remember which pen was used for which strip!)

Fill the bowl with just a little less than one inch of water.

Hang the strips over the bowl. Make sure the water touches the strips, but NOT the dot of black ink.

Stick the strips in place and watch the ink creep up the strip...but what colour is the ink?

WHAT NEXT...?

1. Why does the black ink turn into so many colours?

2. You may notice some colours travel further than others. Why might this be?

Barometer

Activity 10

WHAT DO I NEED?

Clear Glass/ Plastic Jar

Straw

Tape

Modelling Clay

Cold Water

Food Colouring

Marker Pen



WHAT DO I DO?

Put a few drops of food colouring into a cup of water.

Pour coloured water into the jar until it is $\frac{1}{2}$ full.

Tape the straw to the side of the jar, make sure the straw is in the water, BUT NOT TOUCHING the bottom of the jar.

Mark on the straw the level of water.

You have now made yourself a barometer! Watch the weather forecasts and see if you can predict if the water will move up or down the straw!



WHAT NEXT...?

Q. What is a barometer? How can it predict the weather?

Bio-Domes

Activity 11

WHAT DO I NEED?

1 Litre Plastic Bottle
Soil
Seeds
Pebbles
Re-sealable Food Bag
Water
Scissors



WHAT DO I DO?

Ask an adult to cut the plastic bottle in half. You keep the bottom half.

Fill the bottle with pebbles, around $\frac{1}{2}$ an inch deep.

Now add 1 inch of soil over the pebbles.

Plant the seeds by first making a hole in the centre of the soil, as deep as your fingernail.

Then sprinkle a pinch of seeds into the hole.

Now cover the hole back up with soil.

Add enough water until you see it begin to collect in the pebbles.

Put your bottle into the bag and seal it tightly. You have now created a bio-dome!

Put your bio-dome by a sunny window and within 3–4 days, your plant will start growing!

Sink or Skin? Activity 12

WHAT DO I NEED?

Bowl

Orange

Water

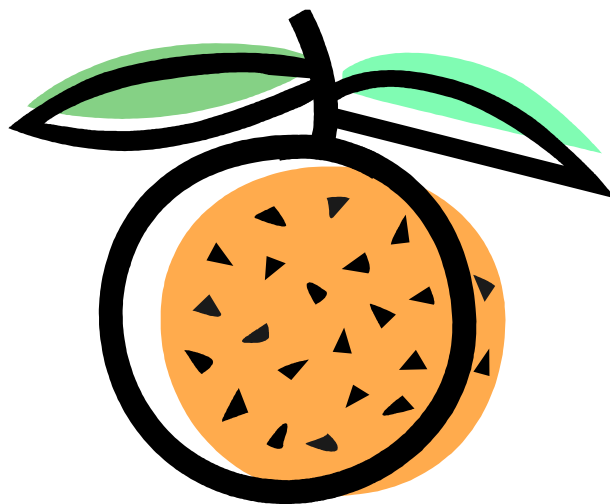
WHAT DO I DO?

Fill up the bowl with water.

Place your orange into the bowl. What happens to the orange?

Take out the orange and peel it.

Now place your orange back into the bowl of water. What happens this time?



WHAT NEXT...?

1. Why does my orange sink when I take off the peel?

Why not try with different foods with different skin textures such as apples, bananas and limes. Does the same thing happen?

Spill the Beans Activity 13

WHAT DO I NEED?

Glass cup
Water
Cooking Oil
Dried Beans

WHAT DO I DO?

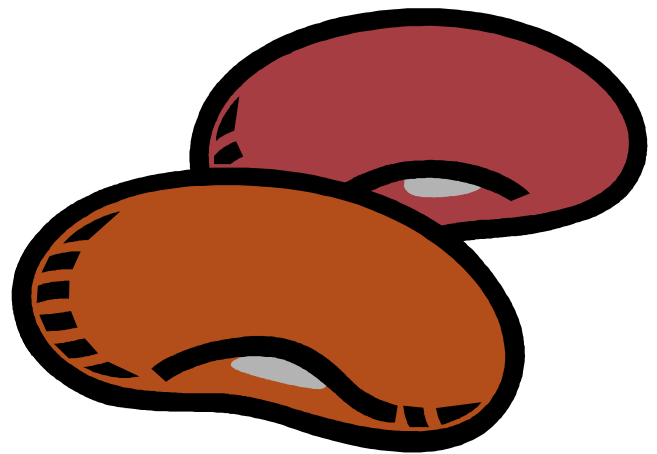
The aim of this experiment is to test how many beans you and your friends can fit in a glass of liquid BEFORE spilling over.

Fill the glass to the top with water.

Now count the number of beans as you add them one at a time to the glass. Record how many beans the water can hold before the water bulges at the top WITHOUT spilling over the edge.

Now repeat steps 2) and 3) using a glass of cooking oil.

Does the water or oil hold more beans?



WHAT NEXT...?

This experiment investigates surface tension and varying density of liquids.

Experiment using different liquids, honey, poster paint, tomato ketchup!
Use different materials such as sweets, coins, buttons, and dried pasta.

Fish for Ice

Activity 14

WHAT DO I NEED?

Ice Cubes
Big Bowl of Water
String
Salt

WHAT DO I DO?

Play with friends to see who can fish the most ice cubes!

To fish for an ice cube, float ice cubes in a bowl of water.

Lay one end of a piece of string on the ice cube.

Sprinkle a pinch of salt onto the string and wait for 30 seconds.

Now fish! You will see that you have just caught an ice cube!

Have a race with friends to see who catches the most ice-fish!



WHAT NEXT...?

1. Why does adding salt make the string stick to the ice cube?

Experiment sprinkling different substances, such as sugar, talcum powder or pepper. Do these have the same effect?

Does this help to explain why you see gritters and salt spreaders on the roads when it is snowing?

Balloon Race Activity 15

WHAT DO I NEED?

Empty Drink Cans
Balloons
Your Hair!

WHAT DO I DO?

Have a race with your friends to reach the finish line.

Place a can on its side on a smooth, flat surface (floor/table).

Blow up and tie the balloons before rubbing it on your hair quickly for 10 seconds.

Now hold the balloon an inch away from the can and watch it roll!

Try moving the balloon away and towards the can, and also see which direction the can moves when you hold the balloon on either side of the can.

Now you have mastered controlling the can, it is time to race!



WHAT NEXT...?

Make your own race track with twists, turns, and even slopes to really test your skills!

React!

Activity 16

WHAT DO I NEED?

Ruler with Centimetre Marks

Table

Chair

Paper

Pen

Coloured Stickers

WHAT DO I DO?

Take it in turns to see who has the fastest reaction times!

Sit on a chair, with your arm resting on a table so you can hold out your hand and wrist off the table.

Get your friend to hold the ruler above your hand, so the end of the ruler dangles between your thumb and finger.

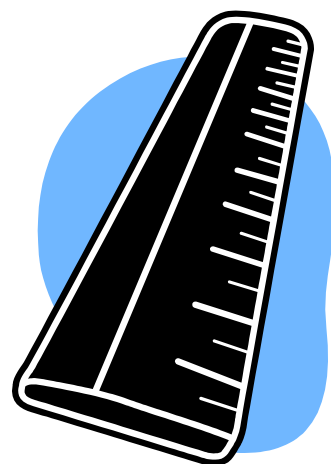
When your friend lets go of the ruler, catch it as soon as possible.

Mark where you caught the ruler with a sticker.

Take it in turns and repeat again to get a table of results comparing the distances.

Use the table below to work out your reaction time.

Distance on Ruler	Reaction Time	
5cm	0.10	seconds
10cm	0.14	seconds
15cm	0.18	seconds
20cm	0.20	seconds
25cm	0.23	seconds
30cm	0.25	seconds



WHAT NEXT...?

Does practice improve your reaction time?

Why not plot these results on a graph! With the reaction time up vertically along the side (y-axis) and trial along the bottom horizontal (x-axis).

Eruption!

Activity 17

WHAT DO I NEED?

100 ml Vinegar

Bicarbonate Soda 150 ml Water

150 ml Detergent Food Colouring

Large container

WHAT DO I DO?

Carefully measure out all the ingredients.

Combine the vinegar, detergent into the container and add to this a few drops of food colouring.

Now take your container to a place where you are allowed to get messy! (Maybe outdoors or over kitchen sink)

In a cup, mix the bicarbonate soda and water, and then pour it quickly into the container.

Stand back and watch your home made volcano erupt!



WHAT NEXT...?

Why not create a volcano surrounding to put around your container using play dough, or even soil and pebbles from your garden!

Pocket Rocket Activity 18

WHAT DO I NEED?

Empty 35mm Plastic Film Canister and Lid

Water

Fizzing Tablets (or Alka Seltzer)

Safety Goggles

WHAT DO I DO?

Get your shoes and goggles on and take all the equipment outside!

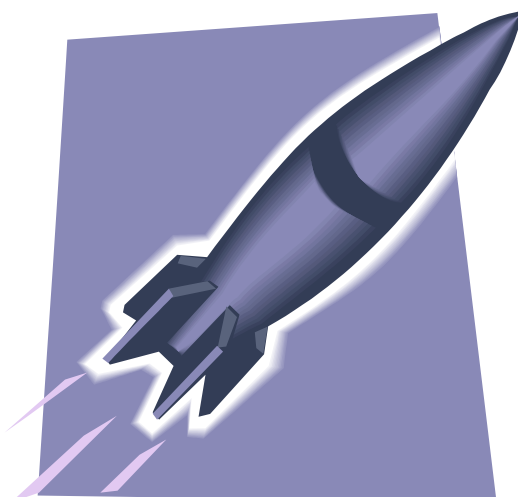
Put a teaspoon of water into the film canister.

Break the fizzing tablet into half and drop it into the canister.

Now quickly put the lid back onto the canister (make sure it snaps shut tightly!)

Place the canister on the floor; LID SIDE DOWN in an open area and TAKE 5 BIG STEPS BACK!

Now watch the lift off!



WHAT NEXT...?

1. Wow! How did my canister launch into the air after a big POP?

Try investigating the effect of changing the water temperature, varying the size of the tablet and the amount of water in the canister.

Enzymes

Activity 19

WHAT DO I NEED?

Hard-Boiled Egg

2 Jars / Glasses

Biological Washing Powder

Non-Biological Washing Powder

WHAT DO I DO?

Fill both jars with water.

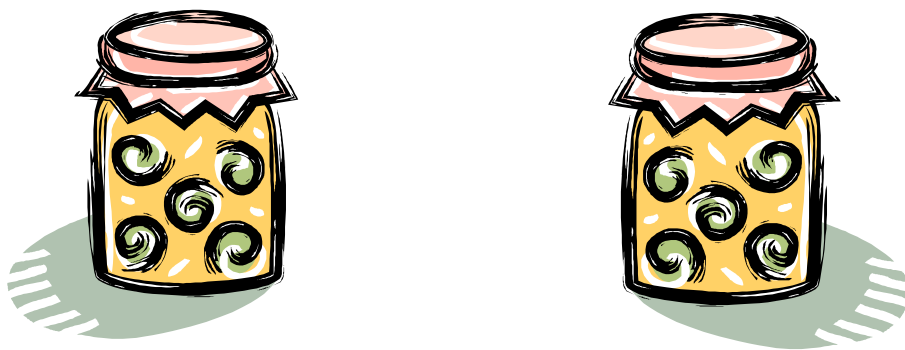
In 1st jar, add 3 tablespoons of biological washing powder.

In 2nd jar, add 3 tablespoons of non-biological powder.

Use only the white of the egg and roughly tear it up into 2 pieces of the similar sizes (you want the edges to be jagged).

Put a piece in each jar and leave for 3 days in a warm place.

After 3 days, take the egg out and compare the bits of egg!



WHAT NEXT...?

Q. The shape and size of the pieces looks different to each other and from 3 days ago. Why?

Book Lift

Activity 20

WHAT DO I NEED?

Zipper Lock Plastic Bag

Straw

Heavy Book

Pencil

Tape



WHAT DO I DO?

Can you lift a book with just air?!

On a table, place the book on top of the bag. Let 2 inches of the bag stick out from under the book.

Using a sharp pencil, poke a hole through just one side of the bag... NOT all the way through!

Stick the straw through the hole and into the bag.

Using the tape, seal the hole around the straw so no air can escape.

Take a deep breath and BLOW to lift the book!

WHAT NEXT...?

Have a competition with friends to see who can lift the most books!

Why not try varying the size of the bag to lift different sizes objects! – just imagine what a bin liner can lift!

Science Answers

Activity 1—Crack Me!

1. Calcium Carbonate
2. A chemical reaction occurred between the vinegar (acetic acid) and egg shell (calcium carbonate). The bubbles (carbon dioxide) were the product of this reaction.
3. It has absorbed carbon from the air

Activity 2—Food Boogie

1. When baking soda is added to vinegar, carbon dioxide is one of the outputs from this chemical reaction. These bubbles of gas stick to the sides of the raisins. Acting like parachutes, the raisin is 'lifted' to the surface. When it reaches the surface, the air is released and the raisin falls.

Activity 3 —Yeast Balloon

1. Yeast is a living micro-organism, so like us; yeast needs food and energy too. We fed yeast sugar and it released a gas called carbon dioxide. This is what inflates the balloon. Yeast works best in certain environmental conditions affected by temperature and 'food' available. Why not carry out further experiments with friends to investigate the effect of temperature and different 'yeast foods' (e.g. honey, treacle) on the speed which the balloon inflates.

Activity 4—Flower Dye

1. The coloured water travels in special tubes up the stem of the plant and into the petals, making them appear a different colour

Activity 5 – Hover Egg

1. By adding more salt to the water, it becomes harder for the salt particles to find a space to fit in, when there is no more space in the water, the water is known to be 'saturated' and 'dense' solution. Before the experiment the egg is heavier (denser) than the water, so it sinks. But now the solution is denser than the egg, so your egg elevates.

Activity 6—Light Me Up!

1. The explanation to this is caused by tiny particles called ELECTRONS. When you brushed your hair with the comb, electrons moved from your hair to the comb. The comb is now charged. When you touch the bulb with the charged comb, these electrons now move to the bulb. This is what causes the bulb to light up!

Activity 7—Invisible Ink!

1. Lemon juice is a special substance; it turns brown when heated. We diluted the lemon juice in water to make your message invisible, but as soon as it is heated under the lamp, the message will be revealed

Science Answers

Activity 8—Bottled eggs

Air expands when heated and contracts when cooled. The matches heat the air inside the bottle and cause it to expand. When the matches extinguish, the air cools and contracts. As it cools, a lower pressure is created inside the bottle compared to the outside. Air always moves from area of high pressure to low pressure. This causes the egg to be 'sucked' into the bottle.

Activity 9 – Chromatography

1. Black ink is actually made up of several different colours, or pigments. When you dip the strip into water, the dried pigments dissolve and as the water travels up the strip, it takes the pigments with it. This is because different pens contain different pigments, which contain different sized pigment molecules, so some are easier to carry than others.

Activity 10—Barometer

1. A barometer is a device used to measure air pressure. You may notice the water moves up the straw when there is high pressure, and normally this is on a nice, calm, sunny day. But when the water moves down, there is low pressure and this is a warning to get your umbrellas out!

Activity 12—Sink or Skin?

1. If you look carefully, the orange peel is full of holes. These form mini air pockets making the orange less dense and cause it to float. But once we remove the peel and its air pockets, the orange is much denser than the water, so it will sink.

Activity 14—Fish for Ice

1. This experiment investigates melting and freezing points. Adding salt to the ice cube lowers its freezing point, meaning it will melt faster than normal. As some salt washes away, the water refreezes, so the string is trapped in the ice.

Activity 18—Pocket Rocket

1. When the tablet dissolves in the water, this releases the gas carbon dioxide. As more gas is released, the pressure inside the film canister builds up more and more until the cap is blasted down and the rocket blasts up!

Activity 19—Enzymes

Egg whites contain protein and this can be digested by the enzymes (to be more specific, protease). Biological washing powders contain enzymes, but non-biological powders do not. Notice how the egg in the biological powder jar is rounder, smoother and smaller. This is because the enzymes have made the chemical reaction that digests proteins speed up so the egg is dissolved quicker. Whilst the egg in the non-biological powder jar is broken down less quickly as there are no enzymes to speed up this reaction. Enzymes are known as 'biological catalysts' – they speed up chemical reactions.