ACTIVATE 2

Adults and Children Together
Investigating Virtually Anything
That Exists

sphere science

Parent's guide

This page tells you what you are doing and why. No previous experience or specialist equipment needed!

Science enquiry is asking questions about the world around you. There are two types of experiment: checking something known for yourself or finding out something new. A true investigation is finding out about something to which there is no previously-known answer. This is how all scientific discoveries are made.

Children can invent their own experiments. Make sure everyone is working safely.

You will all be able to develop your skills as scientists:

- Using equipment safely
- Working precisely
- Observing – watching very carefully
- Recording results

Think about ...

What questions are you hoping to answer?

Is it safe?

What variables (things that can be changed to see if something different happens) are involved?

What needs to be observed? Note down, draw or discuss what happens.

Which variable are you going to change? Keep everything else the same.

Did this investigation answer your question? if not, why not?

Investigation 1

Whoosh!

Children

This is a messy activity – best do it outside!

Have you seen what happens if you drop five mints together into a bottle of fizzy drink? Stand well back when doing this! But is this always true? Do all sweets make all fizzy drinks react like this? Does it with other fizzy drinks?

Does it matter how you put the mints in (one at a time; all together)?

Which drinks could you investigate?

Which sweets could you investigate?

Parents

Variables: sweets (mass, number, shape, type, how they are put in); type of fizzy drink; drinks container (size, shape).

Note: it is easier to add several sweets together if they are poured in from a tube.

Resources needed: fizzy drinks; sweets (eg mentoes, polo mints, boiled sweets).

Safety: not to have the experiment gushing all over people (stand well back!) or the floor where people might slip (best do it outdoors); diet fizzy drinks make a less sticky mess.

Further research

Carbon dioxide, nucleation

Investigation 2

Sparkling pennies

Children

Put an old dull penny into a container. Add enough lemon juice so that the lemon juice covers the penny. After five minutes, take the penny out and dry it. What has happened to the penny?

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Does it matter for how long you leave the penny in there?

Do other liquids have the same effect (eg vinegar, fizzy drink, soap)? Check with an adult before using other liquids.

Does this work with other coins (eg 2p, 5p)?

Parents

Variables: length of time penny is immersed; liquid used; coin used.

Resources needed: old coins; container (eg cup); lemon juice and other liquids.

Safety: most household liquids are safe for this activity.

Further research

Acids, alkalis, corrosion

Investigation 3

Finding Fats

Children

Take a solid bit of food and rub it on a brown paper bag. Does it leave a greasy smudge?

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Do other foods make a smudge? If so, are the smudges different?

Try different papers – which ones are best at showing the greasy marks?

Does it make a difference how you rub the food stuff on the paper?

Parents

Variables: foods; papers; how you rub the food stuff.

Resources needed: food samples (small); brown paper bags; other types of paper.

Safety: any mess needs to be cleared up so no one slips on bits of food

Further research

Fats in foods

Investigation **4**

Will it float?

Children

Have you noticed that not all boats are the same shape?

Have you tried to make a boat out of plasticine – one that really does float. Does it matter what shape you put the plasticine in? Is one shape better than any other?

What shape(s) could you try out?

Where, exactly, will you test them?

How will you measure your results (eg how many pennies it can hold before it sinks)?

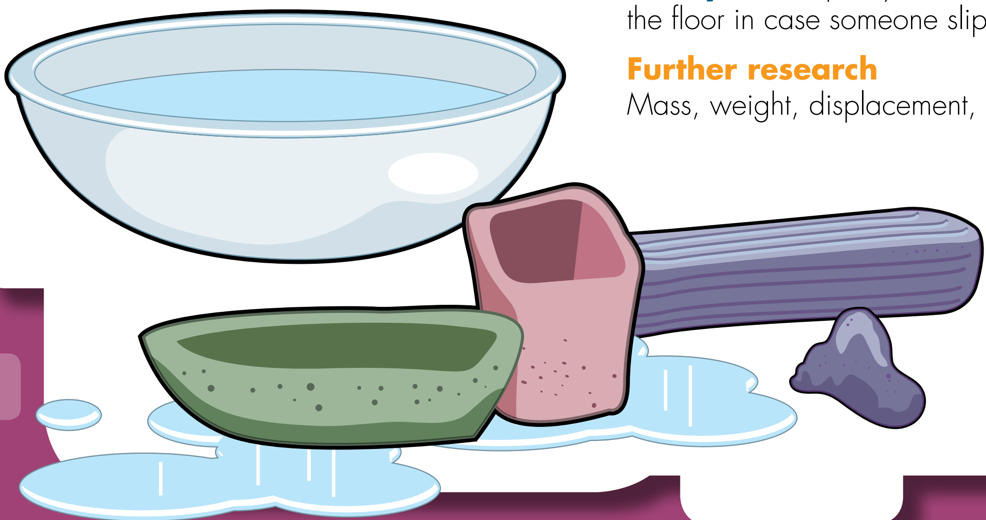
Parents

Variables: amount of plasticine used; shape of boat; other malleable material (eg blu-tac).

Resources needed: plasticine; bowl or sink.

Safety: clear up any water spilled on the floor in case someone slips on it.

Further research
Mass, weight, displacement, malleable



Investigation 5

Loop the loop

Children

You can make a very simple plane with a straw and two strips of paper. Make the paper strips into two paper loops and attach one to each end of the straw. Then throw this plane through the air to see how far it flies.

Does it fly straight or in a curve? Does it matter what size the paper loops are? Would it work if they were both the same size? Or made from the same type of paper? Or made with different widths? Or made with a thicker or thinner or longer or shorter straw?

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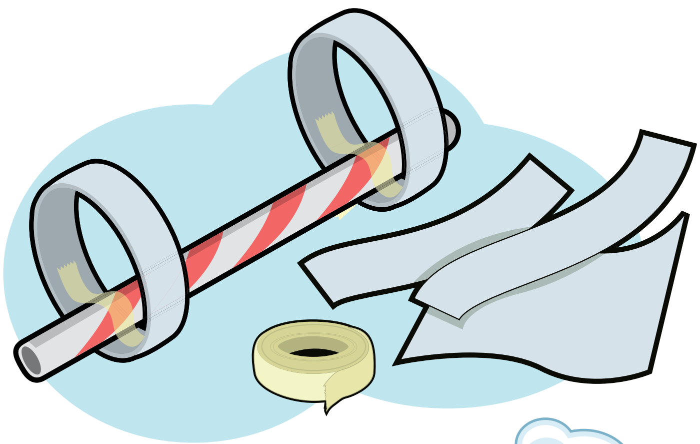
Where do the circles need to be attached to the straw?

Which of these variables will you test?

Where, exactly, will you test them safely?



Parents

Variables: paper loops (width, length, type of paper, point of attachment to the straw); straw (length, width).

Resources needed: paper; straws; sticky tape; large space for testing (it is not a fair test if the plane hits the wall).

Safety: care not to hit anyone.

Further research

Bernoulli's Principle, aerodynamics

Investigation 6

Cartesian Divers

Children

Warning: this is fiddly but well worth the effort.

To make a Cartesian Diver, you use half a straw. Fold the top over and seal it down (sticky tape works but plasticine will last longer) so that some air is trapped inside. Then attach a small weight (eg another piece of plasticine) around the open end. Put this in a bowl of water to see if it floats so that the top of the straw is just above the surface of the water. If it is floating too high, squeeze some of the air out; if it is floating too low, take some weight off.

When you have it floating with the top of the straw just above the surface of the water, carefully take the Cartesian Diver out making sure no water comes out of it. Now put it in a plastic bottle full of water and screw the top on firmly. As you squeeze the bottle, the Cartesian Diver will gently fall to the bottom. What happens when you squeeze less hard?

?

Does it matter how big the piece of straw is?

Does it matter how much air is trapped inside?

Does it matter how big a weight is attached?

How will you measure your results?

Parents

Variables: size of straw; amount of air trapped; size of weight; how hard you need to squeeze the bottle.

Resources needed: straw; plasticine; sticky tape; screw-top plastic bottle full of water.

Safety: clear up any water spilled on the floor in case someone slips on it.

Further research
Mass, weight, relative density

Investigation 7

Watch it grow

Children

Warning: this is an interesting experiment but it might take several days.

Have you noticed that a lot of substances used around your home are made of crystals? For example salt. Did you know that it is possible to make your own crystals? Although crystals are not alive, in science we say that crystals grow.

Put about two tablespoonfuls of hot water into a mug and dissolve as much salt as you can into it. As you add the salt, stir the water with a teaspoon. Keep adding salt until no more dissolves; this should be about two teaspoonfuls. Now pour this salt solution into a container such as a plate or saucer and leave it on a windowsill.

Leave this for a few days but keep checking it to see if crystals are growing. If you have a hand lens, you might like to look at the crystals you have grown.

?

Does it matter what temperature of water you use?

Does it matter how deep your container is?

What happens if you use more water and more salt?

Are there any other substances you could you try out safely?

Parents

Variables: water temperature; amount of solution used; solution depth; crystalline substance used.

Resources needed: crystals; water; container; spoons.

Safety: not all crystalline substances can be touched with bare hands.

Further research

Saturated solution, solvent, crystallisation

Investigation 8

Spin dryer

Children

This is a wet activity – best do it outside!

Spin dryers are a great way of getting clothes nearly dry after they have been washed. This experiment works in the same way as a spin dryer.

Get a sealable sandwich bag and make two holes below the seal. Thread a piece of string through the two holes and tie it to itself. This is now the handle. Now make a pin hole in the base of the bag. You now a have a very simple spin dryer!

To make this work put a piece of wet cloth into the bag and then spin it round your head for a few minutes. Check how wet the cloth is afterwards.

Would it work better if there were more holes in the bottom? Or bigger holes? Does the speed of spinning make a difference?

?

How would you make the holes the same size as each other?

Where, exactly, will you test this device?

How will you measure your results?

Parents

Variables: number of holes; size of holes; speed of spinning; wetness of test cloth.

Resources needed: sandwich bag; string; cloth; water.

Safety: adult help needed for making holes in the bag; plenty of space for testing to avoid hitting people or making a mess.

Further research

Centripetal force, centrifugal force

Investigation 9

Soak it up

Children

Have you noticed how good kitchen paper towels are at soaking up something you've spilled? But would other types of paper work just as well?

Hang strips of different papers over the edge of a saucer (or other small shallow container), with one end of each in the centre. Put small amount of water into the centre of the saucer.

What type of papers could you try out?

Do they all soak up water as much as each other?

How will you measure your results?

Parents

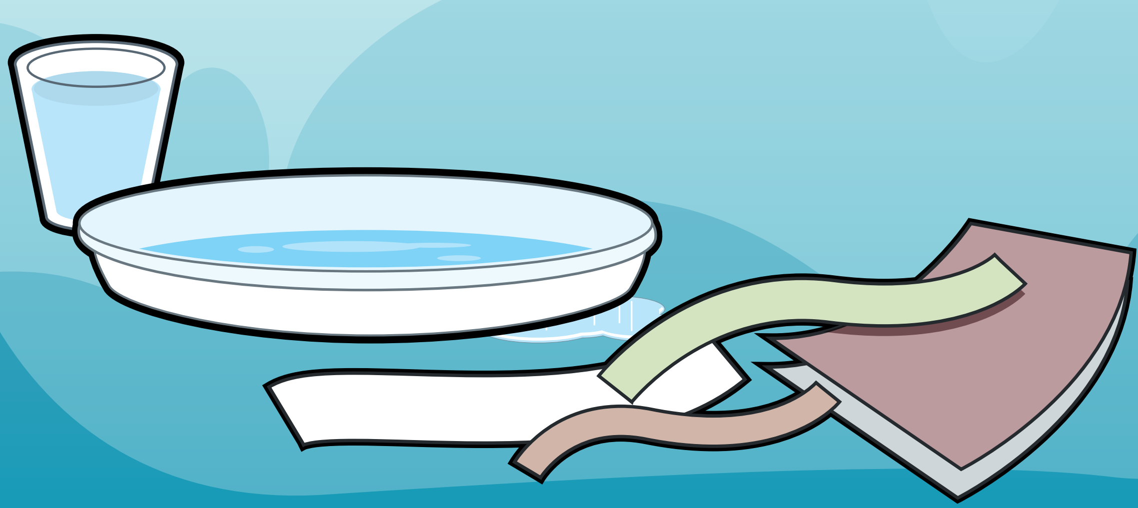
Variables: type of paper; size of paper.

Resources needed: different types of paper; water; shallow container.

Safety: don't do the experiment on a polished surface; clear up straight away any water spilled.

Further research

Absorbency, capillary action



Investigation 10

Sounds from different things

Children

Tie a long piece of string tightly round the handle of a fork so that the fork is in the middle of the string. Hold one end of the string in one ear and the other end in the other ear. Lean forward slightly so that the fork is dangling in mid air. You are now ready to test it.

Let the fork swing against different objects (eg the table) and listen to the results. Do different objects give different sounds?

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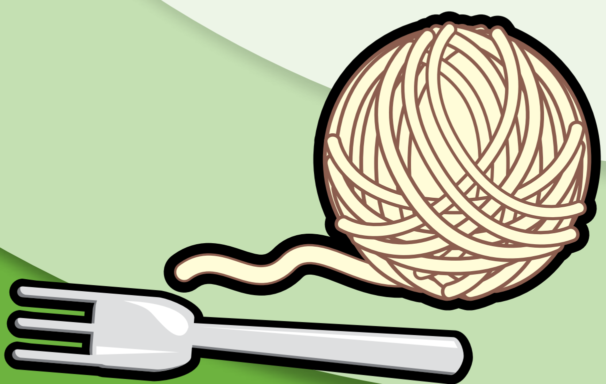
Which objects could you try out?

Would it work if you used something else instead of a fork?

Does the length or type of string make a difference?



Parents

Variables: fork (or alternative); objects being hit; string (length, type); how hard you hit the object with the fork.

Resources needed: fork (or alternative); string.

Safety: don't push your fingers or string too far into your ears.

Further research

Sonorous, vibration, tuning fork

Worksheet Recording Template

What question am I asking?

What do I need?

What will I do?

What will I change?

How will I do this safely?

What happened?

What variable factors(s) made a difference?

What could I change to improve the investigation if I were to do it again?