NATIONAL SCIENCE & ENGINEERING WEEK

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Super Science

Symbol supported science activities

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BIS | Department for Business Innovation & Skills

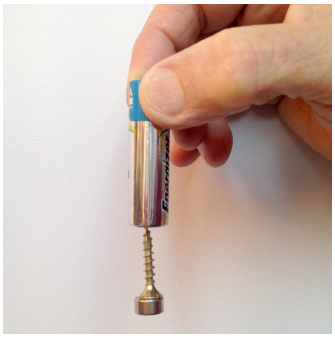
BRITISH SCIENCE ASSOCIATION

Spinning screws

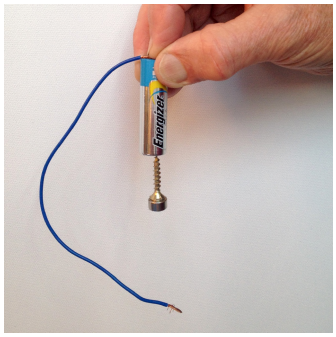
Equipment | magnet | screw | battery | wire

Put the magnet on top of the screw.

Put screw tip on the bottom of the battery.

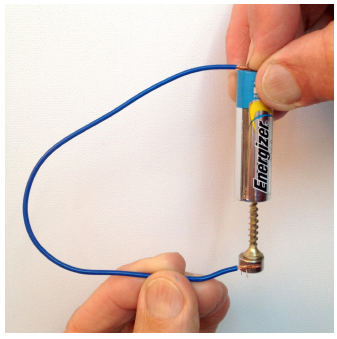


Put the wire on top of the battery.

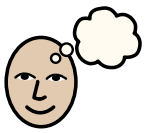
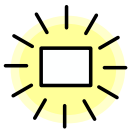


Find the other end of the wire.

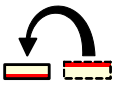
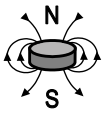
Touch the wire on the edge of the magnet.

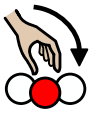


Watch the screw spin.

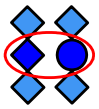




Think of new experiments

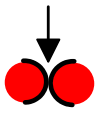



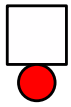
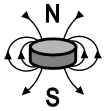


Turn over the magnet and try the experiment again

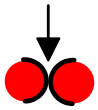



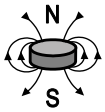
What is the difference?



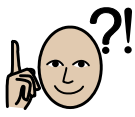
Touch the wire on the bottom of the magnet.



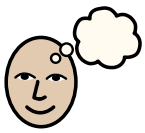
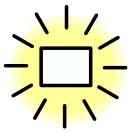



Touch the wire in the middle of the magnet.





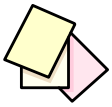
Does it work as easily?


Think of new experiments

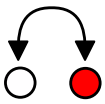

Decorate the screw.



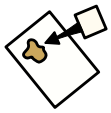
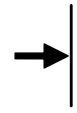


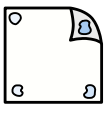
Get some small bits of paper.



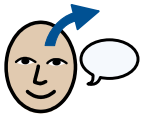



Make some wings or a body.

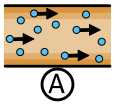


Stick it to the screw with blu-tac.

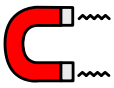
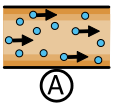


Explanation





The battery makes a current.


+

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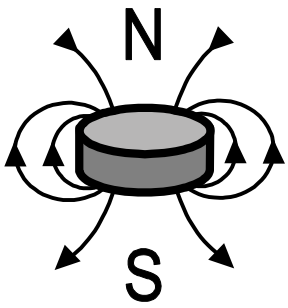
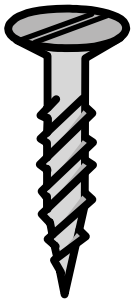
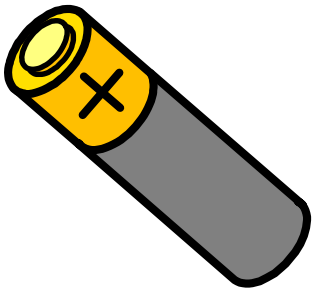
Magnetism and a current creates movement.



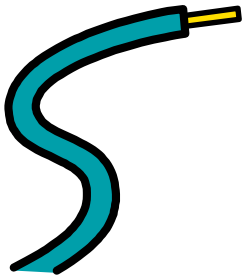
magnet



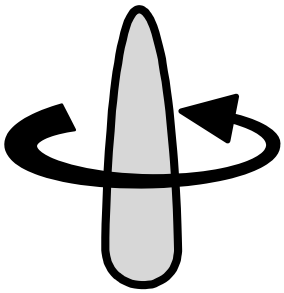
screw



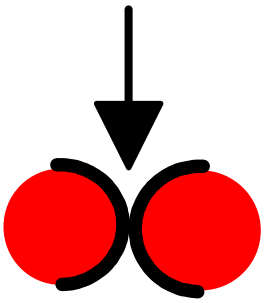
battery



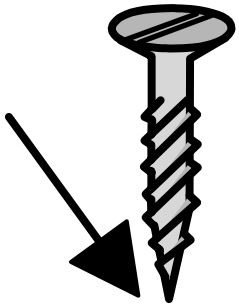
wire



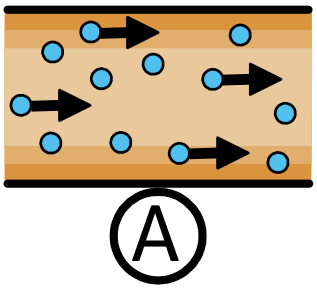
spin



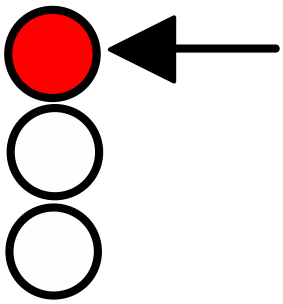
touch



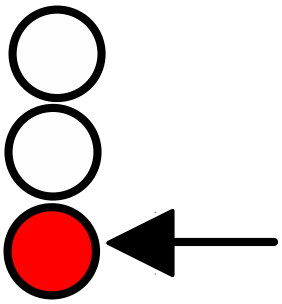
tip



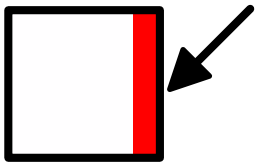
current



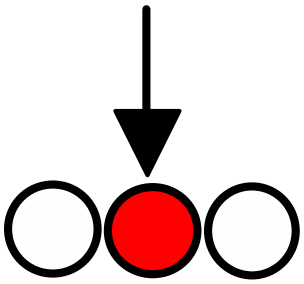
top



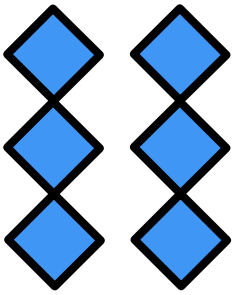
bottom



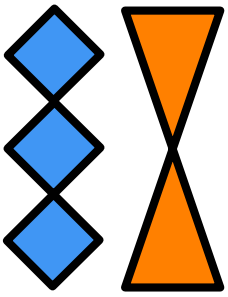
side



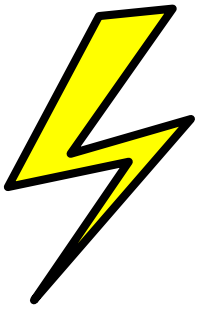
middle



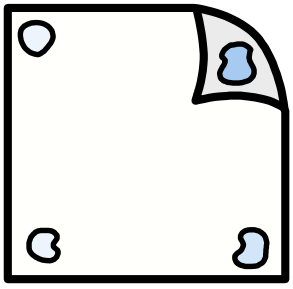
same



different



electricity



blu-tac

Skiffle bass data sheet

Listen to the note	high	medium	low
thin string			
medium string			
heavy string			

skiffle bass

Equipment

a cardboard or wooden box without a lid

a washer or bead

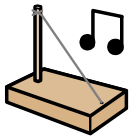
different threads: twine, light string, heavy string

60cm strip of wood with a hole at the end

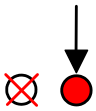
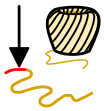
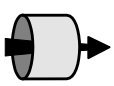
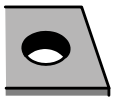
Tie the washer or bead to the end of the string.

Put the other end of the string through the hole in the box.

The washer or bead must be inside the box.

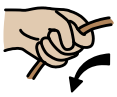


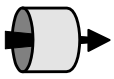
skiffle bass




Thread the other end of the string

through

the hole

in

the stick.

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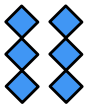
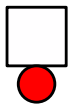
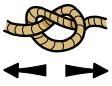
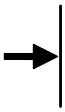
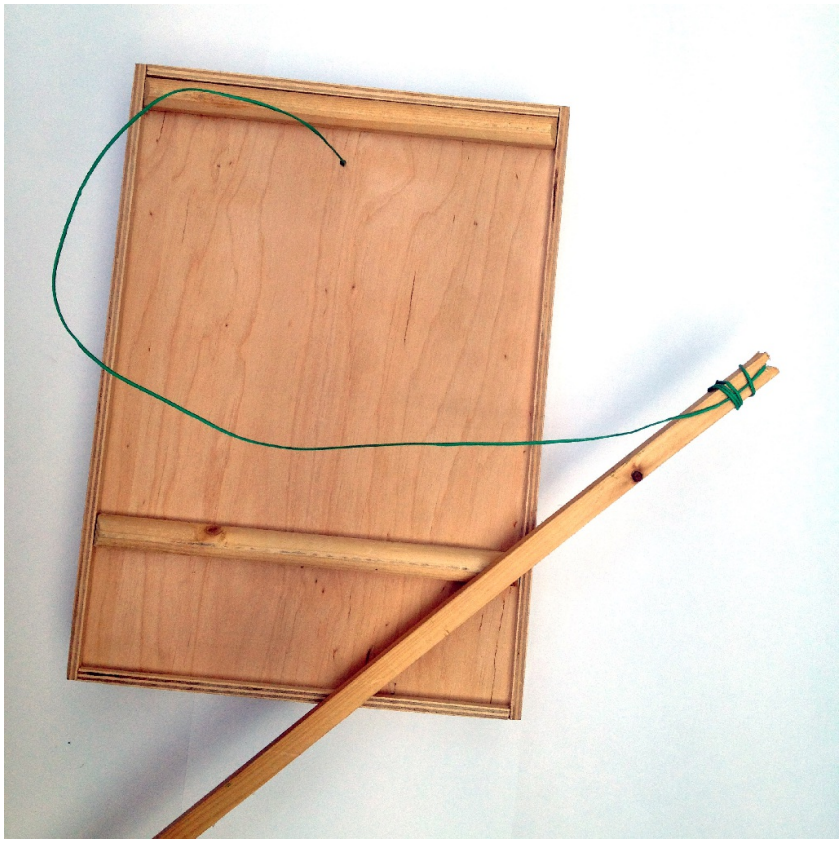

Pull the string through so it is the same as the

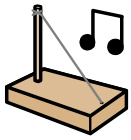
picture

below.



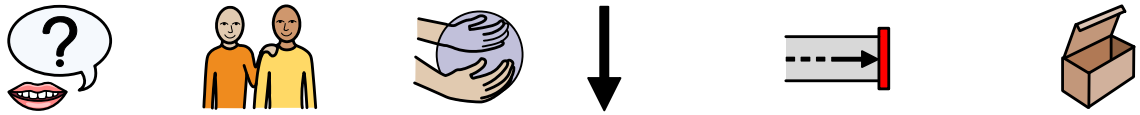


Tightly tie the string to the stick.

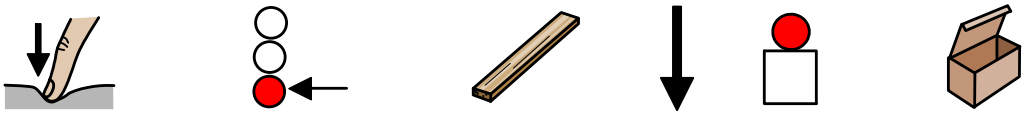




skiffle bass

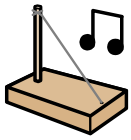


Ask a friend to hold down the end of the box.



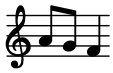
Press the bottom of the stick down on the box

Pull the top of the stick so the string tight.

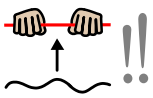


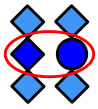
skiffle bass



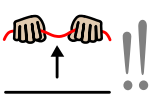



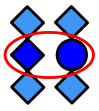
Pluck the string and listen to the note.



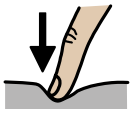
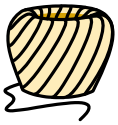
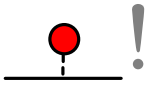
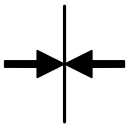



Tighten the string, What is the difference?

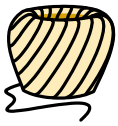
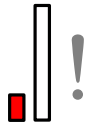


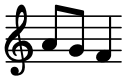
loosen the string, What is the difference?

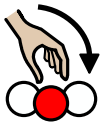
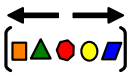
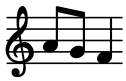

Press the string lower against the stick.

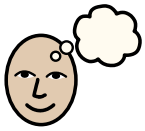
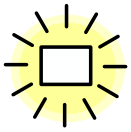
The string is shorter.


Is the note different?

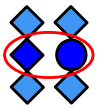
Try a range of notes.


Think of new experiments



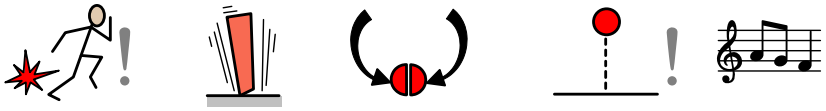
Change the thickness of the string.

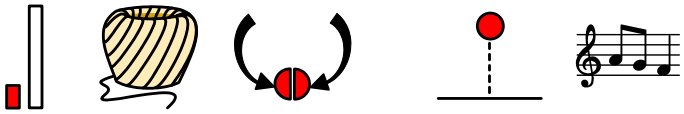
What is the difference?

Explanation

A tight string vibrates faster.

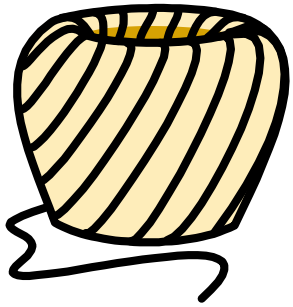


A faster vibration makes a higher note.

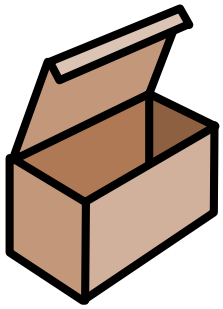


A short string makes a high note.

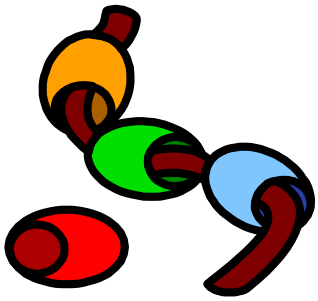
A thick string makes a low note.



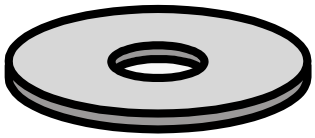
string



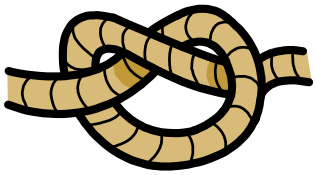
box



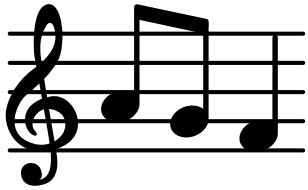
bead



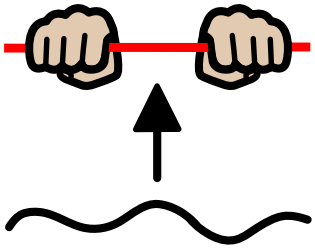
washer



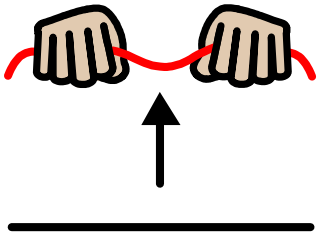
tie



note

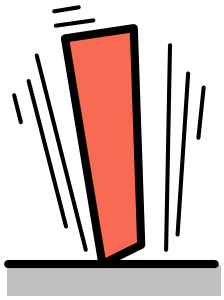


tight

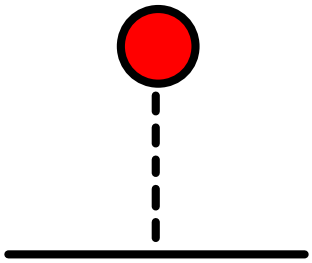


loose

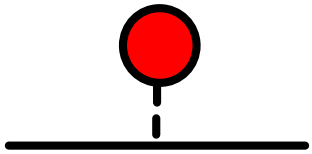
listen



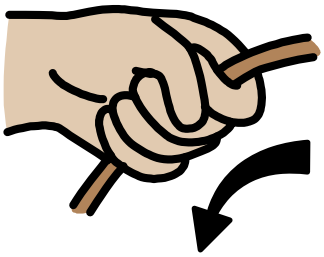
vibrate



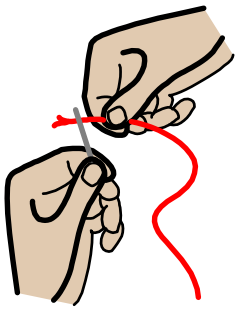
high



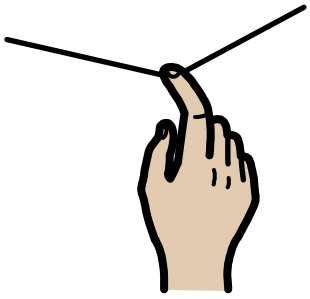
low



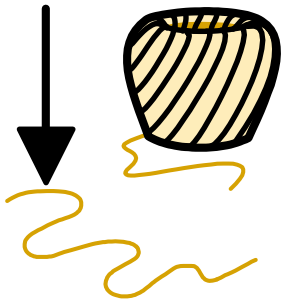
pull



thread



pluck



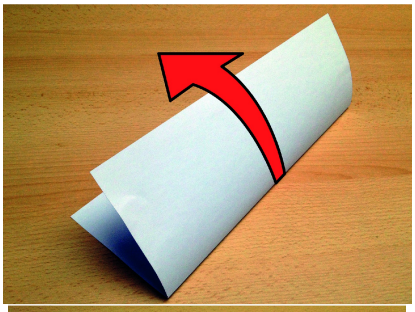
thin string

Aeroplane engineers

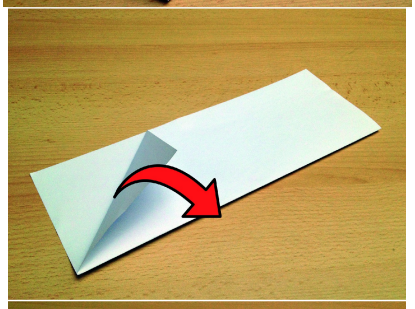
Equipment

sheets of paper

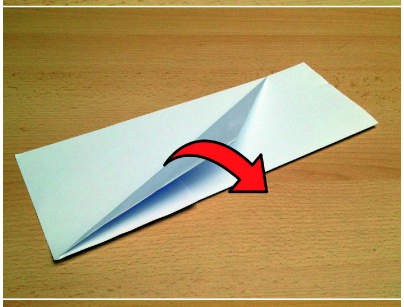
Fold the paper in half.



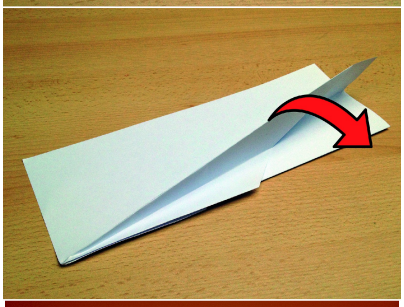
Fold the corner back.



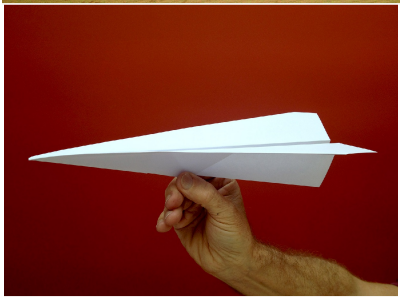
Fold the edge back.



Fold the edge back again.



Turn over and fold the same.

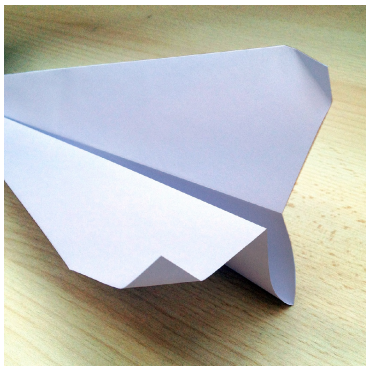


Unfold the plane.

Aeroplane engineers

Fold up the end of the wings a little.

What difference does the fold make?

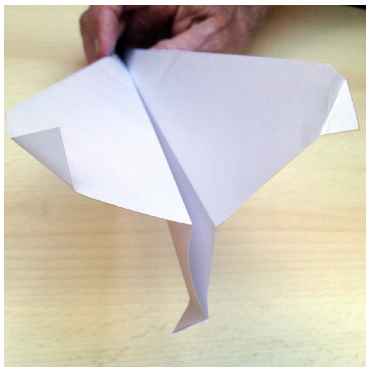


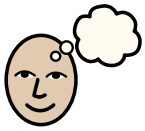
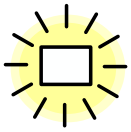
Try folding the wings up more!

What is the difference?

Fold the ends of the wings + the body clockwise.

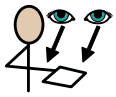
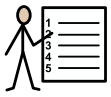
What is the difference?




Think of new experiments



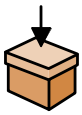
Find a book that shows you how to make paper planes.



How much better are these?

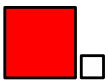
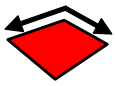
Explanation



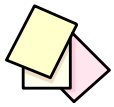



Air resistance slow objects when they fall.



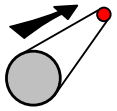



Paper is light and has a large area.

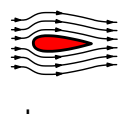
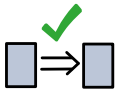



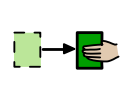
Air resistance means paper takes time to fall.



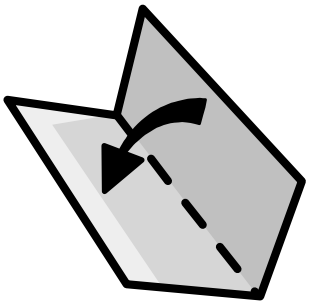



A good paper plane can fly a long way while it is falling.

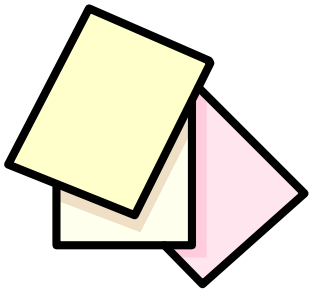






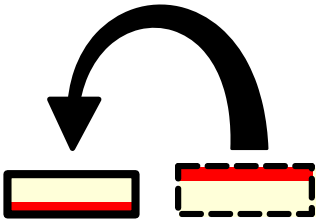

Wing shape causes the air to move the plane in different directions.



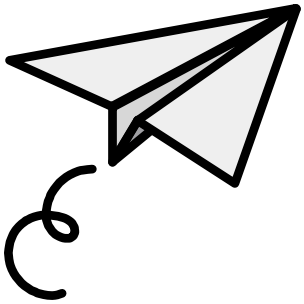
fold



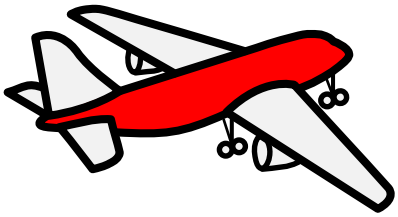
paper



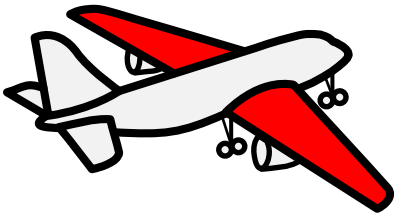
turn over



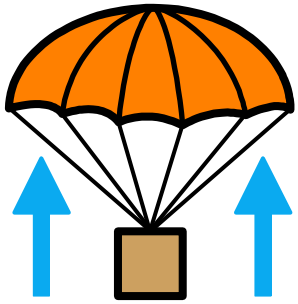
plane



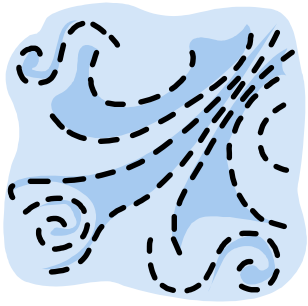
body



wings



air resistance



air

Fizzics experiment

Equipment

large balloon

small funnel

short string

Bottle of very fizzy drink

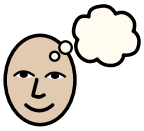
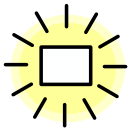
Put the funnel into the balloon.

Pour fizzy drink into the balloon.

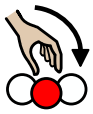
Quickly tie the balloon.

Shake the balloon to make the drink fizz.

What happens?

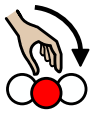

Think of new experiments

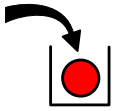



Try fizzy water.

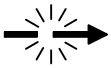



Does fizzy water work as well.

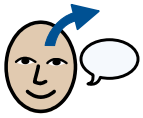


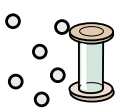
Try putting the balloon in a sink of warm water.

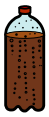
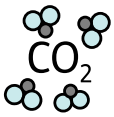



What happens.

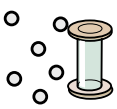


Explanation

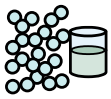

the gas

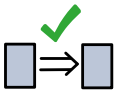
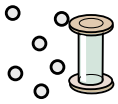
in

fizzy drinks
=
is


carbon dioxide.

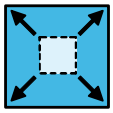

The gas

dissolves

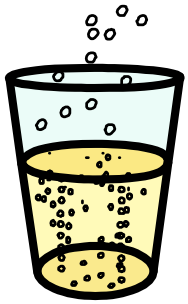
in

the liquid.


Shaking

causes

the gas

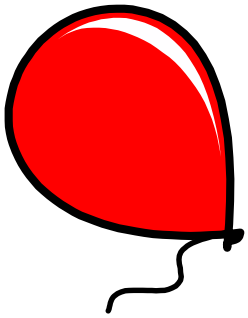
to fizz

out
+
and

expand

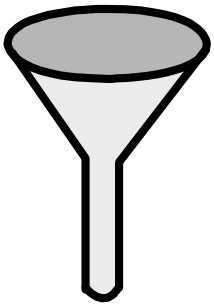
the balloon.



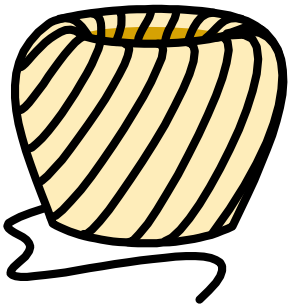
fizzy



balloon

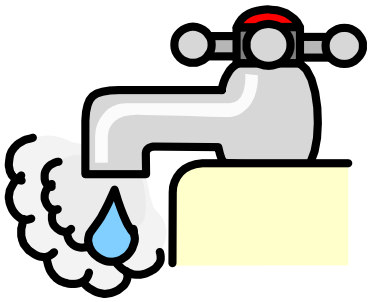


funnel

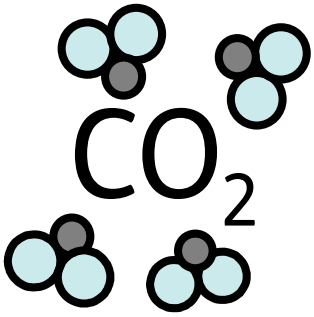


string

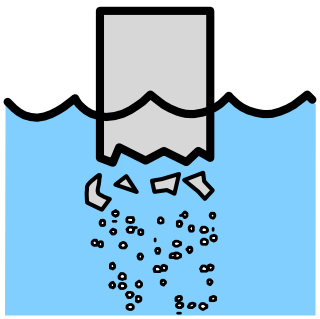
shake



warm water



carbon dioxide



dissolve

Invisible treacle data sheet

Which is the slowest?	fastest	medium	slowest
1 One magnet			
2 Two magnets			
3 Three magnets			

Invisible treacle

Equipment | copper tube | 4 magnets | small object

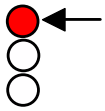
Touch the magnet onto the copper tube.

Is copper magnetic?

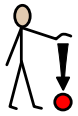
yes | no


Invisible **treacle**





Hold the tube at the top so it is vertical.



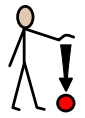

Drop the small object down the tube.

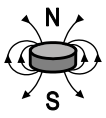


Does it fall quickly?

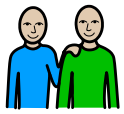
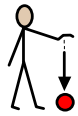
yes

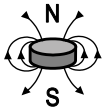
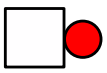
no



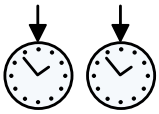


Drop 2 magnets down the tube.

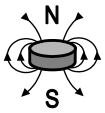




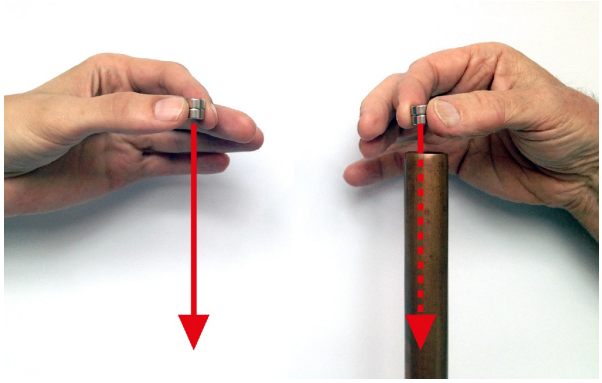

Ask a friend to drop 2 magnets next to the tube



at the same time.

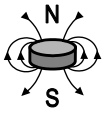
Which magnets fall quickest?




Invisible **treacle**

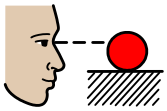






Look down the tube while the magnets are falling.


Make sure the tube is vertical.

What do you see?

Think of new experiments

Try 4 magnets instead of 2 magnets.

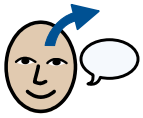
What is the difference?

Try 3 magnets.

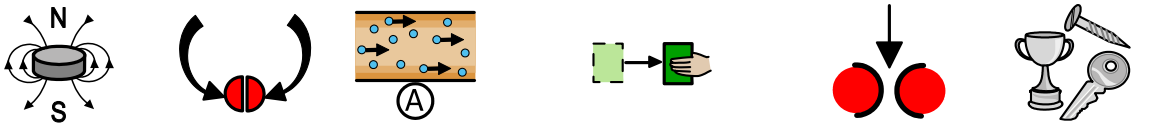
What is the difference?

Try 1 magnet.

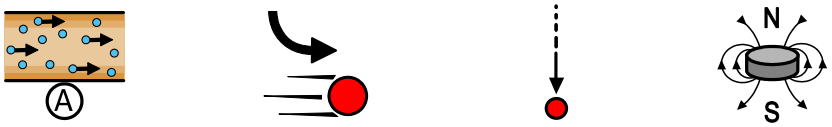
What is the difference?



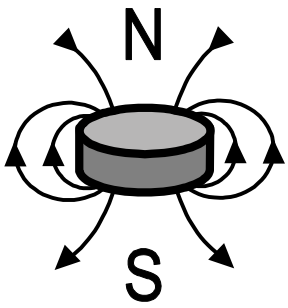
Explanation



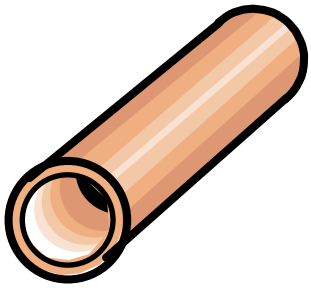
Magnets create current when moving near to a metal.



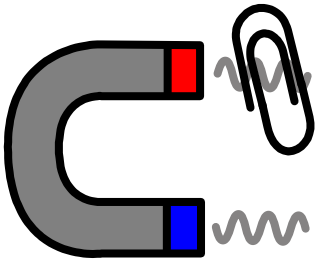
The current slows down the falling magnet.



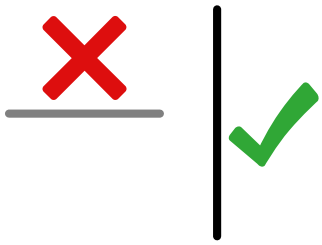
magnet



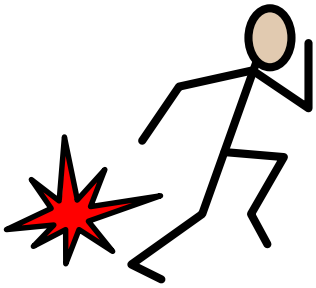
copper tube



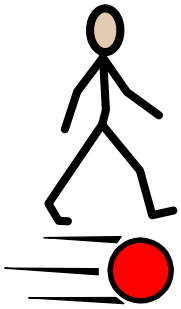
magnetic



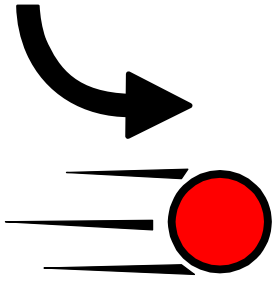
vertical



fast



slow



slow down

metal

Kelly wobbles

Equipment

half a table tennis ball

plasticine

cocktail sticks

3 balls of plasticine

Fill the half a table tennis ball with plasticine.

smooth over the top.

Poke a cocktail stick in the centre down to the bottom.

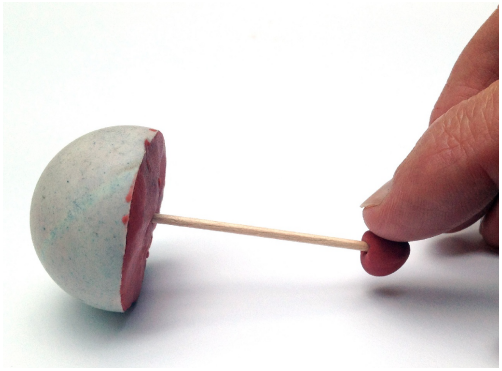
Kelly wobbles

Put 1 small piece of plasticine on the top of the cocktail stick.

Push the top, does it bounce back?

yes

no



Put 2 small pieces of plasticine to the top of the cocktail stick.

Push the top, does it bounce back?

yes

no

Kelly wobbles

Does it wobble differently?

yes

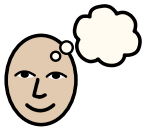
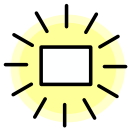
no

Put 3 small pieces of plasticine to the top of the cocktail stick.

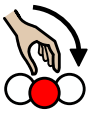
Push the top, does it bounce back?

yes

no

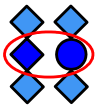

Think of new experiments



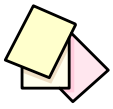
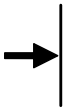
Try the experiment again.



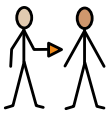
Use a shorter cocktail stick.

What is the difference?

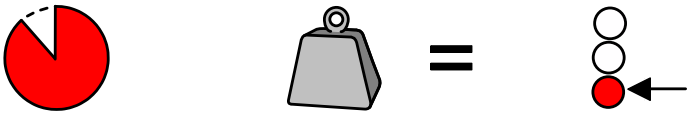
Use paper to decorate your Kelly.



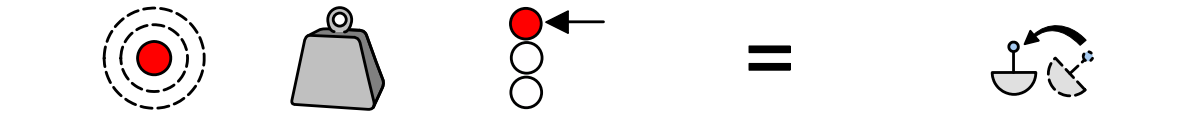


You could decorate your Kelly = like a clown.

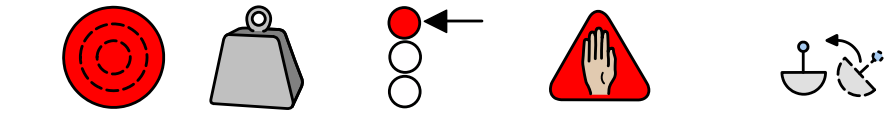
Explanation



Most of the weight is at the bottom.

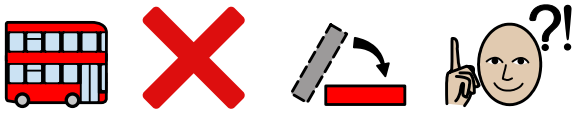


A small weight at the top means it bounces back.

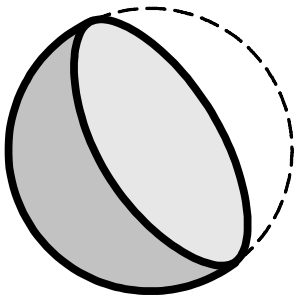


A big weight at the top stops it bouncing back.

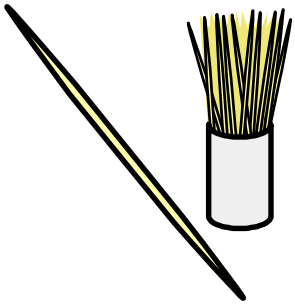
Double decker buses have a lot of weight low down.



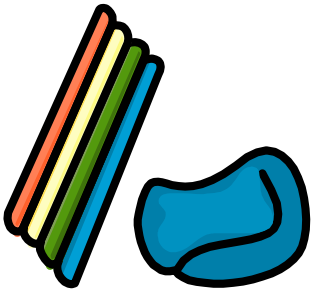
Buses don't fall over easily!



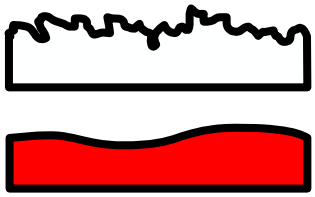
half a table tennis ball



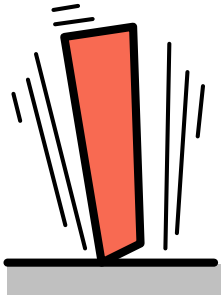
cocktail stick



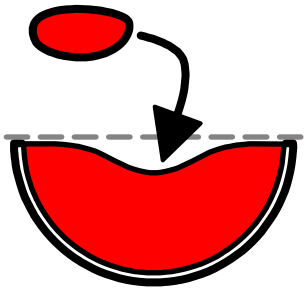
plasticine



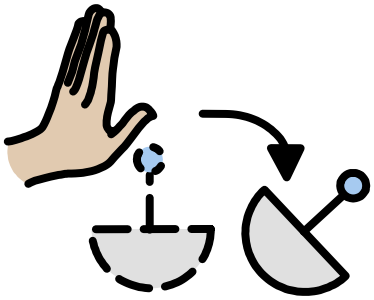
smooth



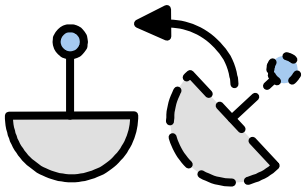
wobble



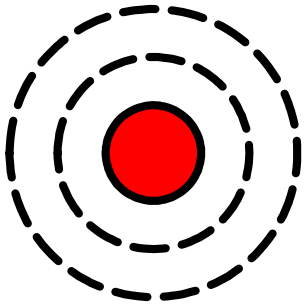
fill



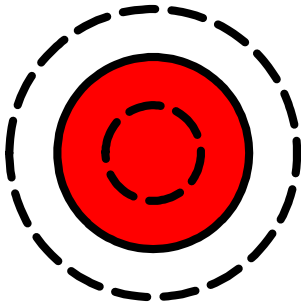
push



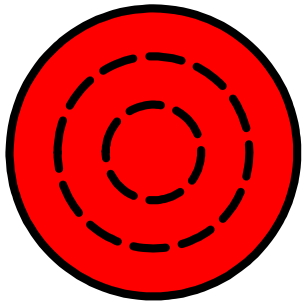
bounce back



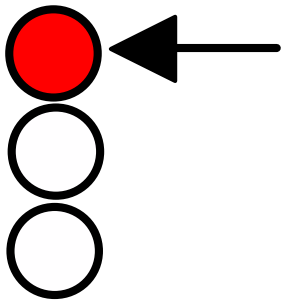
small



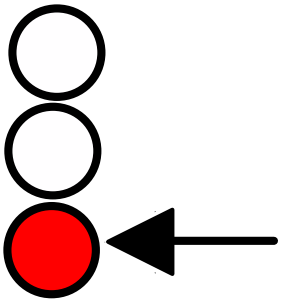
medium



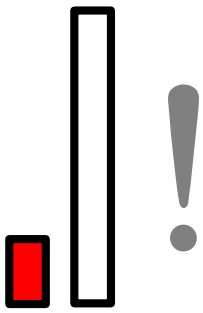
large



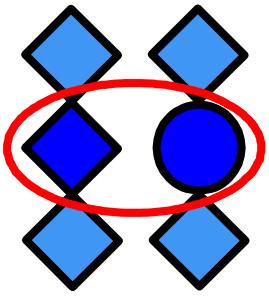
top



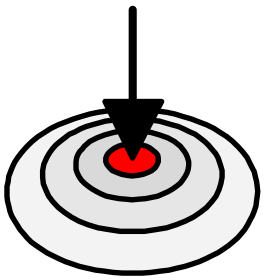
bottom



shorter



difference



centre

Drop it in

Equipment

plastic beaker

piece of card

Objects

All objects must fit in the beaker.

some heavy

some light

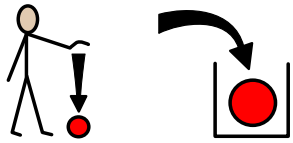
some rough

some smooth

Put the card on top of the beaker.

Put an object on top of the card.

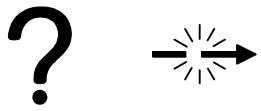
Slowly Pull out the card and see what happens.



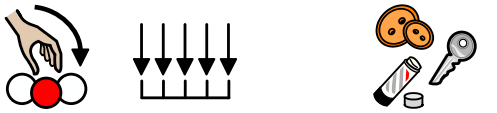
Drop it in

Try the experiment again.

Pull out the card quickly.

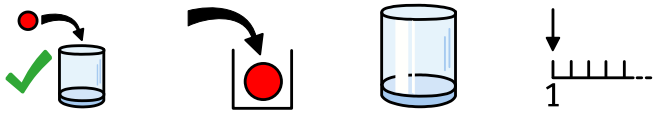


What happens?

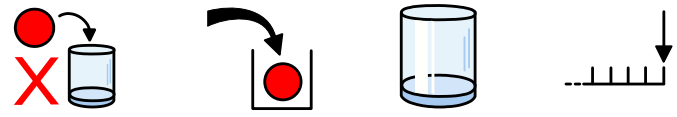


Try all the objects.

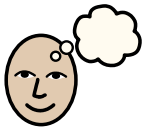
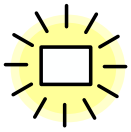
Put the objects in order:



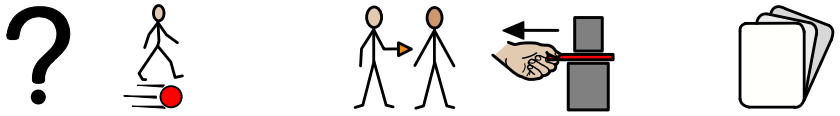
Easiest to fit in the beaker first.



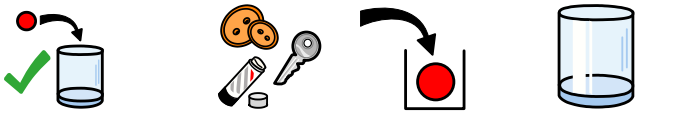
Hardest to fit in the beaker last.

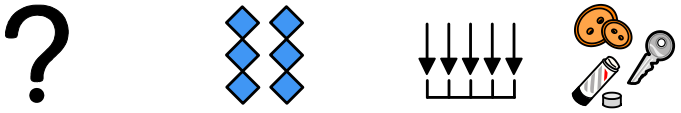

Think of new experiments



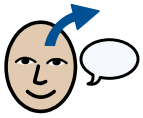
How slowly can you pull out the card?



to get an object in the beaker.

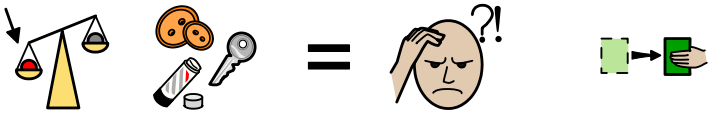


Is it the same for all objects.

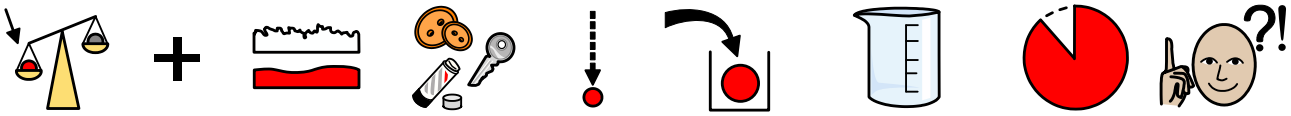


Explanation

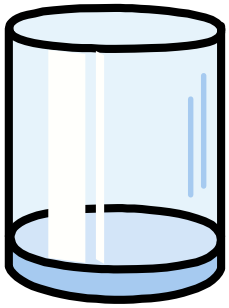
Smooth objects create less friction.



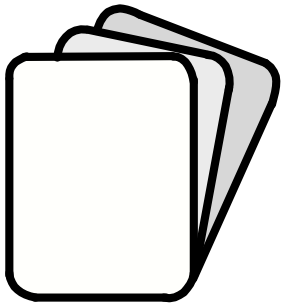
Heavy objects are harder to move.



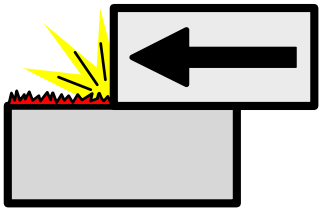
Heavy and smooth objects fall into the beaker most easily.



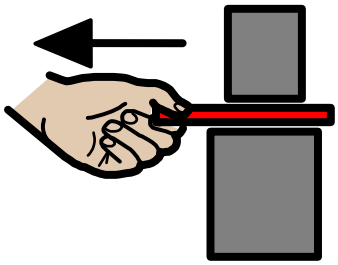
beaker



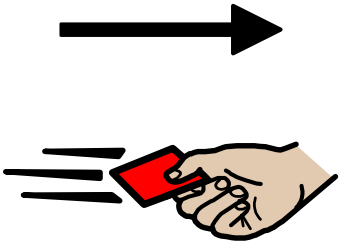
card



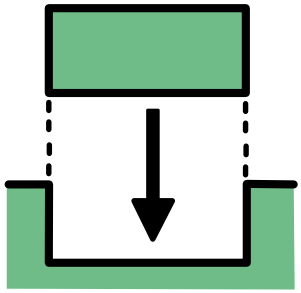
friction



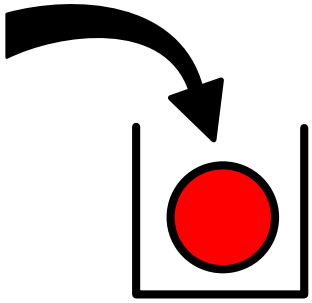
pull



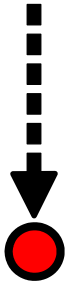
snatch



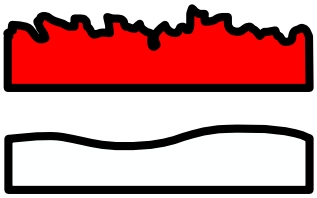
fit



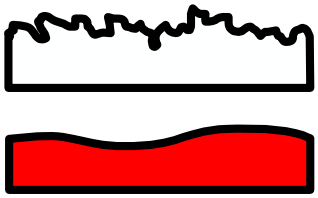
into



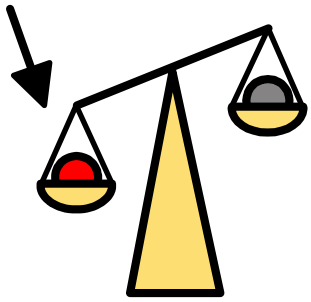
fall



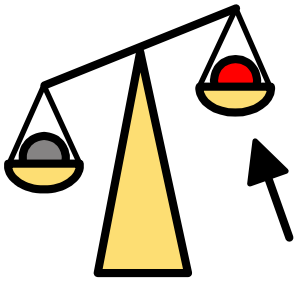
rough



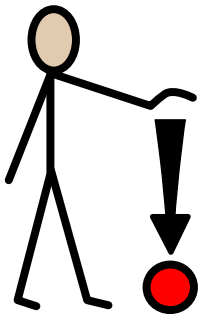
smooth



heavy

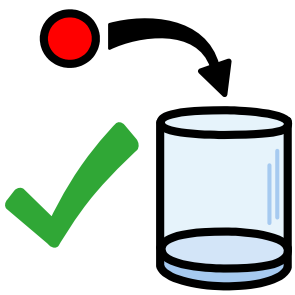


light

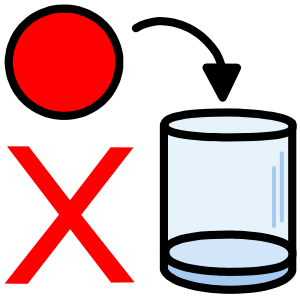


drop

object



easiest to fit



hardest to fit

Rainmaker

Equipment

soil

cling film

sticky tape

large clear container

small clear container

Put the soil in the large container.

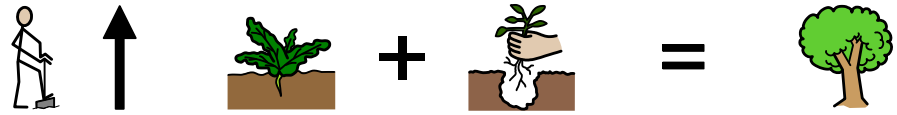
Make a hole in the soil.

Put the small container in the hole.

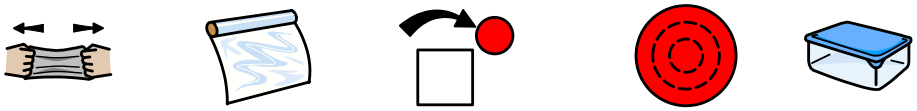
Make some mountains in the soil.

Rainmaker

Fill the small container with water.



Dig up a weed and plant it like a tree.



Stretch the cling film over the large container.

Put tape round the cling film and container.

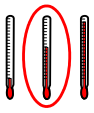
Make sure there are no holes.

Rainmaker


Put


the container


in


a warm


place.


On a sunny day


put

the


container


in

the

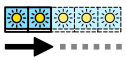

sunlight.


Wait for

a

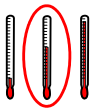

few hours.


Wait

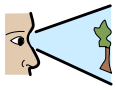

a few days

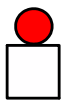

if it


is not


warm.


What do


you see

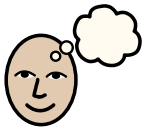
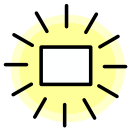

on


the cling film?

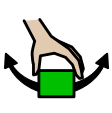

Where

has it

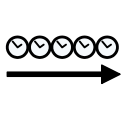

come from?


Think of new experiments



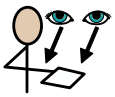
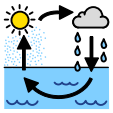


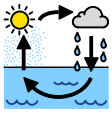
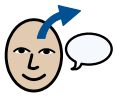
Use dry soil and wait for a very long time.



The drops from the cling film moisten the soil.

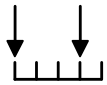
This experiment shows the water cycle.

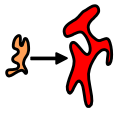
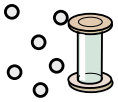




The water cycle explains where rain comes from.

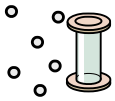
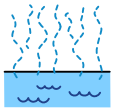
Explanation



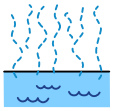


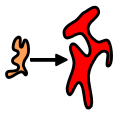
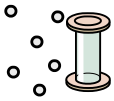
The warmth makes some of the water turn into a gas

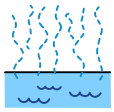
The gas is water vapour.

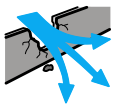
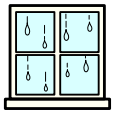
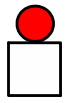



Water vapour is invisible.

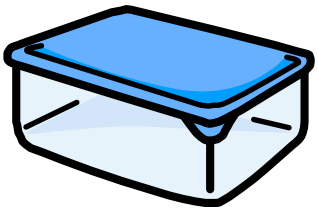
Water becoming gas is called evaporation.




The water vapour cannot escape and condenses on the cling film.

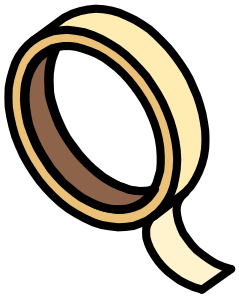

The water falls to the soil.



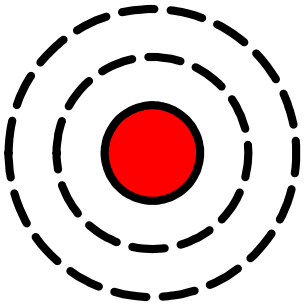
container

soil

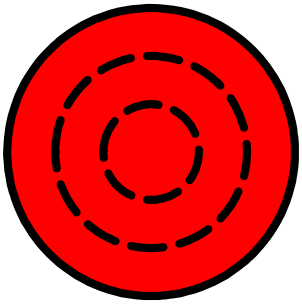
cling film



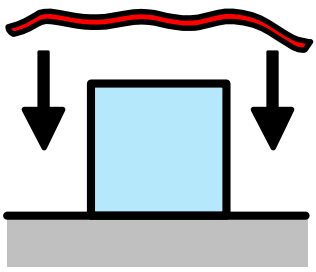
sticky tape



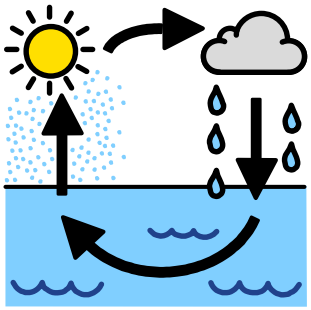
small



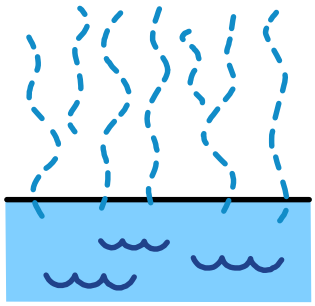
large



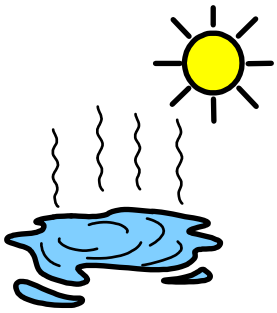
cover



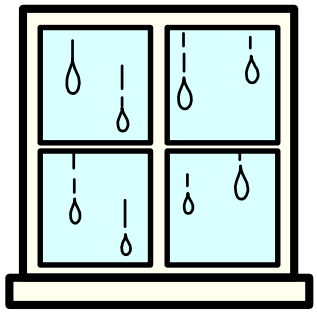
water cycle



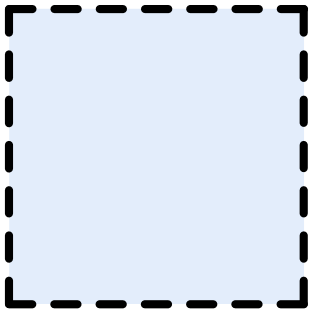
water vapour



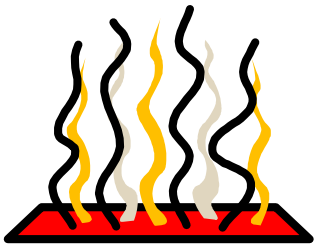
evaporation



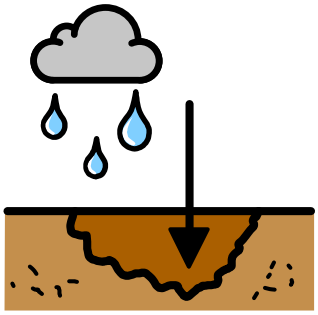
condensation



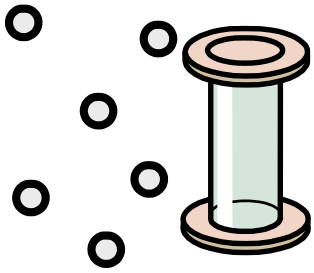
invisible



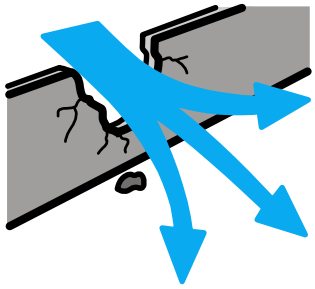
warmth



moist



gas



escape

Wizzy Washing up liquid

Equipment | card | sink | scissors | pencil

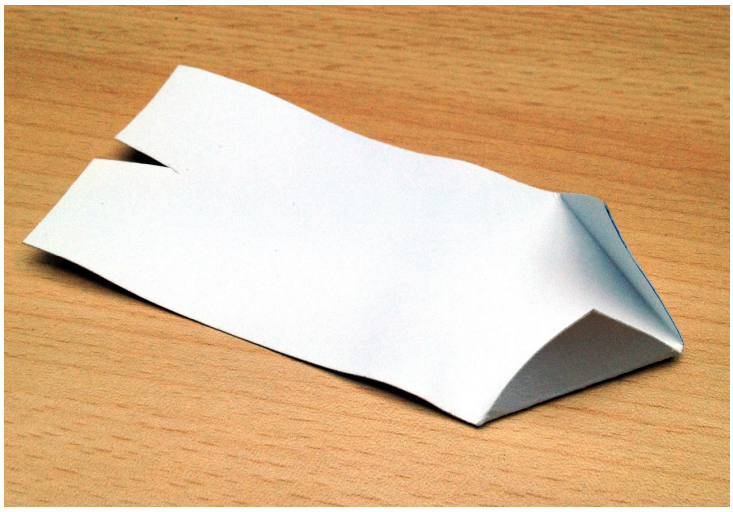
washing up liquid | in a | small | pot

Fold | the front | corners | of | the card.

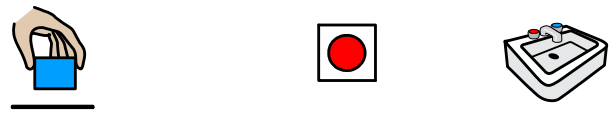
Cut | a triangular | piece | at the other | end.

Make | it | like | the | picture.

You | have | a | paper | boat.

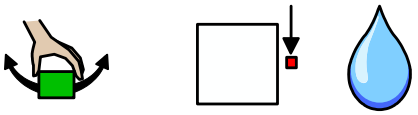


Wizzy Washing up liquid



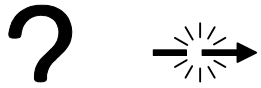
Place the boat in the sink.

Dip the point of a pencil in the washing up liquid.

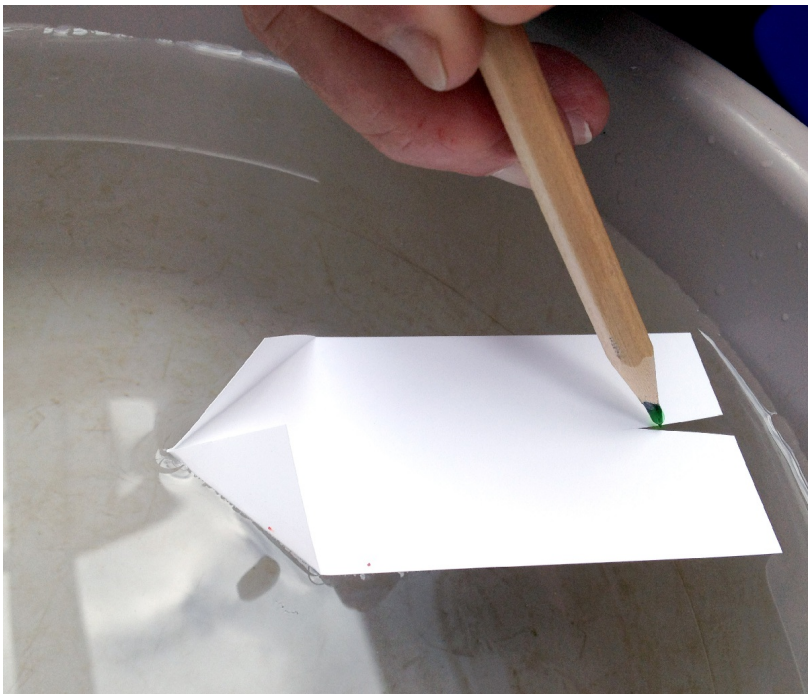


Use a tiny drop.

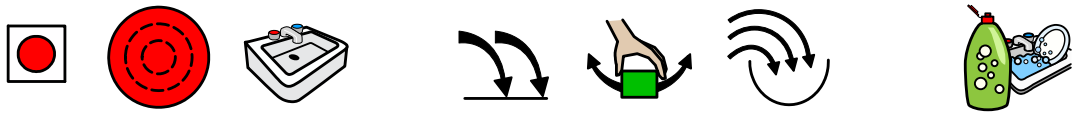
Touch the pencil to the v at the back of the boat.



What happens?

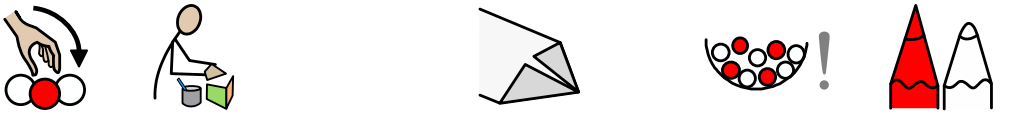


Think of new experiments

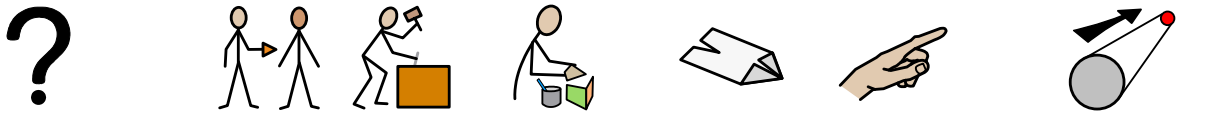


In a large sink try again using more washing up liquid.

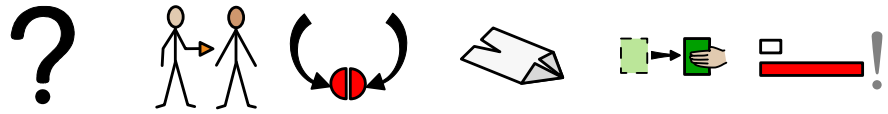
Use a new piece of card for each experiment.



Try making the front of the boat more pointed.

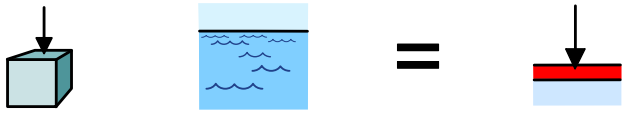


What can you do to make the boat go a long way?

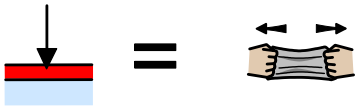


How can you make the boat move further?

Explanation

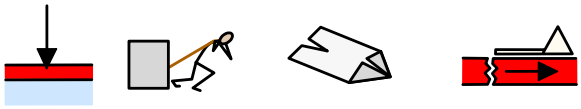


The surface of water is like a skin.

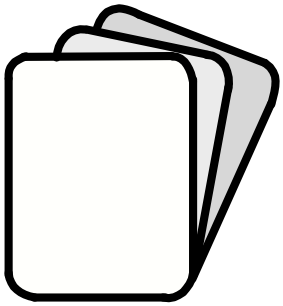


The skin is stretched.

Washing up liquid tears the skin at the back of the boat.

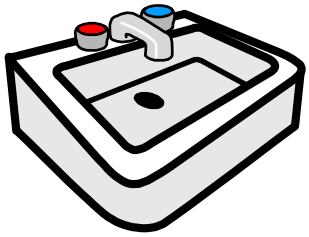


The skin pulls the boat forward.



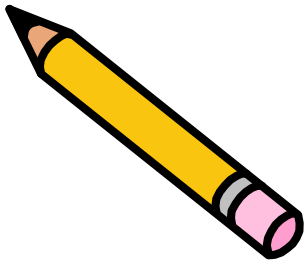
card

scissors

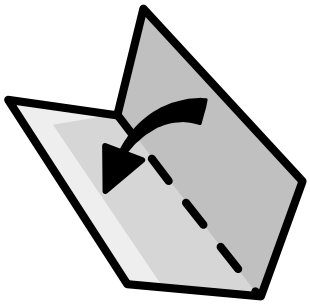


sink

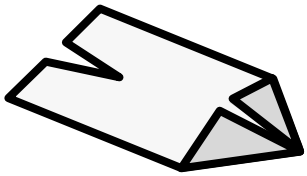
washing up liquid



pencil

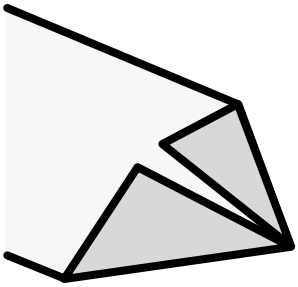


fold

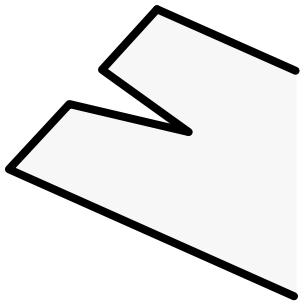


boat

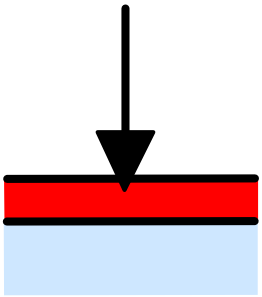
longer



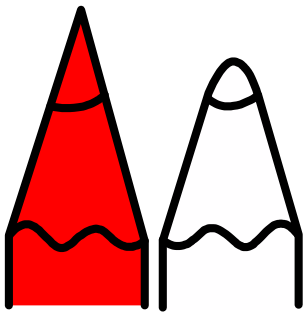
front



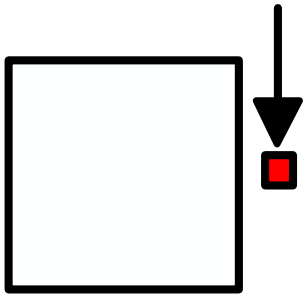
back



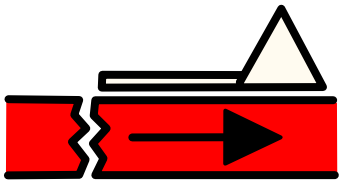
skin



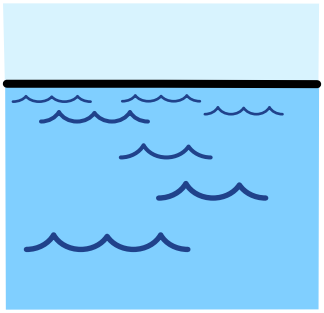
point



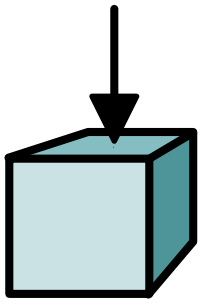
tiny



forward



water



surface

Light entertainment

Equipment

white paper

blu-tac

sticky tape

red filter

green filter

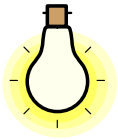
2 2 torches, = equally bright.

Carefully fasten the red filter to 1 one torch with sticky tape.

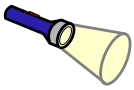
Carefully fasten the green filter to the other torch.

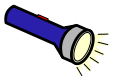
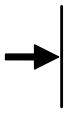
Find a wall in a dark place.

Fasten the white paper to the wall.

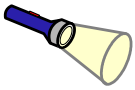


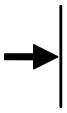

Light entertainment



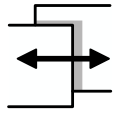




Shine the red torch on the paper.

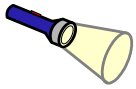


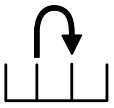
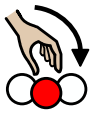
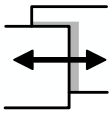

Shine the green torch on paper .

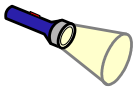




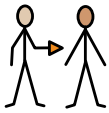
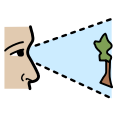
Do not overlap the green and red beams.





Next, try overlapping the green and red beams,

What do you see?

Think of new experiments

Look through the red filter.

Look through the green filter.

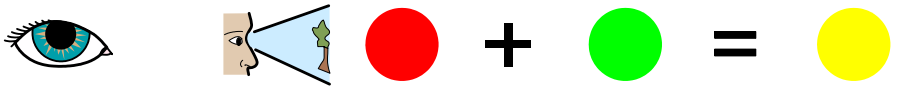
Now put one filter in front of the other filter.

Look through both filters.

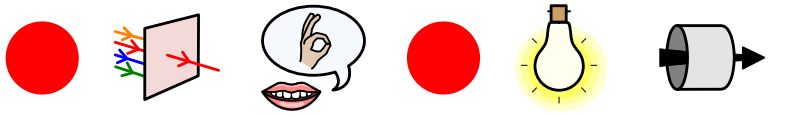
What do you see?

Explanation

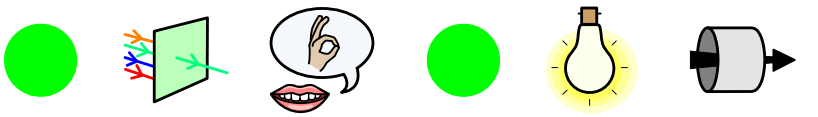
Shining both torches you can see both colours.



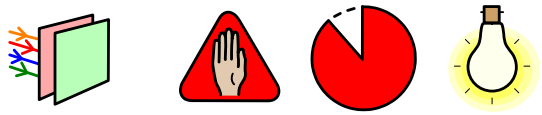
The human eye sees red and green as yellow.



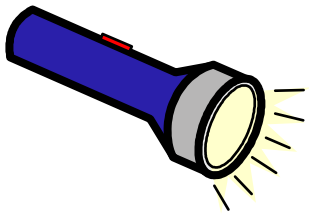
A red filter allows red light through.



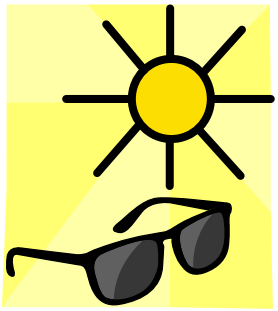
A green filter allows green light through.



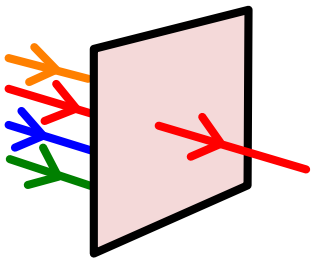
Both filters stops most light.



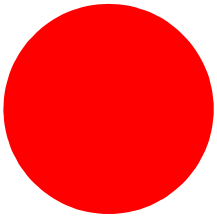
torch



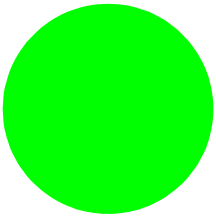
bright



filter

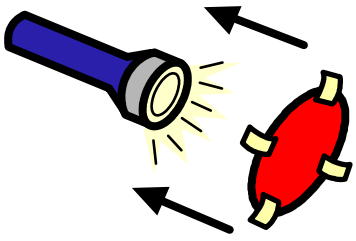


red

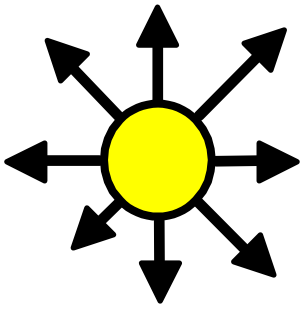


green

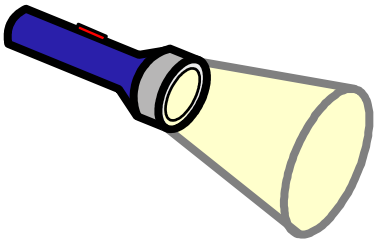
yellow



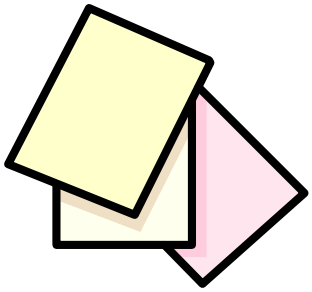
fasten



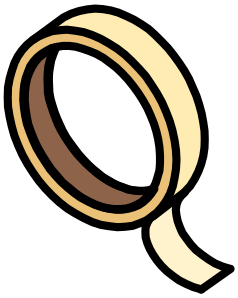
ray of light



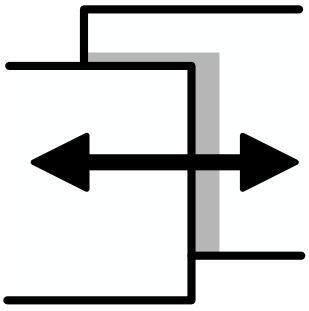
shine



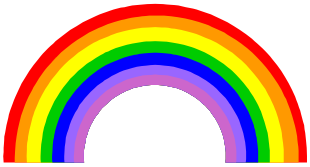
paper



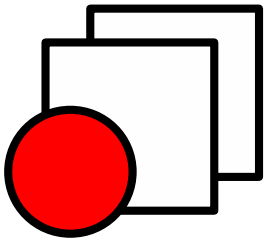
sticky tape



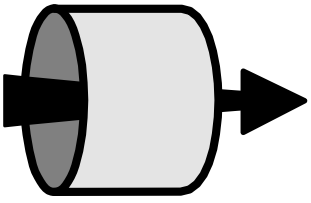
overlap



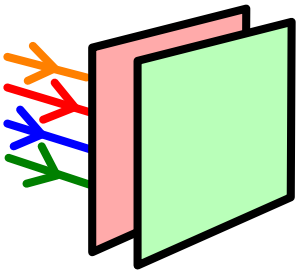
colours



in front



through



both filters

Colour split

Equipment

felt pens

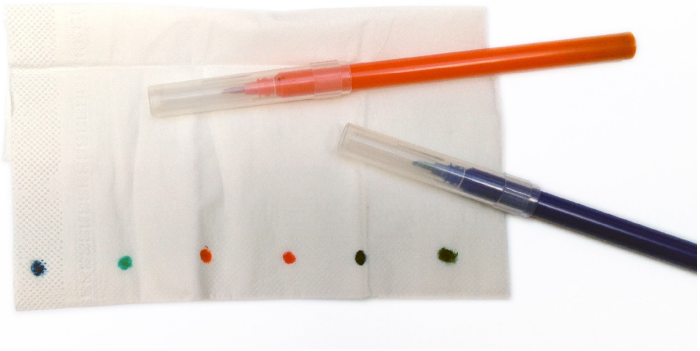
container

tissue

water

Draw coloured dots along the edge of the tissue.

Draw 6 dots of different colours.

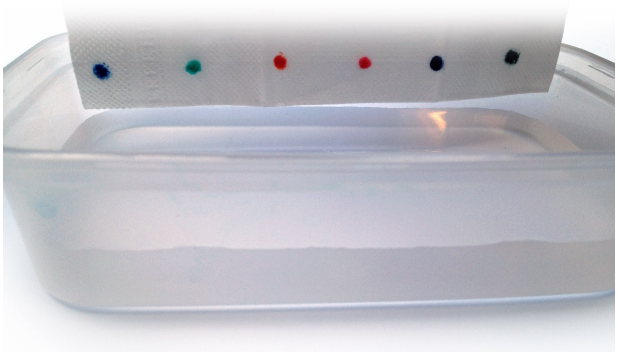


Fill container with water.

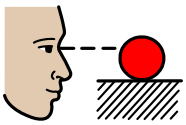
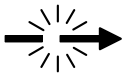
Hold the tissue at the top.

Dip the edge of the tissue in the water.

Dip the tissue for several seconds.

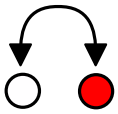


Colour split

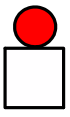
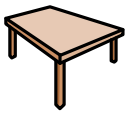
Watch what happens as the water rises up.



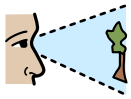



Is this quick or slow?



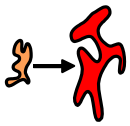



Put the tissue on the table.

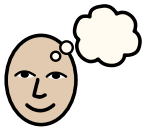
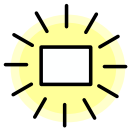



What do you see?

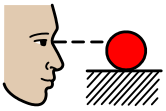




Have the colours changed?

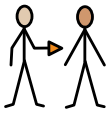

Think of new experiments



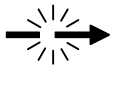
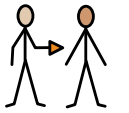


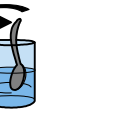
Watch paint being mixed in a DIY store






Are the colours what you expect?




What happens when you mix coloured paints in Art Class.

Explanation

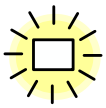




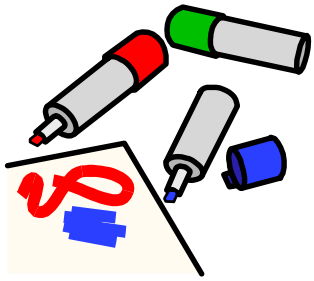

Colours are mixed to make a felt-tip have a special colour.



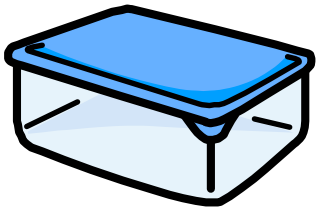


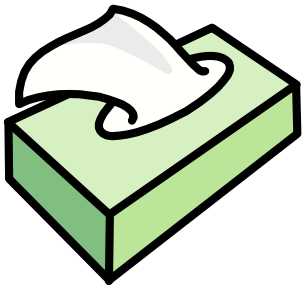

Different colours mixed together look like a new colour.



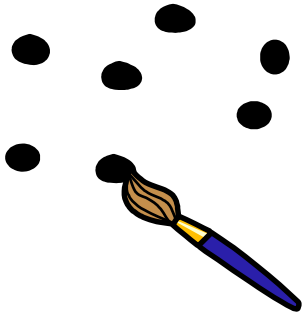
felt pens



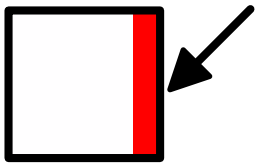
container



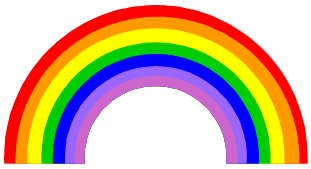
tissues



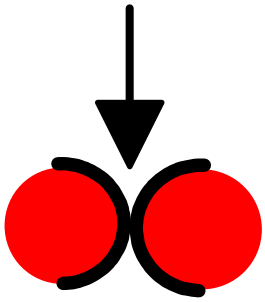
dots



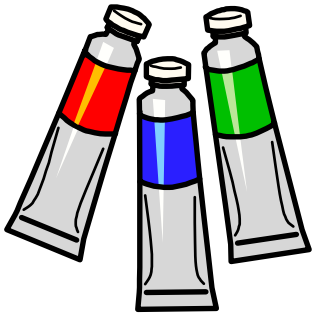
edge



colours



touch



paints

Noisy cutlery

Equipment

metal fork

metal spoon

plastic fork

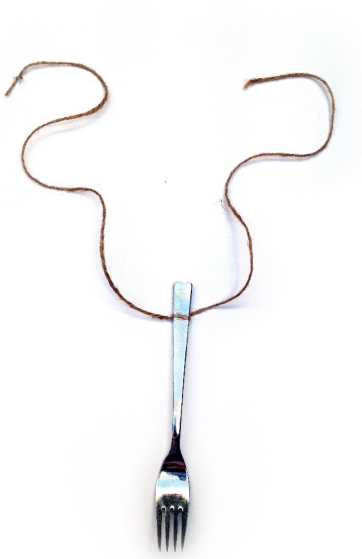
plastic spoon

piece of string as long as your arm

sticky tape

Tie the fork to the middle of the string.

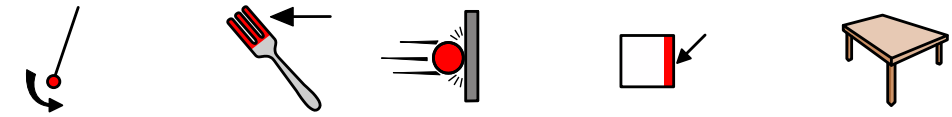
Use sticky tape to hold it tight.



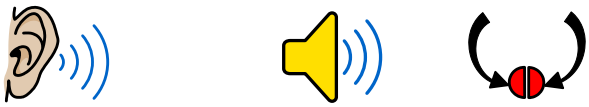
Wrap one end of the string around your first finger

Wrap the other end around the first finger of your other hand.

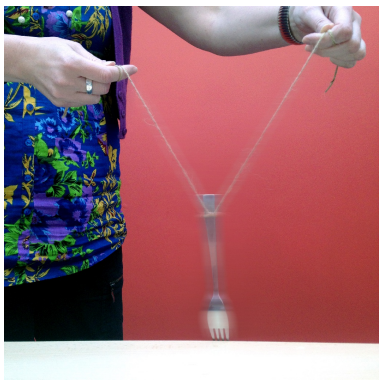
Noisy cutlery

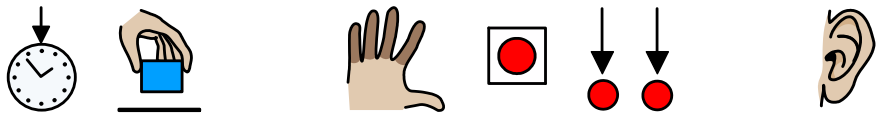


Swing the prongs against the edge of a table.

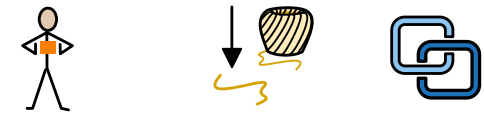


Listen to the sound it makes.





Now put your fingers in both your ears.



Keep the string attached.

Knock the prongs against the edge of the table again.

What is the difference?

Think of new experiments

Try the experiment with the metal spoon

What is the difference?

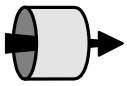
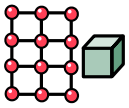
try with the plastic fork + spoon

What is the difference?

Try the experiment with different string.

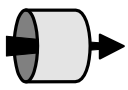
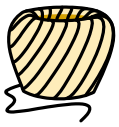
Try thin string + thick string.

Explanation

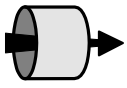

Sound travels

through

solids

best.

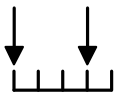

Sound travels

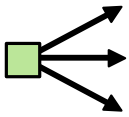
well

through

string


Sound travel

badly

through

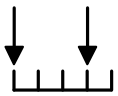
air.


Some

objects

give out

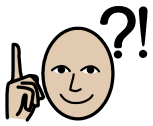
more

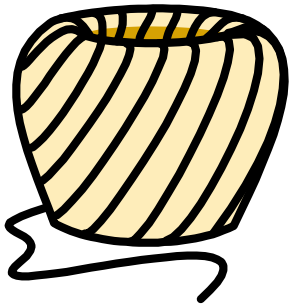
sound.


Some

objects

vibrate

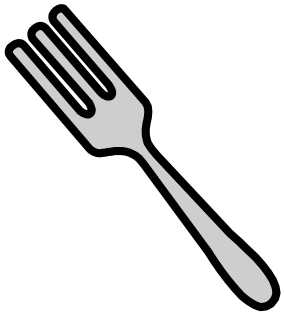
more

easily.



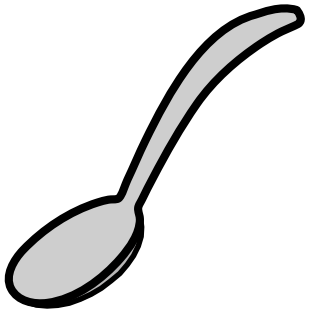
string

metal

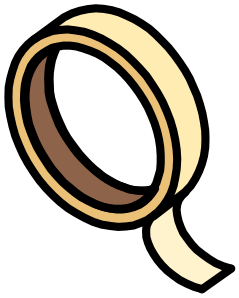
plastic



fork

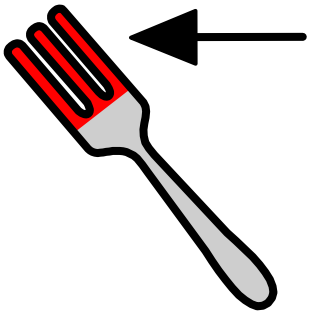


spoon



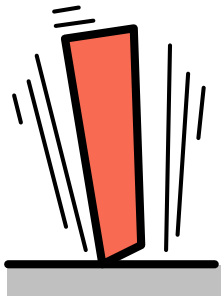
sticky tape

listen

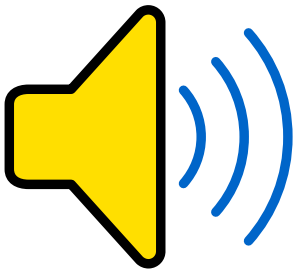


prongs

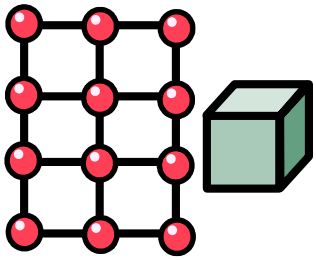
first finger



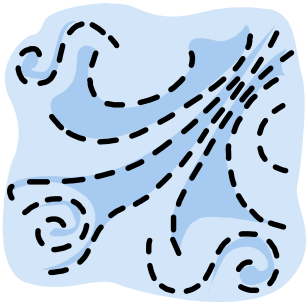
vibrate



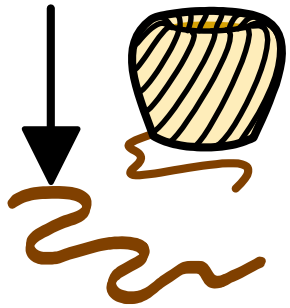
sound



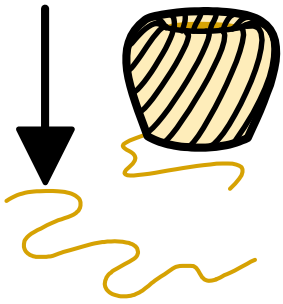
solid



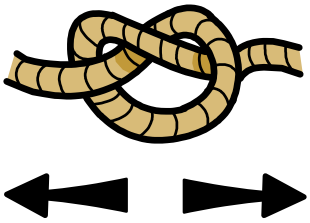
air



thick string



thin string



tight

Investigation 1: Teabag trouble

Equipment

loose tea

3 glasses

3 clippits

3 pegs

teaspoon

kitchen roll

j-cloth

newspaper

material

Imagine you have no tea bags.

Mum's friend is coming at tea time.

You have loose tea.

You do not have a tea strainer.

Can you make tea bags?

Which material is best to make tea bags?

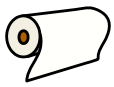
Making teabags

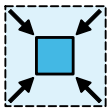

Put

a teaspoon of

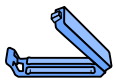
loose tea

in the middle of

a piece of

kitchen roll.


Fold up

the edges around
the

loose tea.


Use
a

clippit
and

fasten
the

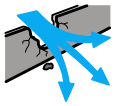
loose tea

inside
the

kitchen roll.


It is important
the

loose tea

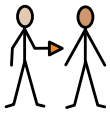
cannot

escape.



Repeat
using
the

j-cloth
and
the

newspaper.


Now

You

have
3
3

teabags.


Carefully

fill
3
3

glasses
with

hot water.

The experiment

Clip a peg to the top of each teabag.

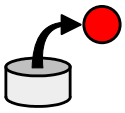
Ask 2 two friends to help.

Give each friend a teabag + and glass.

Dip the teabags in the hot water.

Dip the teabags for about a 1 minute.

The experiment

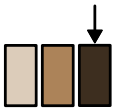



Remove the tea bags.



Do not drink the tea!

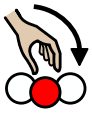
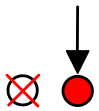




Which teabag is the darkest colour?



Did any tea bags leak?

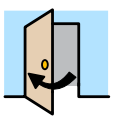




Try other materials.





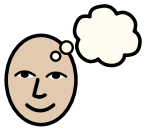
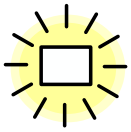
What material makes the best teabag?





The shop opens and mum dashes to buy proper tea bags.


Think of new experiments

?     

Why are some materials are better for making tea bags?

?  

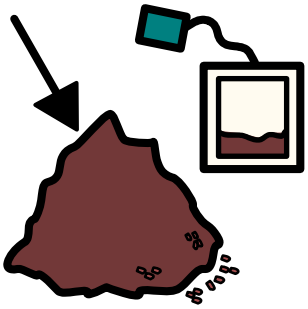
Can you explain?

?     

Can you think of better materials to use?

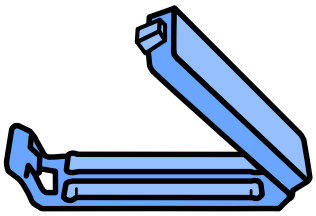
    

Design a poster showing your experiment.

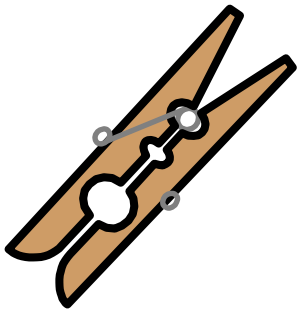


loose tea

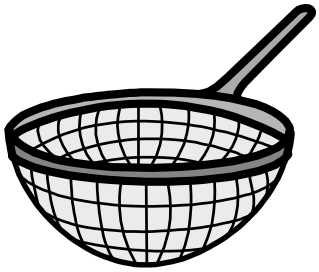
teabag



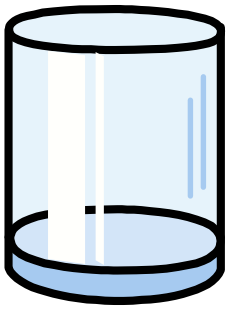
clippit



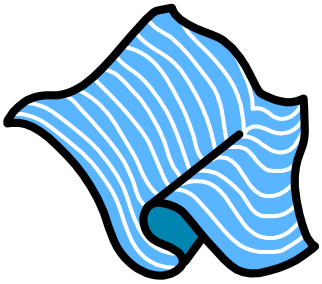
peg



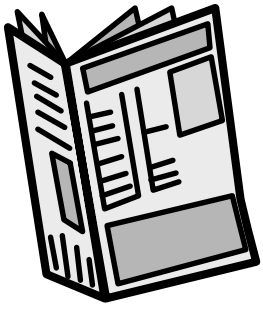
tea strainer



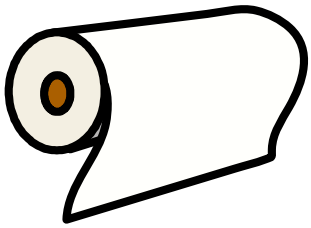
glass



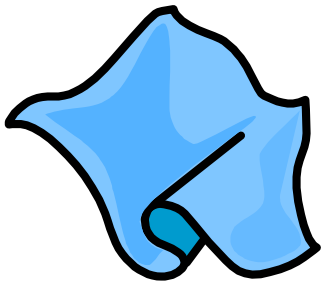
j-cloth



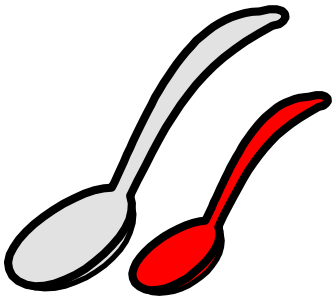
newspaper



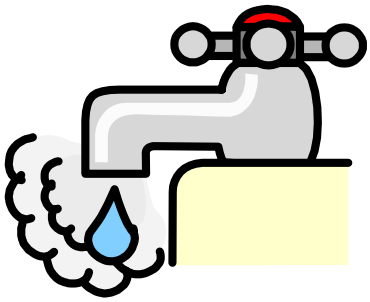
kitchen roll



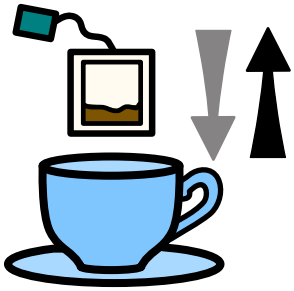
material



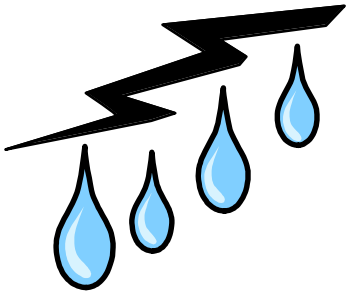
teaspoon



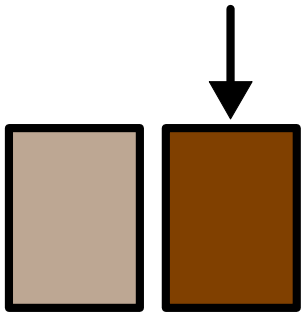
hot water



dunk



leak



strongest colour

don't drink

Teabag trouble data sheet

Which material is best?	light colour	medium colour	dark colour
kitchen roll			
j-cloth			
newspaper			
material			

2 Investigation 2: Super spinners

Equipment

template to make tray

template to make spinner

paperclips

scissors

sticky tape

Many things fly through the air.

Aeroplanes, helicopters and gliders can fly.

Animals like birds and insects can fly.

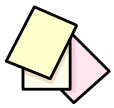
Air is important for flight.

No air means no flight.

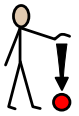
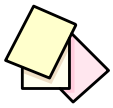
You will learn about things moving in the air.

1

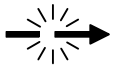
Experiment 1


1


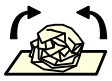
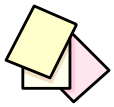
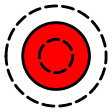
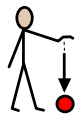
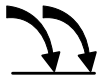

Hold 1 piece of paper flat.

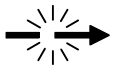
Drop the paper.

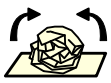
What happens?




+



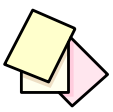
Scrunch up the paper a bit and drop it again.

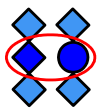



What happens?



Scrunch the paper tightly.

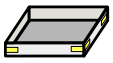
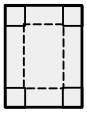





Does the paper fall differently?

1

Experiment 1

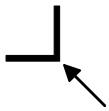




Look at the tray template.



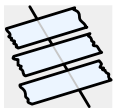
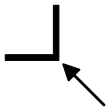
Carefully cut along the dotted lines.


Fold along the straight lines.

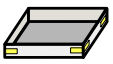
Fold the corners.



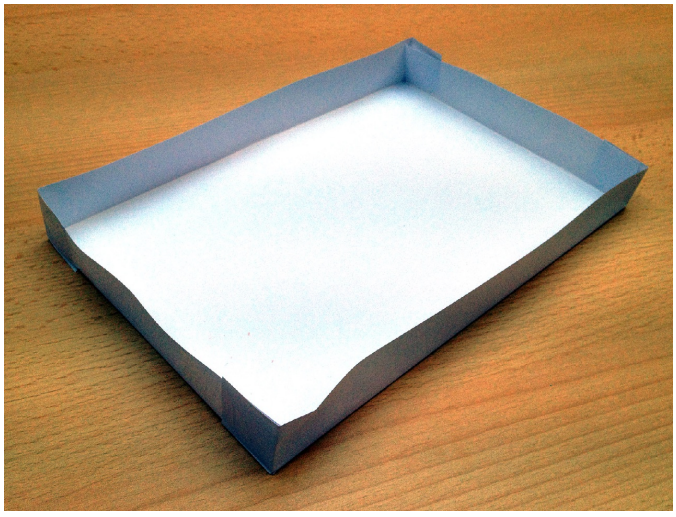



Put sticky tape to fasten the corners.





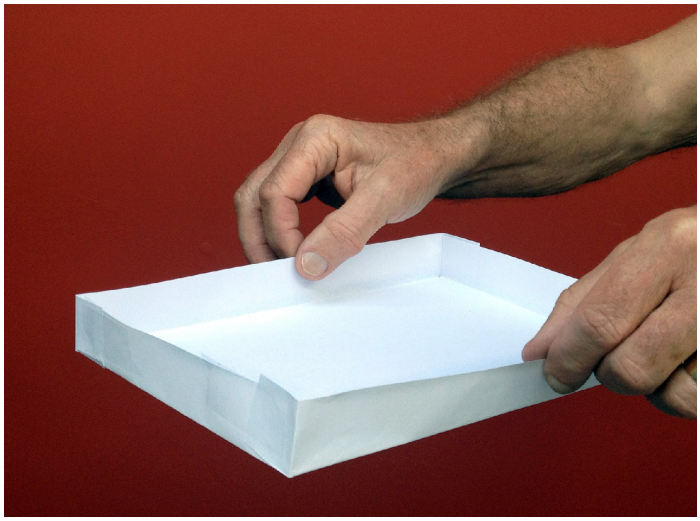
Make your tray like the picture.



1

Experiment 1

Hold the tray the right way up like the picture.

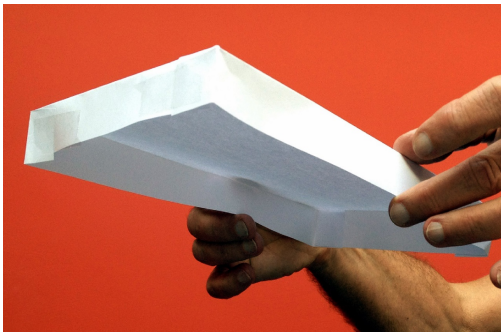


Drop the tray.

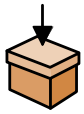
Does the tray fall differently to the piece of paper?

Try dropping the tray upside down.

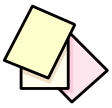
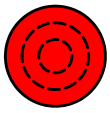
What is the difference?



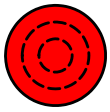
Explanation

Air resistance affects falling objects.

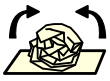
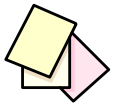
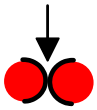
Paper has a large area.

The air resistance is large and the paper is light.

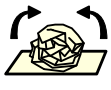
The piece of paper falls slowly.

Scrunched up paper has a smaller area touching the air.

The air resistance is smaller.

The scrunched up paper falls faster.

Explanation

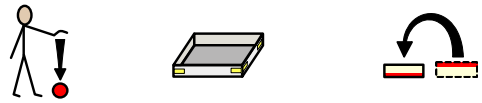
Dropping the tray the right way up.

The air can flow smoothly past the edges.

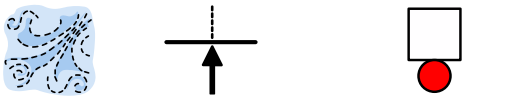
The tray is streamlined.

The tray falls smoothly.

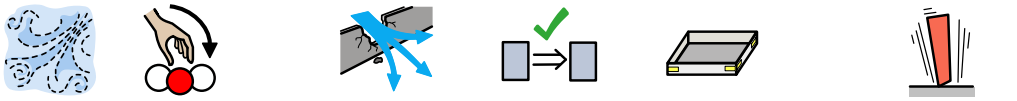
The tray does not wobble.



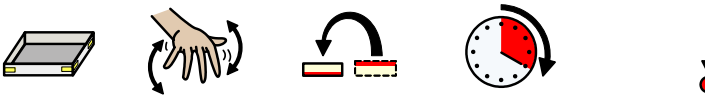
Dropping the tray upside down.



Air is trapped underneath.



The air tries to escape causing the tray to wobble.

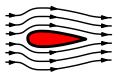


The tray might turn over during the fall.

Ideas to talk about

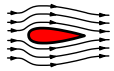

air resistance


area


streamlined

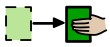


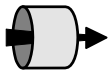
+

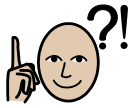
=

Cars, planes and bikes are streamlined.



+





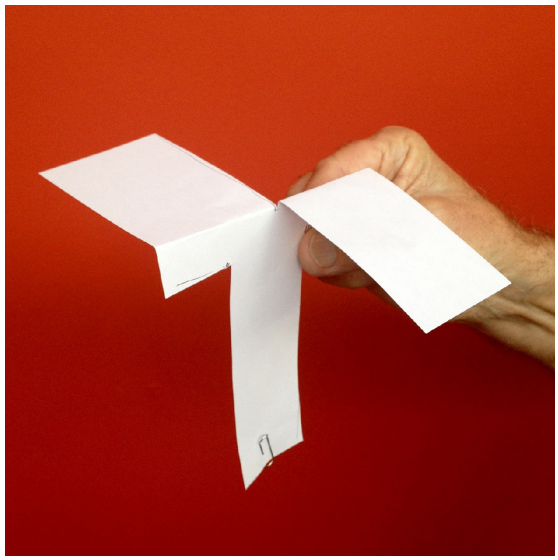

Cars, planes and bikes can move fast through air easily.




Think about cyclist's clothing.

2

Experiment 2



Cut out the medium spinner.

Fold it like the picture.

Put a paper clip at the bottom.

Drop it from a height.

you must ask before climbing on furniture.

Watch the spinner during the fall.

Try it several times.

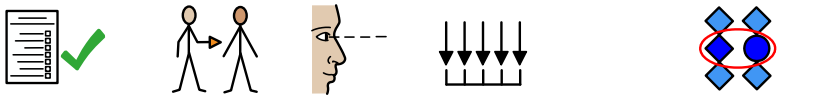
Does it spin?

Does it start spinning straight away?

2

Experiment 2

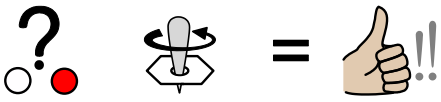
Repeat the using the large spinner.



Make sure you look for all the differences.

Write down all the differences you can.

Try again using the small spinner.



Which spinner is best?

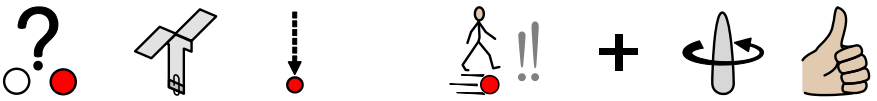
Can you improve the spinners?

Think of new experiments


Add more paper clips to the bottom.


Try cutting the wings smaller.

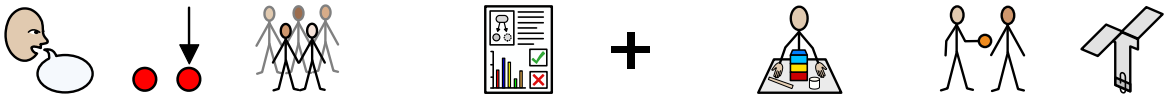

Try more experiments.


Which spinner falls the slowest and spins well?

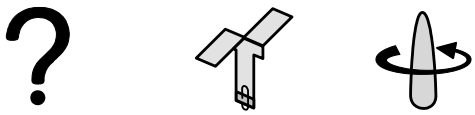


Write down the results.

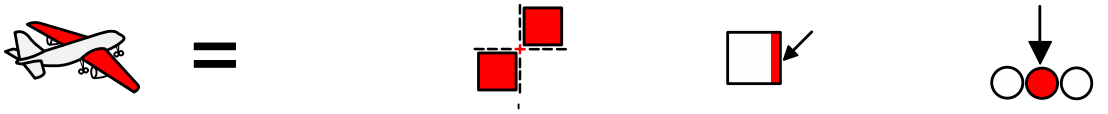

OR


Tell other people the results and demonstrate your spinners.

Explanation



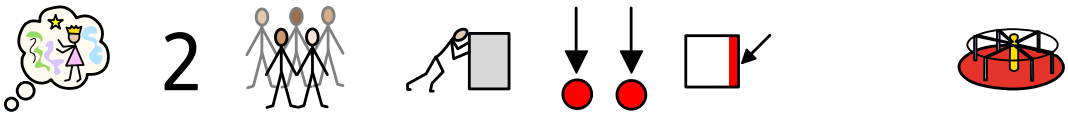
Why does the spinner spin?



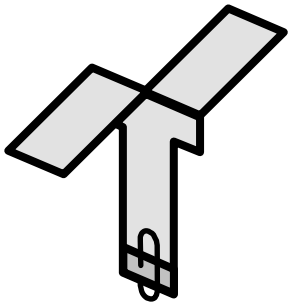
The wings are on diagonally opposite sides of the middle.

The air resistance pushes the wings in opposite directions,

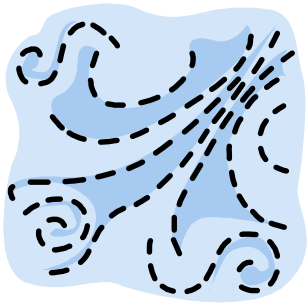
causing the spinner to spin around the centre.



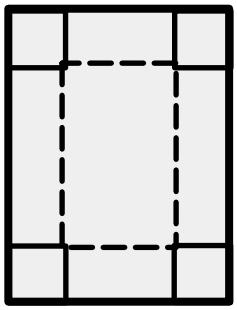
Imagine 2 people pushing either side of a roundabout.



spinner



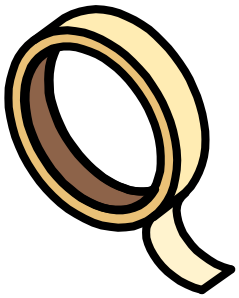
air



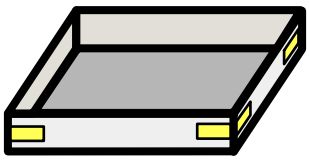
template

scissors

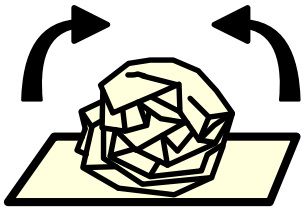
paperclip



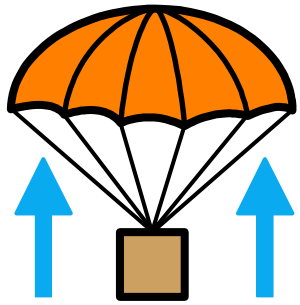
sticky tape



tray

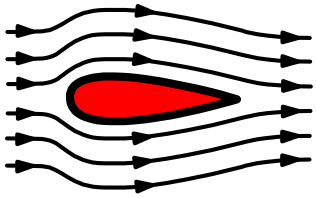


scrunch

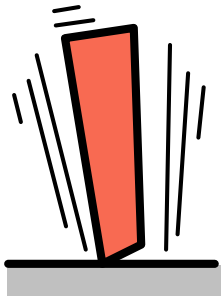


air resistance

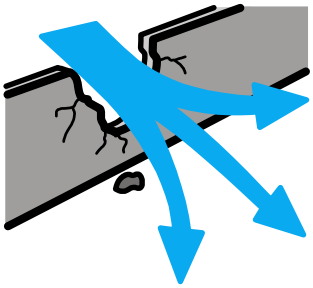
flow



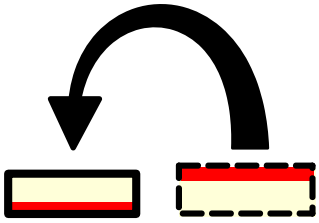
streamlined



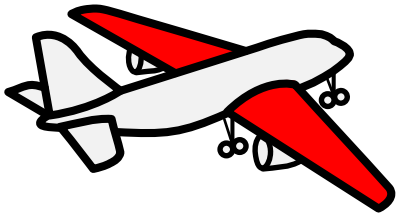
wobble



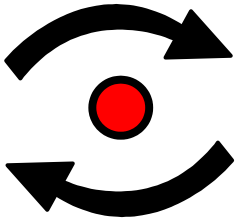
escape



turn over



wing



opposite directions

1

Group work 1: Slippery slopes

Equipment

card

ruler

compass

parcel tape

scouring sponge

paperback book

plastic cup

2 two pieces of wood measuring: 30 x 12 x 1 cm

2 two pieces of wood measuring: 30 x 12 x 1 cm

1 1 pieces of wood measuring: 3 x **4.5** x 8 cm

1 1 pieces of wood measuring: 3 x 4.5 x 8 cm

At what angle do objects slide down a slope?

During this experiment you will find out.

Make the slope

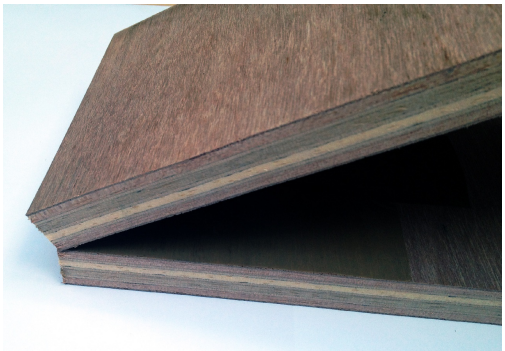
Put the ends of the 2 pieces of wood together.

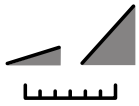
Use strips of parcel tape to join the wood together.

Make sure the tape = pressed down + sticks well.

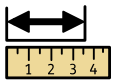
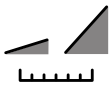
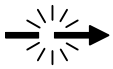
The parcel tape makes a hinge.

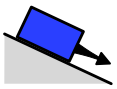
Fold 1 piece of wood back.

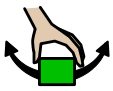


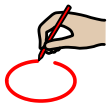
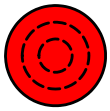
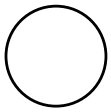


Steepness scale


This experiment

measures

steepness of a slope

when

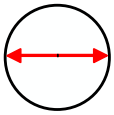
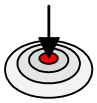
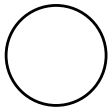
an object

slides.


Use
a

compass

to draw

a big

circle
on

the card.


Draw
a

line

across

the centre of

the circle.

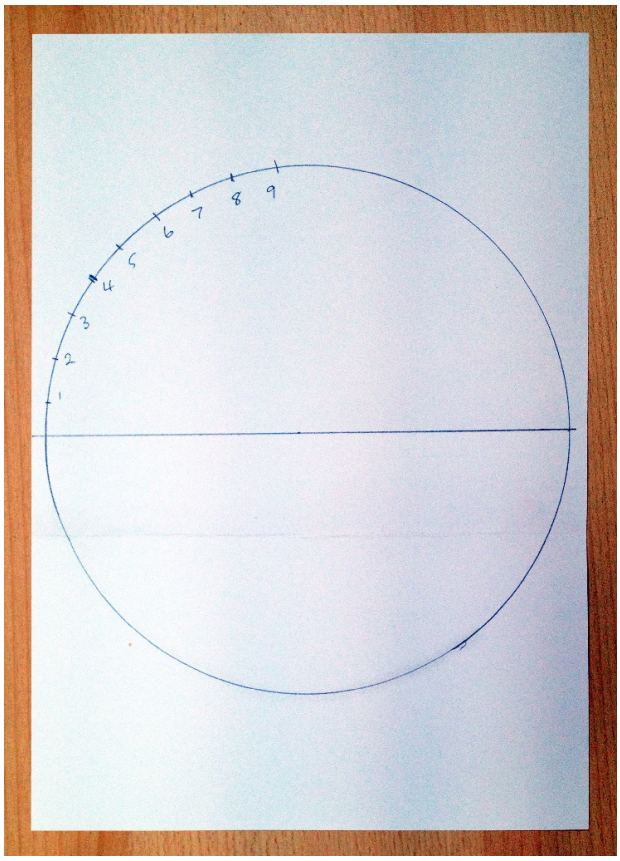
Steepness scale

Make marks along the edge of the circle every 2 cm.

Mark a quarter of the circle.

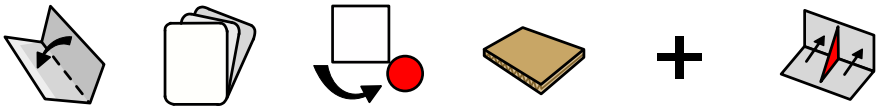
This is a steepness scale.

Use the ruler to mark accurately like the picture.

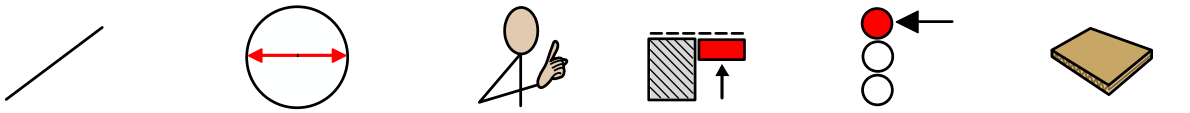


Putting together the apparatus

Putting together the apparatus is tricky.

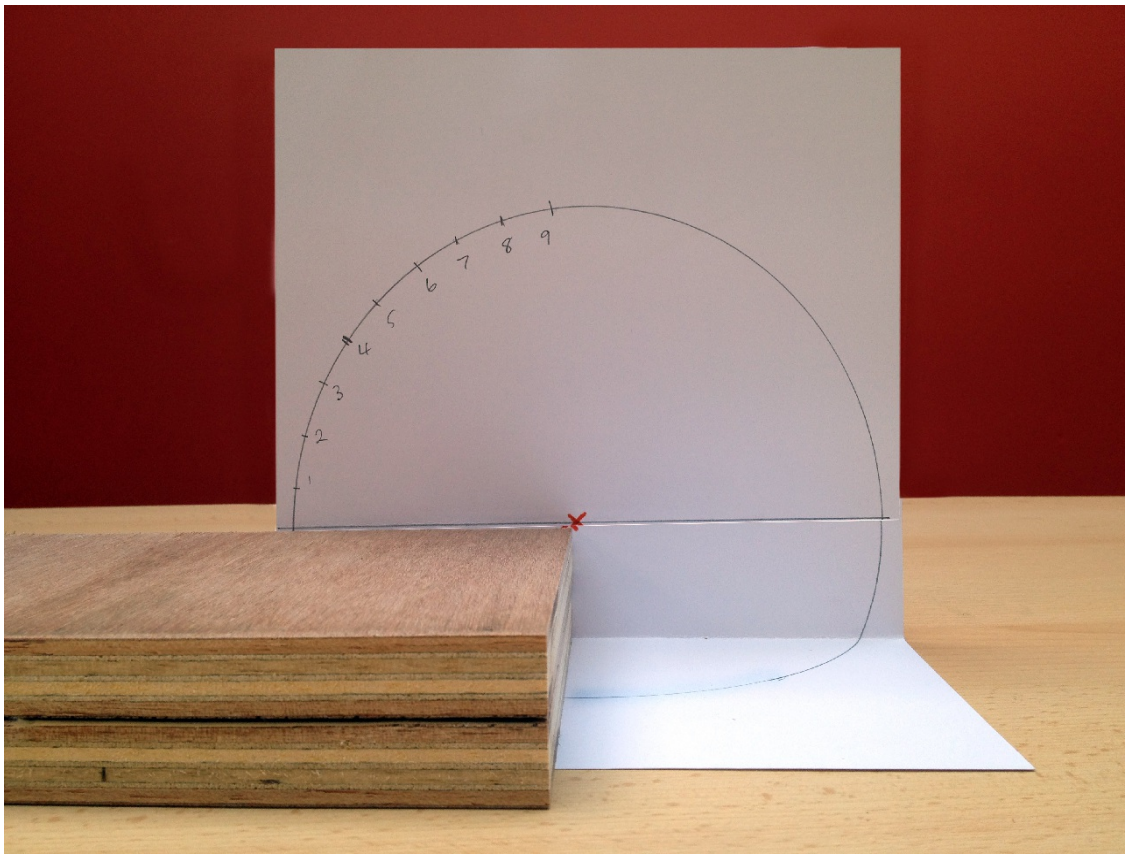


Fold the card under the wood and prop it up.



The line through the circle must line up with the top of the wood.

Make sure your apparatus looks like the picture.

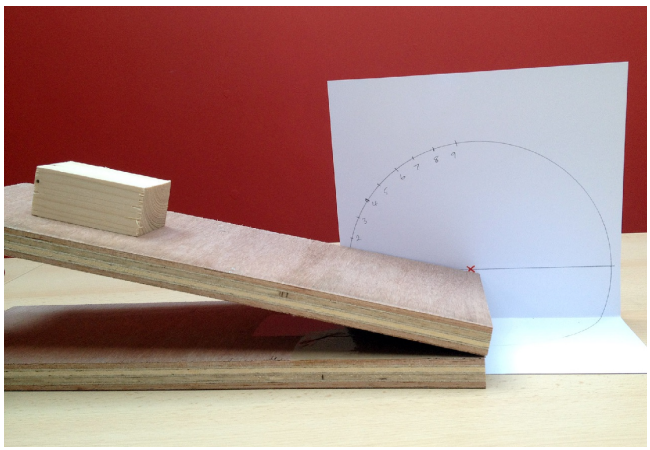


The experiment

Put an object on top of the wood.

Slowly Lift the top piece of wood to make a slope.

You must lift the wood very slowly.



When the object starts to slide,

look at the steepness scale + remember the number.

Try each experiment 3x three times.

Decide the best number + fill in the data sheet.

The experiment

Try different objects and fill in the data sheet:

Try the paperback book.

Try the plastic cup.

Try the scouring sponge on the rough side

Try the scouring sponge on the smooth side.

Try the block of wood on the thick edge.

Try the block of wood on the thin edge.

Questions

What is interesting about the two block of wood experiments?

Which objects slide easily.

Which objects do not slide easily

when would slipping on a slope be useful

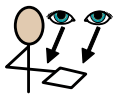
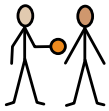
When would slipping on a slope be dangerous?

Think about activities in mountains.

Where else would slipping on a slope be a problem?

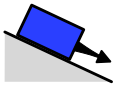

Results poster



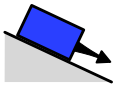

Make a poster showing your results.



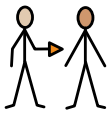


Write about places where slipping on a slope is useful.



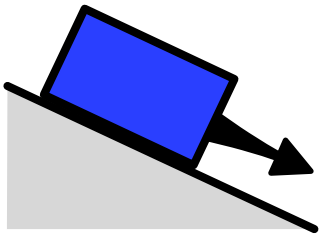


Write about places where slipping on a slope is dangerous.

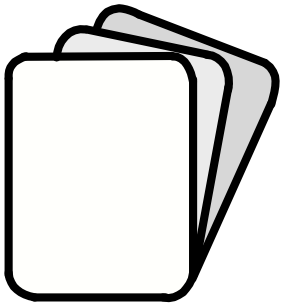



Make you poster colourful.

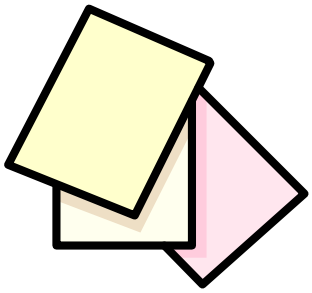
objects



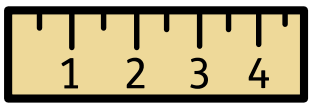
slide



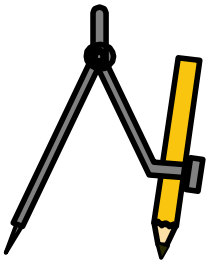
card



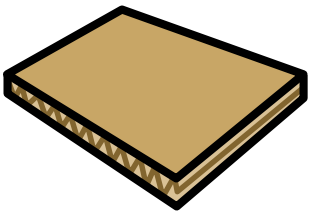
paper



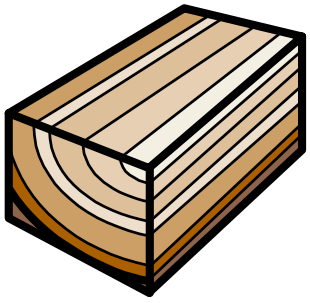
ruler



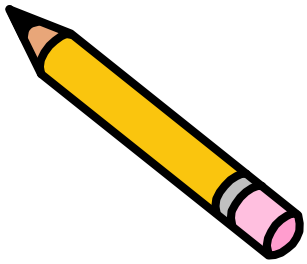
compass



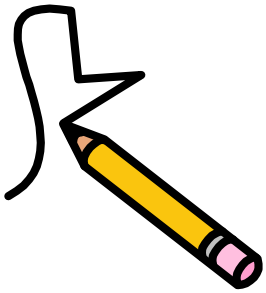
piece of wood



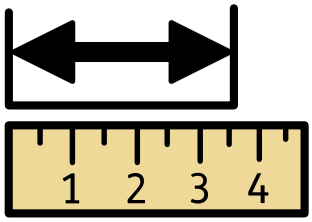
block of wood



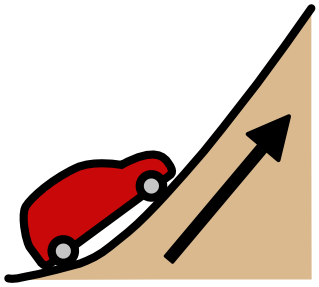
pencil



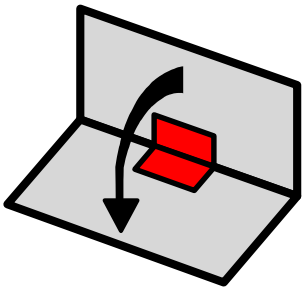
mark



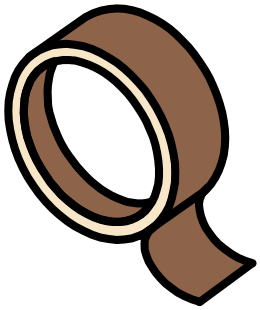
measure



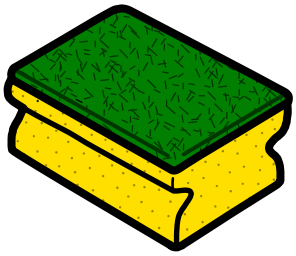
steep



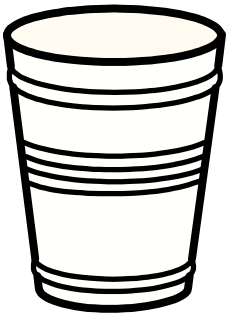
hinge



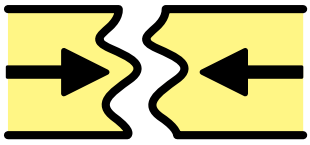
parcel tape



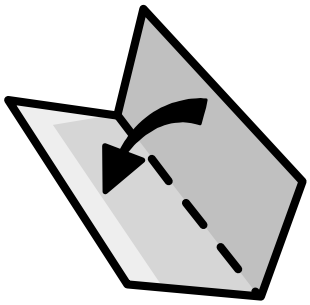
scouring sponge



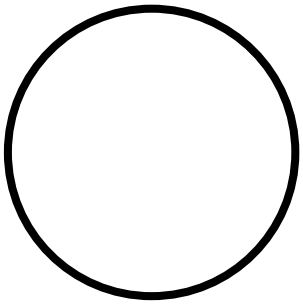
plastic cup



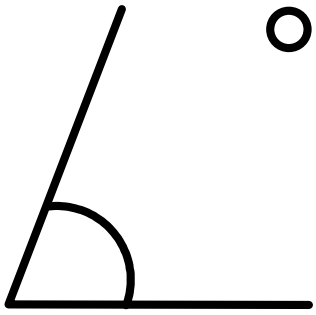
join



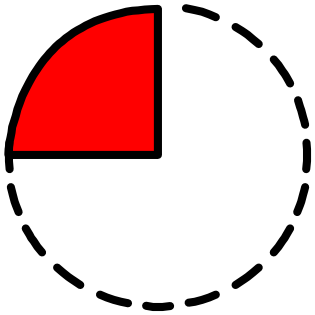
fold



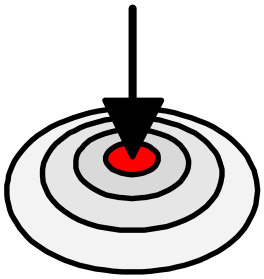
circle



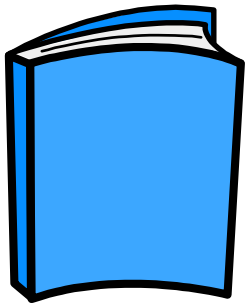
angle



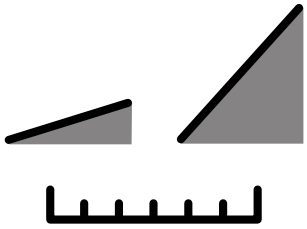
quarter



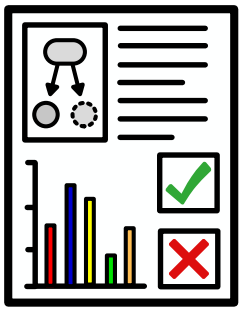
centre



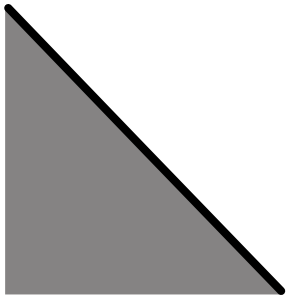
paperback book



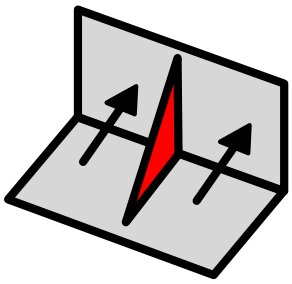
steepness scale



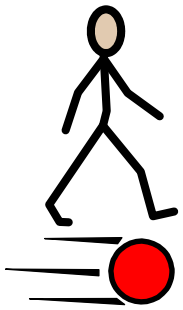
data sheet



slope



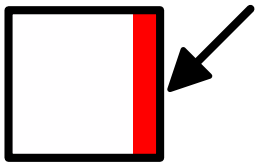
prop



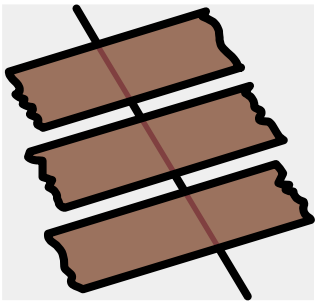
slow

thick

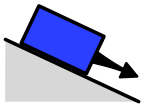
thin



edge

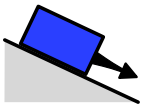


strips of tape



Slippery slopes data sheet

Material	Steepness scale
scouring sponge, smooth, side	1 2 3 4 5 6 7 8 9
scouring sponge, rough, side	1 2 3 4 5 6 7 8 9
paperback book	1 2 3 4 5 6 7 8 9
plastic cup	1 2 3 4 5 6 7 8 9
block of wood, thick, edge	1 2 3 4 5 6 7 8 9
block of wood, thin, edge	1 2 3 4 5 6 7 8 9

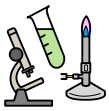


Slippery slopes data sheet

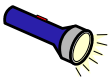
Material	Steepness scale
	1 2 3 4 5 6 7 8 9
	1 2 3 4 5 6 7 8 9
	1 2 3 4 5 6 7 8 9
	1 2 3 4 5 6 7 8 9
	1 2 3 4 5 6 7 8 9
	1 2 3 4 5 6 7 8 9

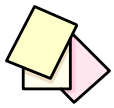

2

Group work 2: Slipping slopes


apparatus


card


torch


paper


jug


sugar

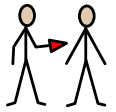

couscous


lentils


flour

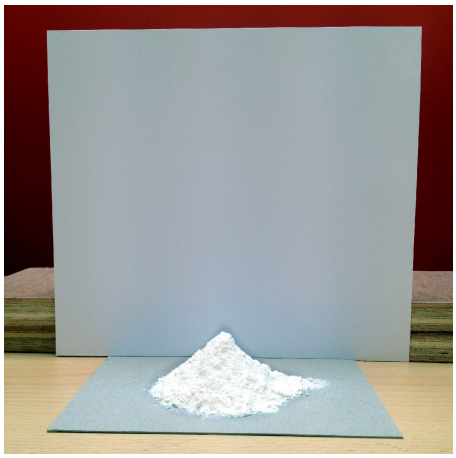

rice

How high can you make a heap?



You will make a heap using different materials.

The experiment



Put the couscous into the jug.

Very gently pour onto a sheet of paper.

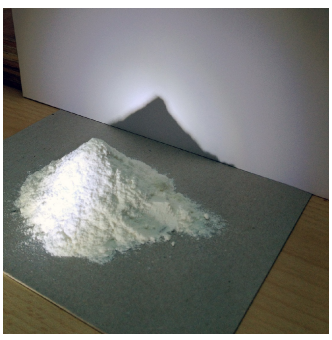
Try to make the highest heap.

Fold a piece of card and prop it up behind the heap.

Put a torch level with the heap and the paper.

You should see the heap shadow on the paper.

Carefully draw around the shadow.



The experiment


Repeat

the experiment

using

sugar,

Flour,

Rice,

lentils.



Which makes

the steepest

heap?



Which makes

the most

pointed

heap?




Experiment using other

materials.

Results poster

Make a poster showing your results.

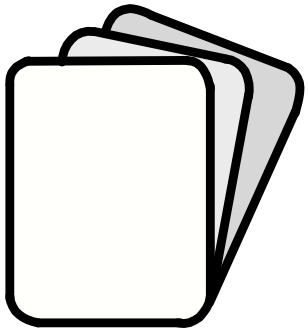
Put the shadow drawings on the poster.

Write about the experiment.

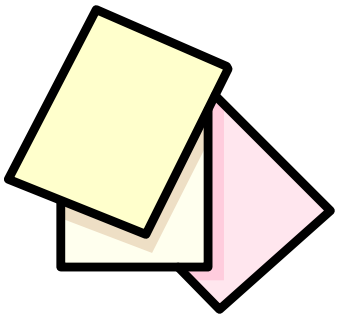
Think about places where slopes slip down.

Think about when slopes slip down.

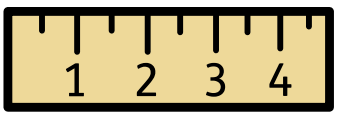
Find information about the Aberfan landslide.



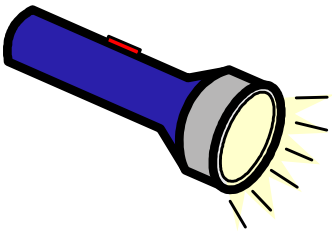
card



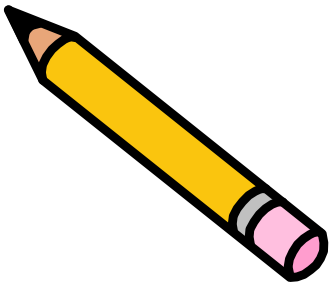
paper



ruler

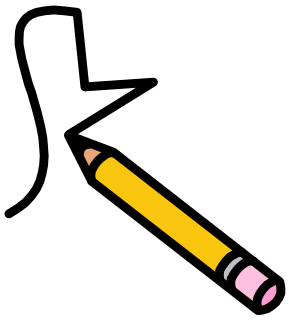


torch

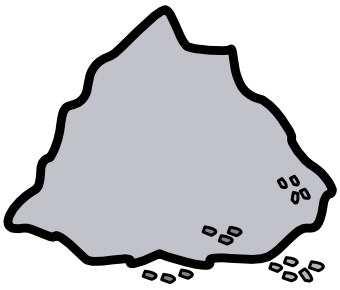


pencil

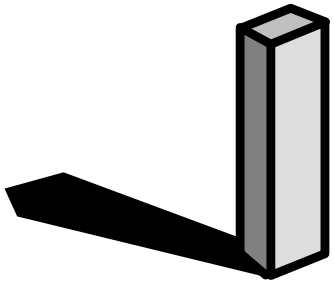
jug



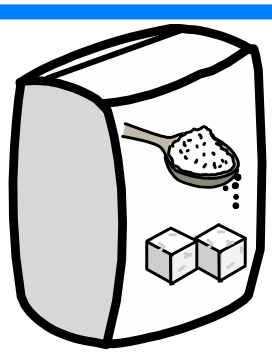
draw



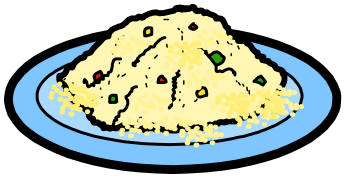
heap



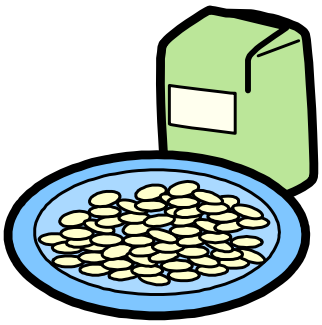
shadow



sugar



couscous



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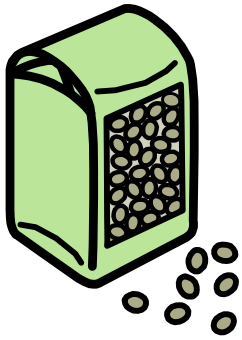
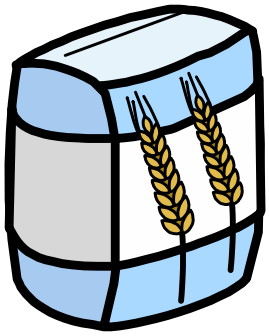
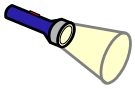


lentils



flour



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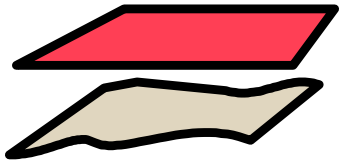

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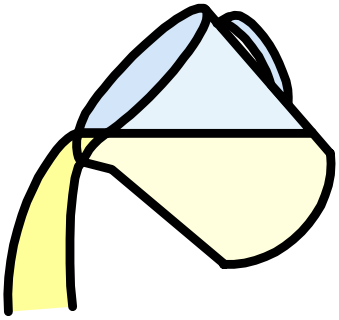
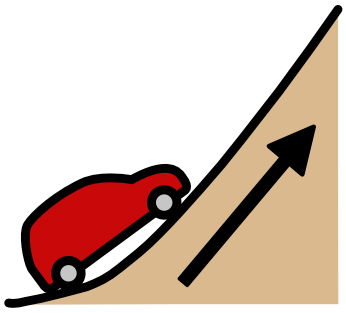
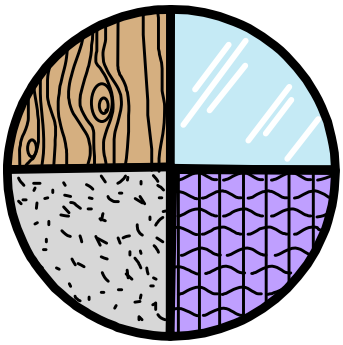


pour

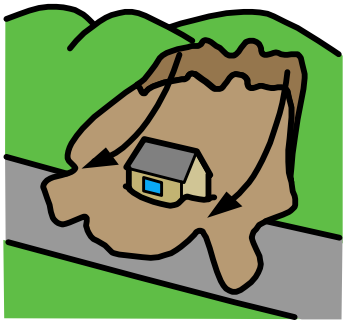


steep

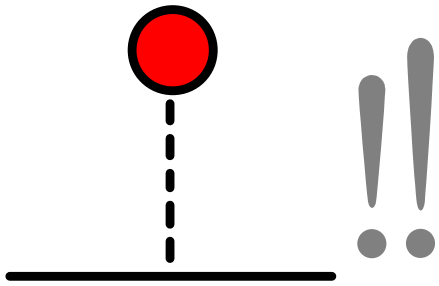


materials

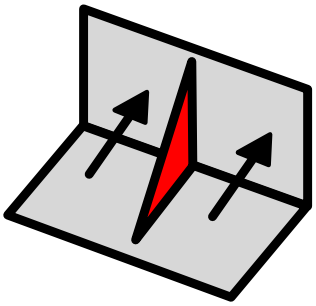
avalanche



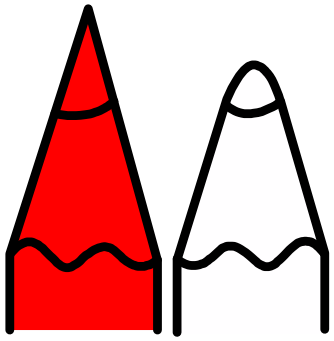
landslide



highest



prop



pointed

Slipping slopes data sheet

	Heap steepness			
material	high	medium	low	order
sugar				
lentils				
flour				
rice				
couscous				