North Gower Partnership

Investigations Year 3 and 4

YEAR 3 INVESTIGATIONS

TOPIC	ATT. TARGET	INVESTIGATION
Teeth & Eating	2	Do boys or girls have more teeth?
Teeth & Eating	2	How many different kinds of teeth?
Changing materials	3	What makes a good bubble?
Materials	3	Which materials are toughest?
Materials	3	Which paper towels are best?
Materials	3	Which tights stretch the most?
Materials	3	Which balls bounce the best?
Materials	3	Which toilet paper is easiest to tear?
Materials	3	Does shape affect strength?
Rocks & Soil	3	Which is the 'leakiest' soil?
Magnets	4	Which is the strongest magnet?
Springs	4	Which is the stretchiest spring?
Springs	4	How bouncy are springs?
Light & Shadows	4	What affects the size of a shadow?

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** TEETH AND EATING

INVESTIGATION DO BOYS OR GIRLS HAVE MORE TEETH?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My dentist told me that boys have more teeth than girls and I'm not sure whether to believe him? Do pupils think we all have the same number of teeth? Or is there a difference between boys and girls? How could we test our ideas?	bar	1 & 2	Small mirrors or dental mirrors may be useful (borrow from local comp.)

BRAINSTORM

What I could change

Sex-boy or girl	

What I could measure

How many teeth each pupil has	

Notes: Pupils can record individual results or if their mathematical skills allow they could calculate averages. Teeth are easier to count using your tongue rather than your fingers.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Sex - boys and girls	Individuals - number of teeth Class - average number of teeth

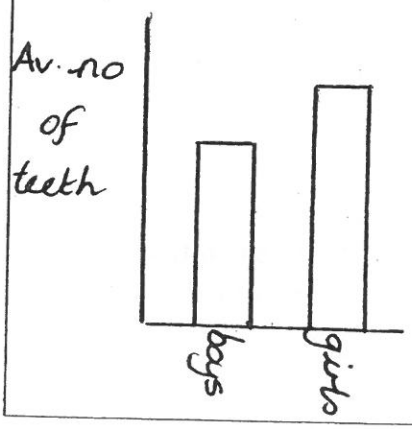
POSSIBLE RESULTS TABLE

I changed sex	I measured Average no. of teeth
boys	13
girls	15

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'On average - girls have more teeth than boys'

Possible discussion - would things change as pupils get older?

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** TEETH AND EATING

INVESTIGATION HOW MANY DIFFERENT KINDS OF TEETH DO YOU HAVE?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Look at pictures/models of the teeth of different animals. Are our teeth the same as animals? How are they different? What are the different shaped teeth for? What different teeth do we have? What are they for? How can we find out how many of each we have?	bar	1 & 2	Small mirrors or dental mirrors may be useful (borrow from local comp.)

BRAINSTORM

What I could change

Type of teeth	

What I could measure

How many of each type each pupil	

Notes: Pupils can record individual results or if their mathematical skills allow they could calculate averages. Teeth are easier to count using your tongue rather than your fingers.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
The types of teeth - incisors, canines + molars	Individuals - the number of each type Class - average number of each type

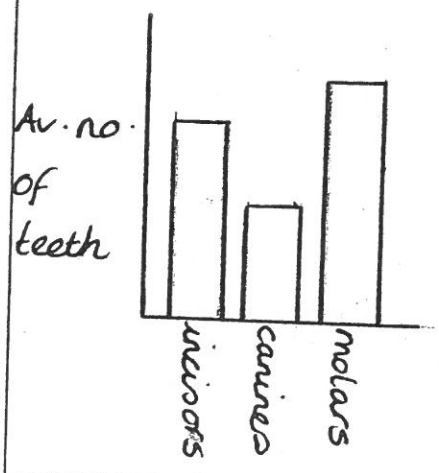
POSSIBLE RESULTS TABLE

I changed	I measured
Type of tooth	No. of each type
incisors	7
canines	4
molars	8

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'I have more incisors than other types of teeth'

'I have less canines than other types of teeth'

'On average we have less canines than other types of teeth'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** CHANGING MATERIALS

INVESTIGATION WHAT MAKES A GOOD BUBBLE?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My children like bubble baths but some of the bubble bath I buy does not give them enough bubbles. Do the children think that some bubble baths are better than others? How could I make more bubbles? Look at the ingredients on the back of bottles and identify the 'bubble-maker' (glycerol/glycerine)	bar or line	1 & 2 & 3	Bubble bath or soap solution, beakers, bowls, measuring jugs, bubble blowing rings- these can be made of thin wire.

BRAINSTORM

What I could change

The amount of soap used	The make of soap used
The amount of glycerol/glycerine in the soap.	

What I could measure

The number of bubbles in a blow	The size of the bubbles made

Notes: Take CARE with regard to allergies and eye contact when using the soap. Thin wire coat hangers could be cut and used as bubble making rings. SAFETY- make sure the ends are smooth or covered with tape/plastecine. Use a set amount of water e.g. 100cm3

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
The amount of soap/ bubble bath OR The amount of glycerine	Number of bubbles in a blow OR Size of bubbles made

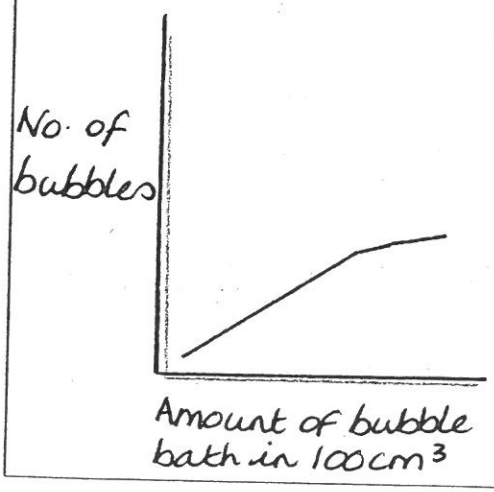
POSSIBLE RESULTS TABLE

I changed *Amount of bubbles*	I measured *No of bubbles*
1 cm^3	6
2 cm^3	9
3 cm^3	13
4 cm^3	14
5 cm^3	14

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH *bar or line*



POSSIBLE PUPIL CONCLUSIONS

'The more bubble bath I used - the more bubbles I got'

'The more bubble-maker I added - the bigger the bubbles I got'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION WHICH MATERIALS ARE STRONGEST?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Look at picture/examples of clothes made of different materials. Ask the children why clothes are made of different materials. Name some of the materials used. Which ones do the children think are strongest? How can they test their ideas?	bar	1 & 2	Equal sized pieces of different materials, sandpaper

BRAINSTORM

What I could change

The type of material	

What I could measure

The number of with sandpaper to make a hole.	

Notes: The pupils are best in mixed ability groups. At least one of the children needs to be able to count to about 100.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
The type of material	Number of 'rubs' to make a hole in the material

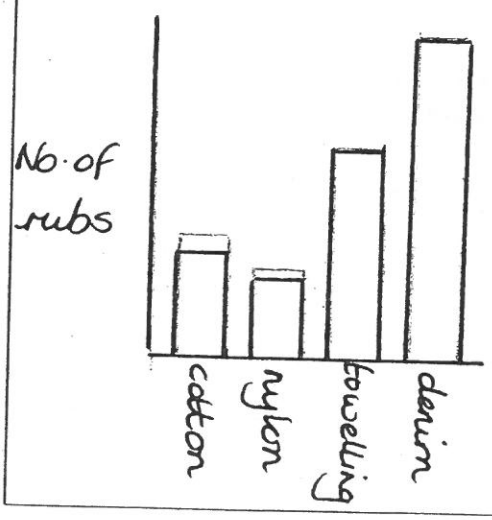
POSSIBLE RESULTS TABLE

I changed	I measured
Material	No. of rubs
cotton	9
nylon	7
towelling	23
denim	57

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'Denim took the most rubs - it is the strongest'

'Nylon is the least hard-wearing and denim is the most hardwearing'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION WHICH PAPER TOWELS ARE BEST FOR MOPPING UP SPILLS?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My aunt has two young children and they are always spilling drinks. She says that some kitchen rolls wipe up the spills better than others. Do the pupils think she could be right? Look at a variety of different kitchen towels and discuss design/price. How can we test which is the most absorbent towel?	bar	1 & 2	A variety of kitchen towels (the same size for a fair test), measuring jugs/cylinders, scales (if measuring weight)

BRAINSTORM

What I could change

The type of paper towel	

What I could measure

The volume of water squeezed from the towel	The weight gain of the paper towel

Notes:

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
The type of paper towel	The amount of water soaked up (volume or weight of water)

POSSIBLE RESULTS TABLE

I changed Name of towel	I measured Amount of water taken up
Tesco	13
Asda	15
Co-op	12
Safeway	17

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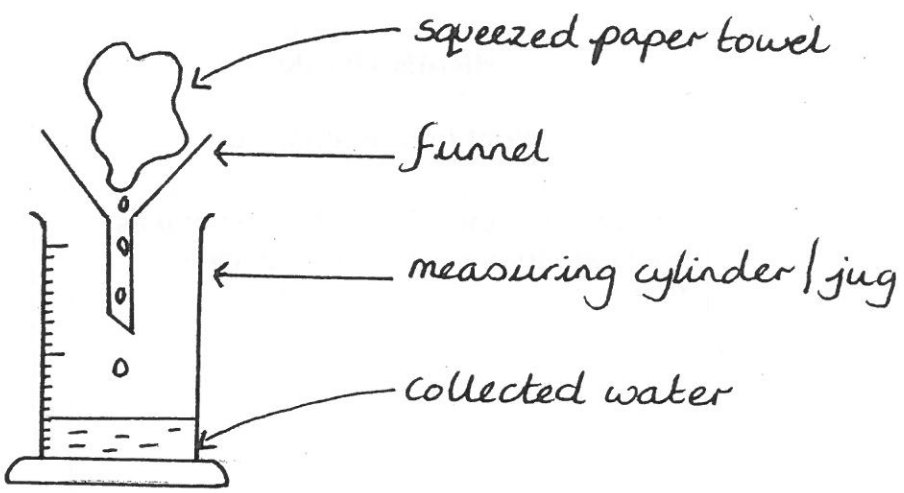
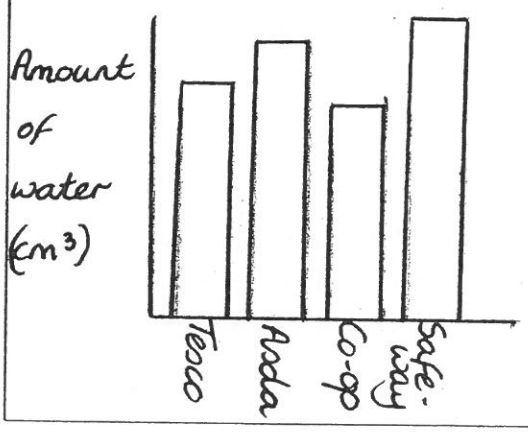


POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'The Safeway towel would be best for mopping up spills'

'The Safeway towel took up the most water - the Co-op towel took up the least'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION WHICH TIGHTS ARE THE MOST STRETCHY?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My friend always has trouble when she buys tights for her daughter. She has tried lots of different types but after she wears them once she finds they stretch out of shape. Do the pupils think that all tights stretch as badly as this? How can they test their ideas?	bar	1 & 2	A variety of tights, weight hangers or fixed weights to be hung from the tights, measuring tapes.

BRAINSTORM

What I could change

The material the tights are made from	Different makes of the same tights

What I could measure

How much the tights are stretched	

Notes: A more complex investigation would be to measure differences in stretch of the same pair of tights when different weights are attached. This would give a number (weight)/ number (amount of stretch) combination and so give a line graph. SAFETY- take care of falling weights!

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Type of 'tights'	Stretch of 'tights'

POSSIBLE RESULTS TABLE

I changed Material	I measured Stretch (cm)
Wool	7
Nylon	3
etc	

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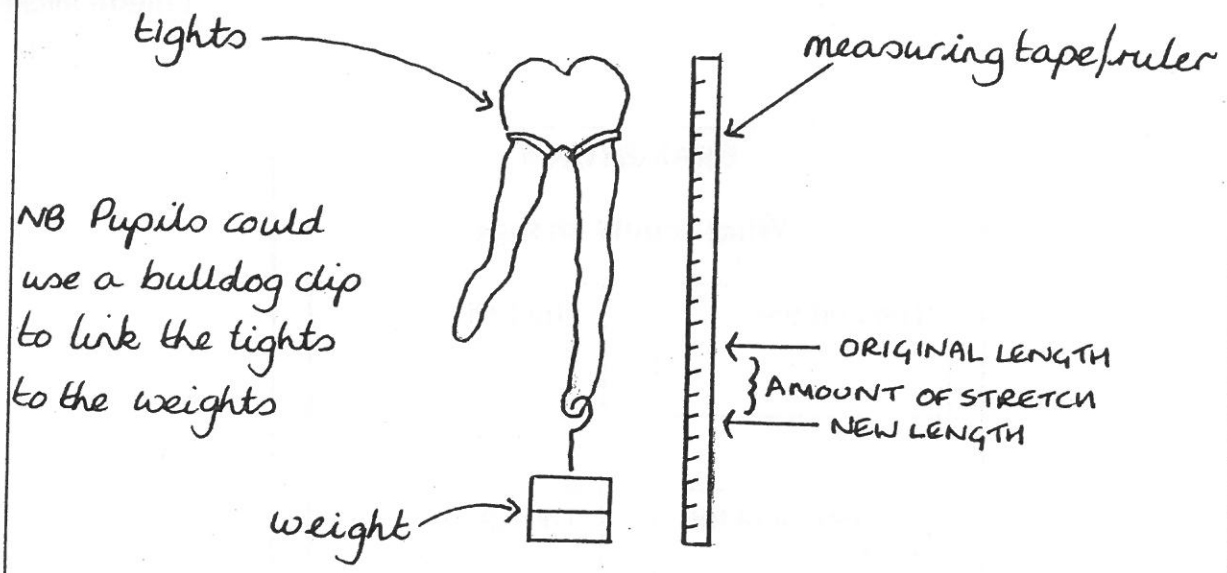

POSSIBLE GRAPHS

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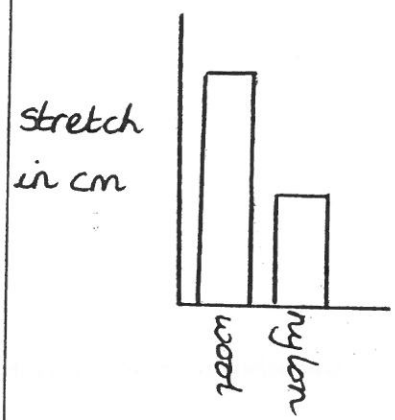

POSSIBLE PUPIL CONCLUSIONS

'Wool tights stretch more than nylon ones'

'Wool is a stretchier material than nylon'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION HOW CAN WE CHANGE THE HEIGHT BALLS BOUNCE?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Why are different types of balls used in different games/sport? Are games/sports played on the same kind of surface? Does the surface make a difference? Why does it make a difference?	bar or line	1 & 2 & 3	A variety of surfaces e.g. lino, tiles, carpet, grass, sand, concrete, a variety of balls e.g. tennis, table tennis, squash, golf, metre sticks

BRAINSTORM

What I could change

The surface	The ball
The height of the drop	The force

What I could measure

The height of the bounce	

Notes: The force used to push the ball will make a difference to the bounce but it is not safe to try this out in the classroom! The pupils will understand the reasons for this- safety and the force of the push cannot be measured!

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Type of surface OR Type of ball OR Height of drop	Height of bounce

POSSIBLE RESULTS TABLE

I changed Height of drop	I measured Height of bounce
50	29
100	53
150	69
200	94

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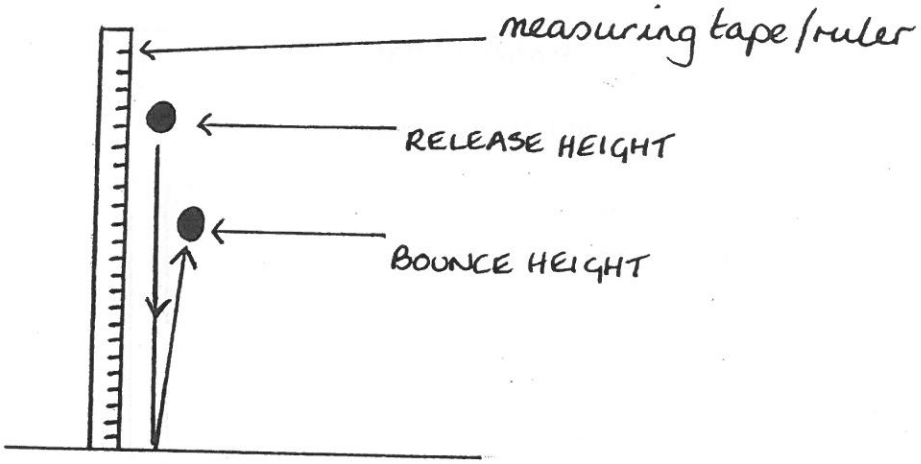
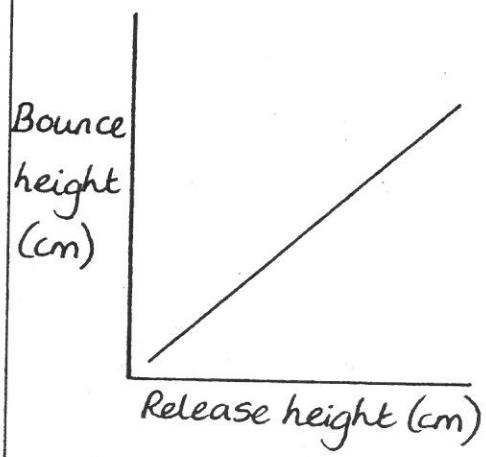


POSSIBLE GRAPHS

TYPE OF GRAPH bar or line



POSSIBLE PUPIL CONCLUSIONS

'The higher the release height the higher the ball bounces'

'Balls dropped from a high place bounce more than those dropped from a low place'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION WHY ARE SOME TOILET PAPERS EASIER TO TEAR THAN OTHERS?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Have you ever had trouble tearing sheets of toilet paper apart? Are all toilet papers the same or are some easier to tear than others? How could we test our ideas.	bar	1 & 2	Different makes of toilet paper, weight hangers (borrow from local comp.), forcemeters, bulldog clips.

BRAINSTORM

What I could change

Different makes of toilet paper	

What I could measure

How many weights the paper can hold	The force needed to break the paper *

Notes: The force needed to break the paper can be measured using a forcemeter.
SAFETY- take care with falling weights! Paper towels can be tested in the same way.

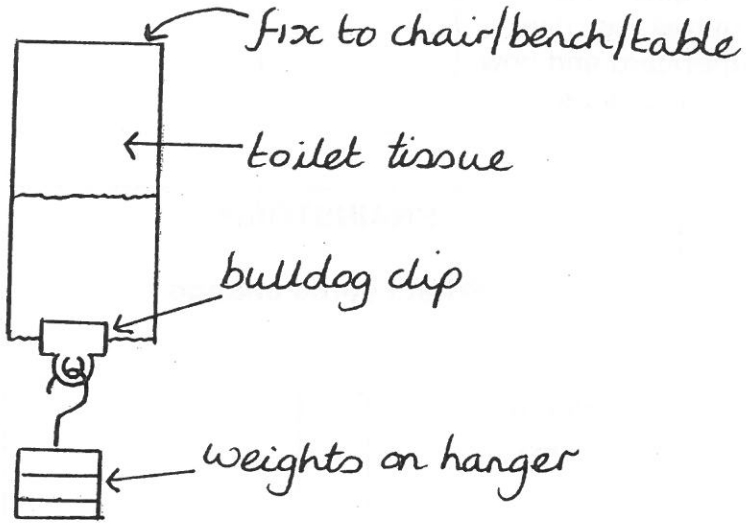
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Make of toilet paper	The weight/ force needed to tear the sheets apart

POSSIBLE RESULTS TABLE

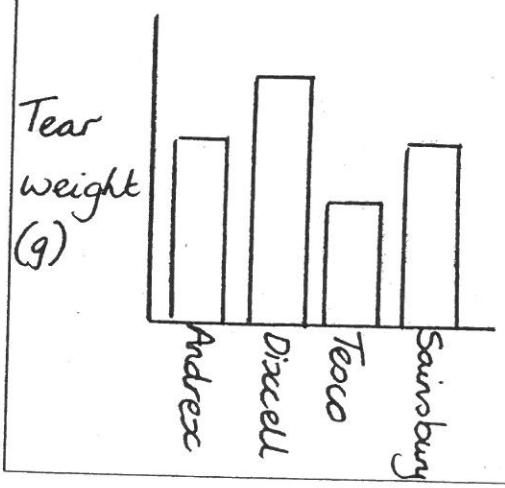
I changed	I measured
Make of paper	Weight needed to tear (g)
Andrex	300
Dixcell	400
Tesco	200
Sainsbury	300
Quicksave	500

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'Tesco toilet paper tears easiest and Quicksave the hardest'

'Tesco toilet paper is the easiest to separate because it takes less weight/force to tear'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MATERIALS

INVESTIGATION DOES THE SHAPE OF A MATERIAL AFFECT ITS STRENGTH?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Ask pupils to look at different shapes around the room/in pictures. Why are materials made into different shapes? Ask pupils to look at pictures of bridges. Do the materials used to build the bridges have different shapes? What is the reason for this? Do different shapes have different properties (strengths)? Ask pupils what shapes they can make from paper/card and how they might test their ideas.	bar	1 & 2	Pieces of A4/A5 card, paper glue, small weights (borrow from local comp. if necessary), bridge supports (books, blocks etc.)

BRAINSTORM

What I could change

Different shapes	

What I could measure

How much weight each shape takes	

Notes:

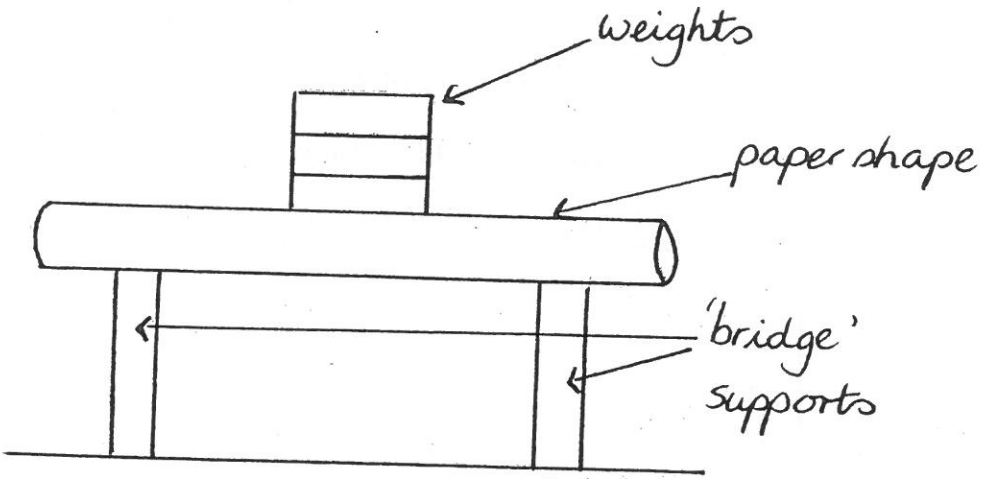
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Shape of paper bridges	Weight the paper supports

POSSIBLE RESULTS TABLE

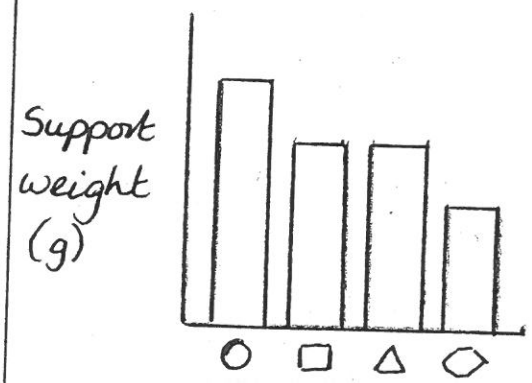
I changed	I measured
Shape	Weight it supports (g)
○	400
□	300
△	300
⬡	200

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'The round shape was the strongest'

'The round shape would be strongest for building bridges - the hexagon was the weakest and least suitable'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** ROCKS AND SOILS

INVESTIGATION WHICH SOIL DOES WATER FLOW THROUGH BEST?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
With all the rainy weather we've been having, the local football/rugby pitch is always water logged. The groundsman says it's because of the soil. Does the type of soil make a difference? What kind of soil should the groundsman add to the pitch to improve drainage?	bar	1 & 2	A selection of different soils, filter paper or newspaper, funnels to support the paper, beakers, measuring cylinders, stopwatches.

BRAINSTORM

What I could change

- The type of soil
- * The amount of soil
-
-

What I could measure

- How long it takes for a fixed volume of water to pass through
- How much water flows through in a given time

Notes: *It is possible to test the **amount** of soil as an input variable if you want the pupils to have a choice. Pupils should wash their hands after handling soils.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Different types of soil	How fast water passes through the soils (time a fixed volume)

POSSIBLE RESULTS TABLE

I changed Type of soil	I measured Time (secs)
sand	12
clay	84
peat	32
chalk	17

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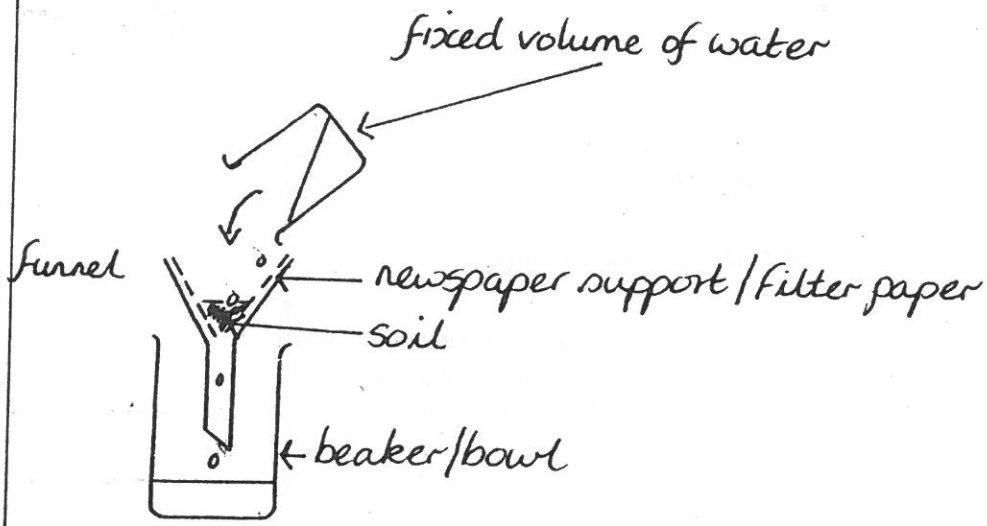
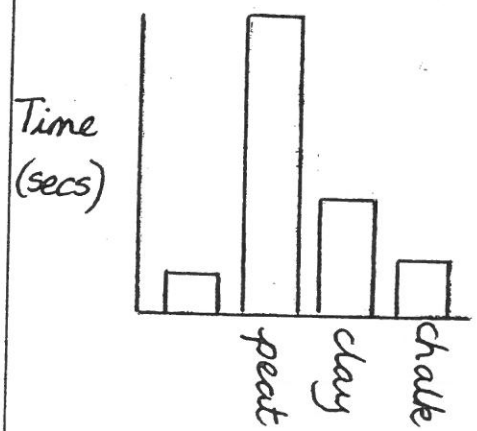


POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'Water passes through sandy soils best'

'Sandy soils drain much better than clay soils and are less likely to get waterlogged'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MAGNETS

INVESTIGATION MEASURING THE STRENGTH OF MAGNETS?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
A batch of fridge magnets were found to be faulty and the manufacturer wanted to find a way to test their strength OR What type of magnet would be the best to recover a tin of metal pins accidentally dropped in the sand (on a beach)?	bar or line	1 & 2 & 3	Different sized but same shape magnets Same size but different shaped magnets, small (but same sized) pieces of paper

BRAINSTORM

What I could change

The shape of the magnets	The size of the magnets (width, diameter, etc.)

What I could measure

How many paper clips the magnet will pick up	How many pieces of paper the magnet holds on a metal door.

Notes: Pupils could trace around magnets and measure diameter later

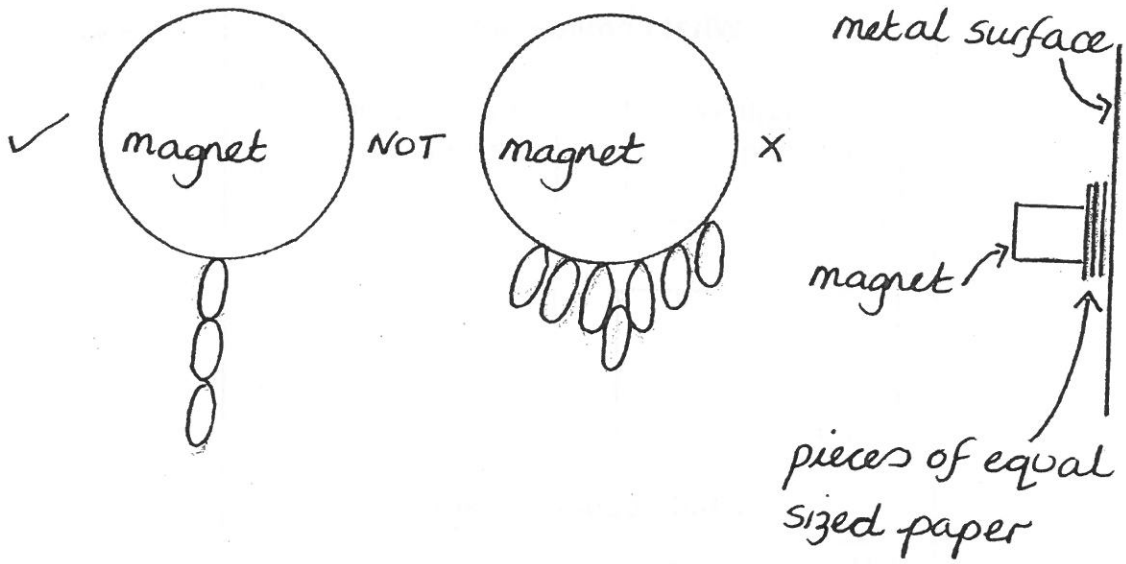
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Shape OR Size of magnet	No. of paper clips held up OR No. of sheets of paper held up

POSSIBLE RESULTS TABLE

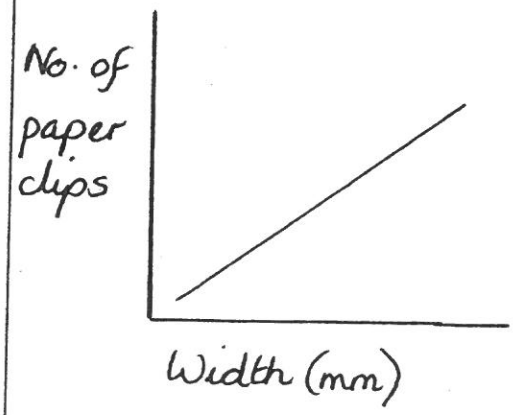
I changed Width (diameter) of magnet (mm)	I measured No. of paper clips held up
5	1
10	2
13	3
20	5
24	7

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar or line



POSSIBLE PUPIL CONCLUSIONS

'Big magnets pick up the most clips'

'The bigger the magnet the more clips were picked up'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** SPRINGS

INVESTIGATION WHICH IS THE STRETCHIEST SPRING?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Show the children a selection of springs. What is different about them. Which spring do the children think will be the stretchiest? How can we test their ideas?	bar or line	1 & 2 & 3	Springs of different sizes and shapes, rulers, weights

BRAINSTORM

What I could change

The length of the spring	The thickness of the spring

What I could measure

How much the spring stretches when a given weight is hung from it	

Notes:

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Length of spring OR Thickness of spring	Amount of stretch

POSSIBLE RESULTS TABLE

I changed Length (cm)	I measured Stretch (cm)
2	1
4	1.5
6	2
8	3
10	3.5

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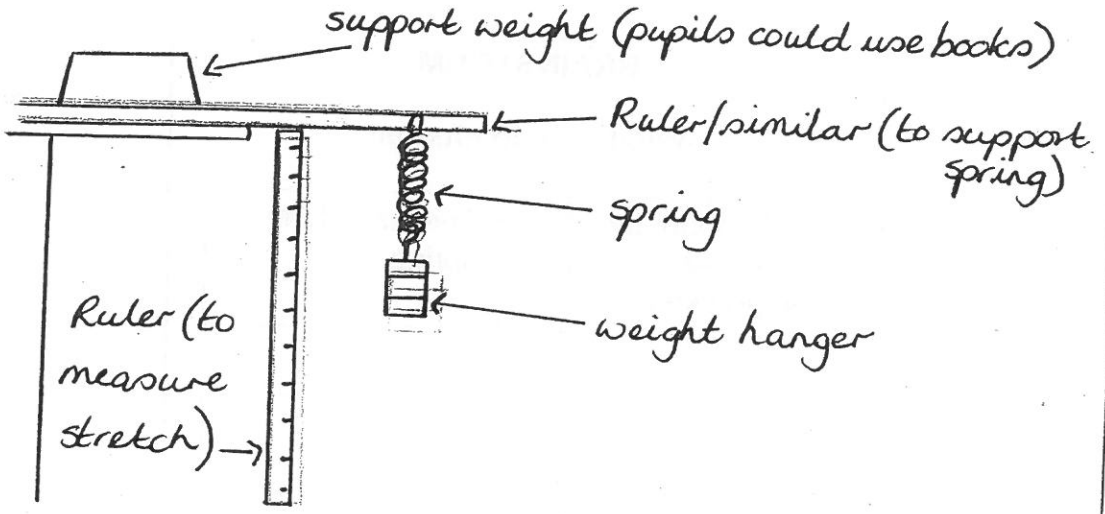
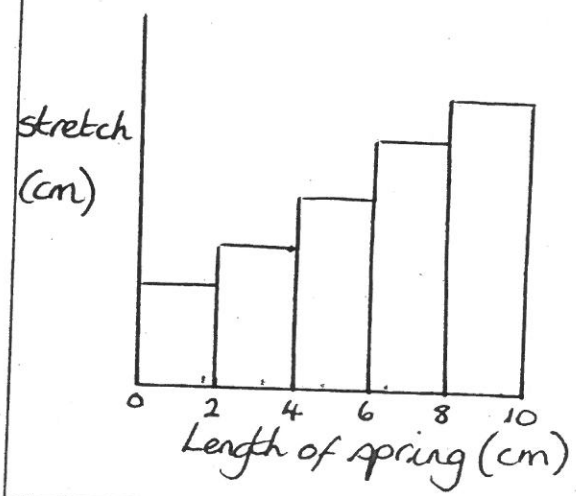


POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'The long spring stretched the most'

'The more coils the spring has the more it stretches'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** SPRINGS

INVESTIGATION HOW BOUNCY ARE SPRINGS?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My brother has just started a new job in a furniture manufacturing company. They have a problem making their sofa seats bouncy enough. What is inside sofas to make them squashy? What other furniture has springs in it?	bar or line	1 & 2 & 3	Springs of different sizes and shapes, dowling rods, cotton reels, metre sticks

BRAINSTORM

What I could change

The amount the springs are compressed	The size of the spring

What I could measure

How far the cotton reel 'jumps' when the spring is released	

Notes:

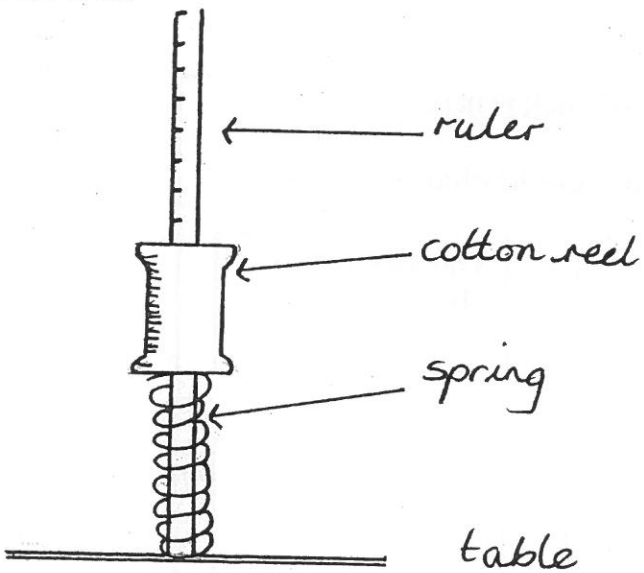
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Amount of compression OR Size of spring	Distance cotton reel travels

POSSIBLE RESULTS TABLE

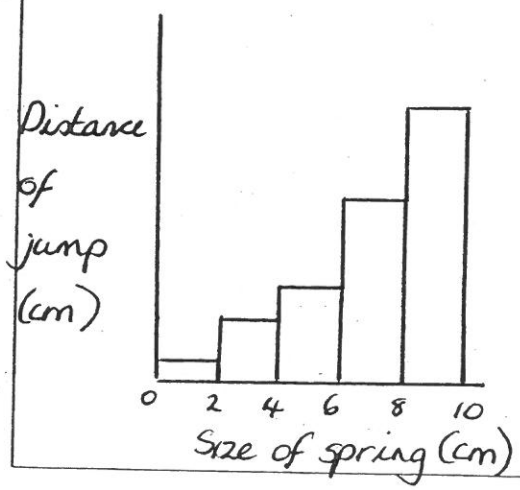
I changed Size of spring (cm)	I measured Distance of 'jump' (cm)
2	1
4	3
6	5
8	10
10	15

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar (or line)



POSSIBLE PUPIL CONCLUSIONS

'The longest spring jumped the furthest'

'The longer the spring the further the cotton reel travels because there is more upward force'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** LIGHT AND SHADOWS

INVESTIGATION WHAT AFFECTS THE SIZE OF A SHADOW?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Ask the pupils what causes a shadow and whether all shadows are the same size. What makes a shadow change in size?	bar or line	1 & 2 & 3	OHP or powerful torches, cut out shapes e.g. matchstick men, measuring tapes

BRAINSTORM

What I could change

The distance the object is from the light	The size of the object

What I could measure

The size of the shadow	

Notes:

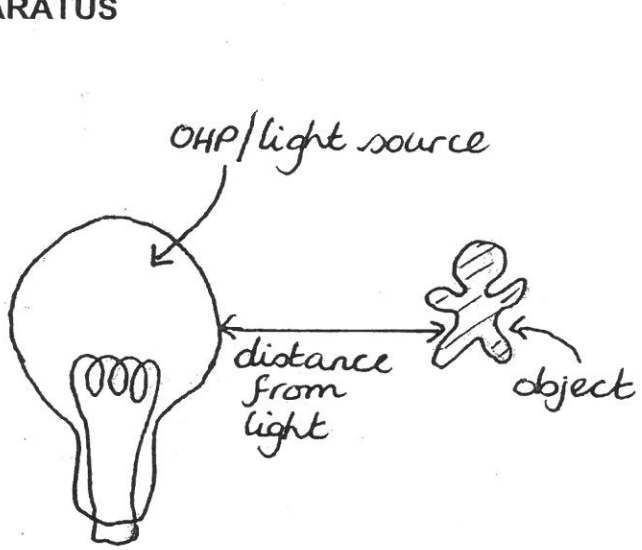
POSSIBLE VARIABLES

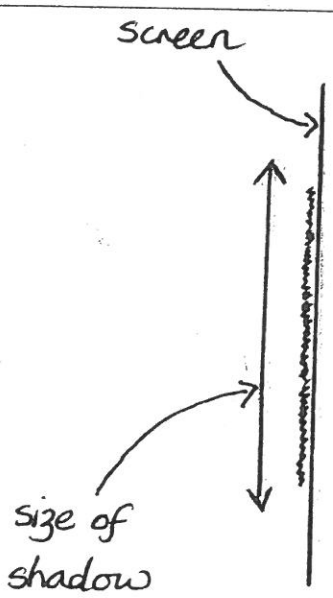
What pupils could change	What pupils could measure
Distance from light source or Size of object	Size of shadow

POSSIBLE RESULTS TABLE

I changed Distance (cm)	I measured Size of shadow (cm)
25	
50	
75	
100	
125	

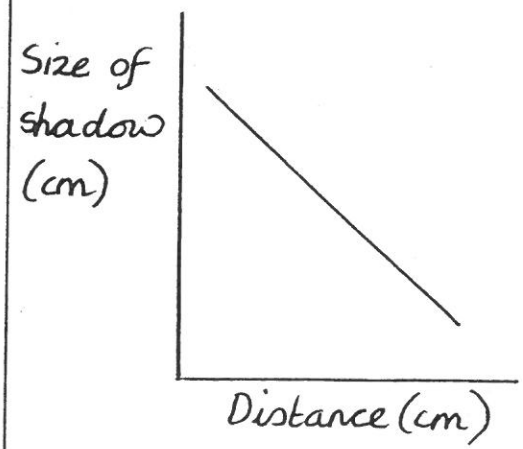
APPARATUS





POSSIBLE GRAPHS

TYPE OF GRAPH line



POSSIBLE PUPIL CONCLUSIONS

'The closer to the light the bigger the shadow'

'The shadow gets smaller when the object is moved closer to the screen'

YEAR 4 INVESTIGATIONS

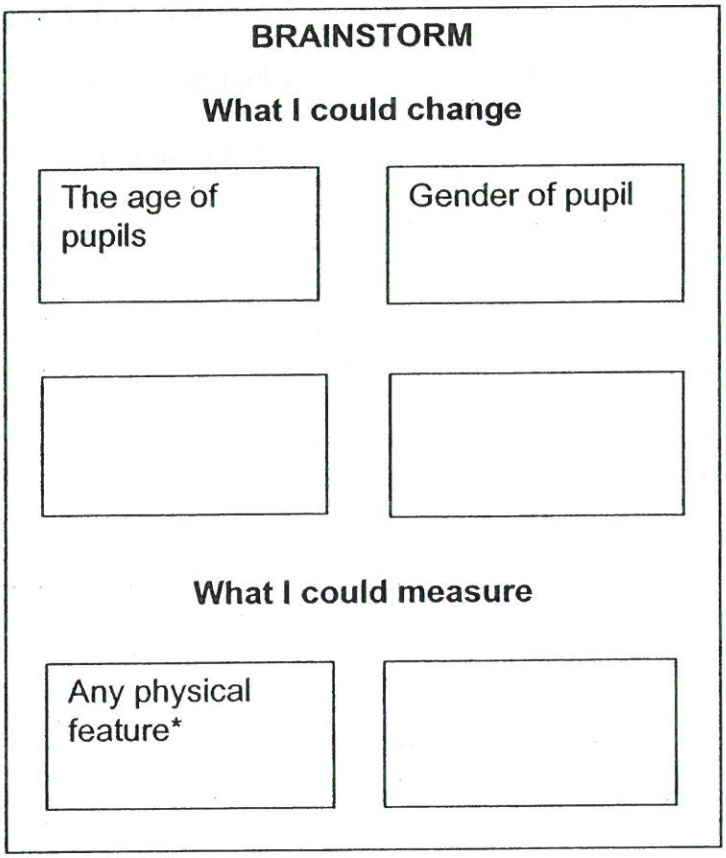
TOPIC	ATT. TARGET	INVESTIGATION
Moving & Growing	2	How do people change?
Habitats	2	Where do animals like to live?
Keeping Warm	3	How can we keep our tea warm?
Separating Materials	3	What's the best material for filtering?
Friction (solids)	4	Which surface has the most friction?
Friction (solids)	4	Which shoes have the best grip?
Friction (liquids)	4	Which is the thickest liquid?
Friction (liquids)	4	What affects the flow of liquids?
Friction (air)	4	What makes a good parachute?
Friction (air)	4	What makes paper fall faster?
Electricity	4	What affects the brightness of bulbs?

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** MOVING AND GROWING

INVESTIGATION HOW DO PEOPLE CHANGE AS THEY GET OLDER?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
What changes about us as we get older? Do all of us grow equally? Do we grow faster at some ages than at others? What ages do we grow faster at? Do boys grow as fast as girls?	bar or line	1, 2 & 3	Pupils will need to visit other classes to measure different age pupils. Measuring tapes.



Notes: Pupils could measure any physical feature e.g. height, handspan, arm/leg length, head circumference etc. Different groups could measure different features and share results at the end of the investigation.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Age of pupils year group of pupils	Any physical dimension

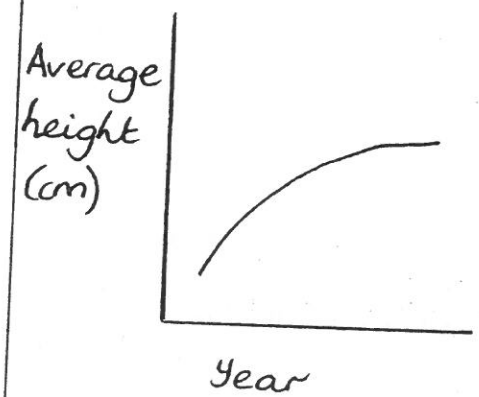
POSSIBLE RESULTS TABLE

I changed Year	I measured Average height (cm)
1	99
2	104
3	109
4	119
5	126
6	132

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'We got taller as we got older'

'Our height increases much faster than our handspan/arm length/chest as we get older'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** HABITATS

INVESTIGATION WHERE DO ANIMALS LIKE TO LIVE?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Where would you normally find woodlice/snails/maggots etc? Why are they found in these places? What attracts them to these places? What advantages do they get by living in these places?	bar	1 & 2	Plastic trays that can have different 'habitats' created on them.

BRAINSTORM

What I could change

- Different foods*
- * Different habitats
- *Different amounts of light
-

What I could measure

- The number of animals found in each habitat
-

Notes: *The 'changes' will vary according to the animal investigated e.g. for woodlice- moist, dry, light or dark conditions; for snails different foods and for maggots light and dark conditions. Use approximately 20 animals and wait at least 30 minutes for results.

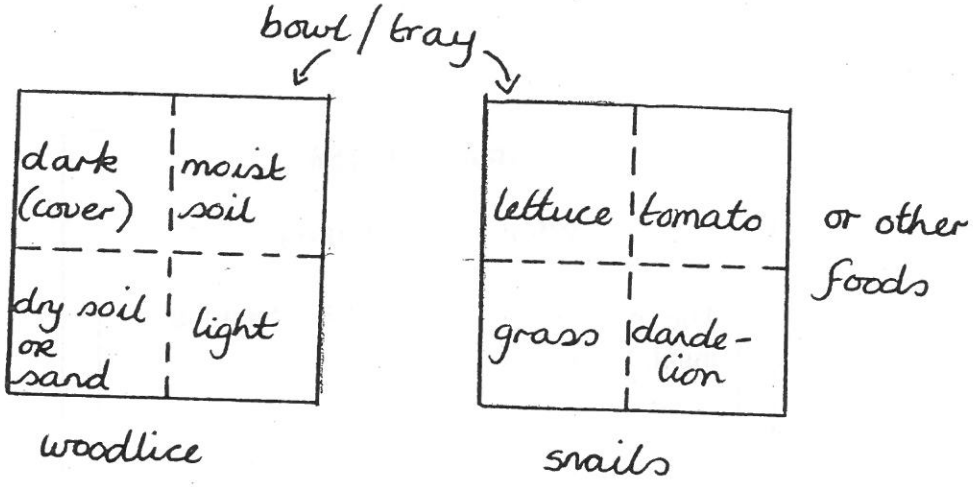
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Food OR Habitat OR Light	Number of animals found in the different conditions

POSSIBLE RESULTS TABLE

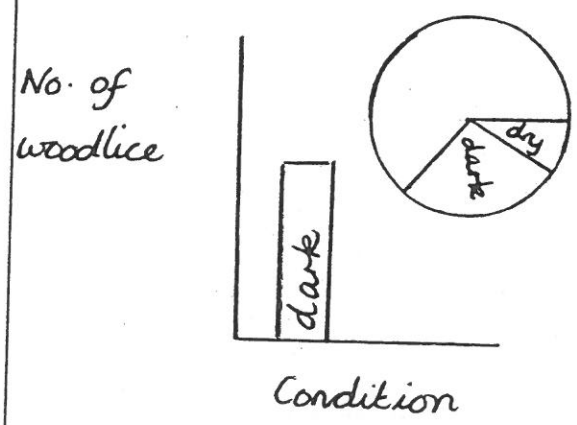
I changed condition	I measured No. of woodlice
Light	0
Dark	5
Moist	14
Dry	1

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH ~~bar (or pie)~~



POSSIBLE PUPIL CONCLUSIONS

'Woodlice prefer dark and moist conditions'

'Snails prefer to eat lettuce and don't seem to like dandelions'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** KEEPING WARM

INVESTIGATION HOW CAN WE KEEP TEA/COFFEE WARM?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
'Mrs Jones' loves a cup of coffee at break times but children are always disturbing her and she never finishes her coffee before it gets cold. How do the pupils think she could keep her coffee warm for longer.	bar or line	1,2 & 3	Disposable cups of different materials and approx. same size, a selection of insulating materials, thermometers, clock/timer

BRAINSTORM

What I could change

- The material to insulate the cup
- The thickness of the cup*
- The amount of coffee
-

What I could measure

- How much 'tea' cools in a given time
- How long it takes for the 'tea' to cool to a set temperature

Notes: The thickness of the cup can be varied increased by placing cups inside each other. SAFETY: do not use water above 60°c.

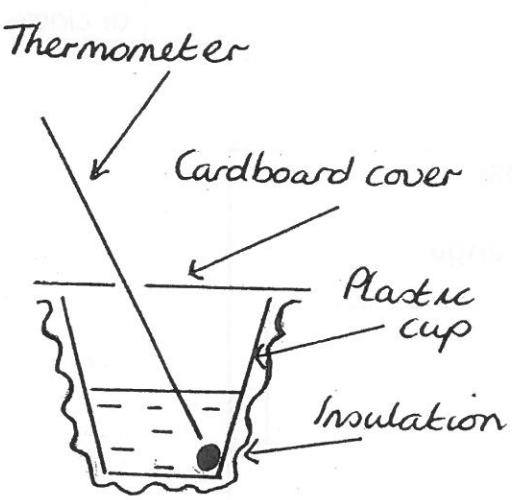
POSSIBLE VARIABLES

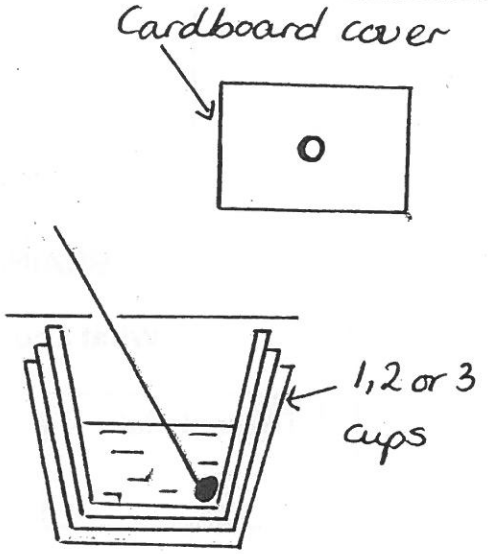
What pupils could change	What pupils could measure
Type of material OR Thickness of material	Temp. fall of water over time

POSSIBLE RESULTS TABLE

I changed		I measured	
Type of material		Temp. of water (°C)	
Wool	'Fur'	Wool	'Fur'
0 min	"	60	60
2 min	"	56	57
4 min	"	52	53
6 min	"	49	50
8 min	"	45	47

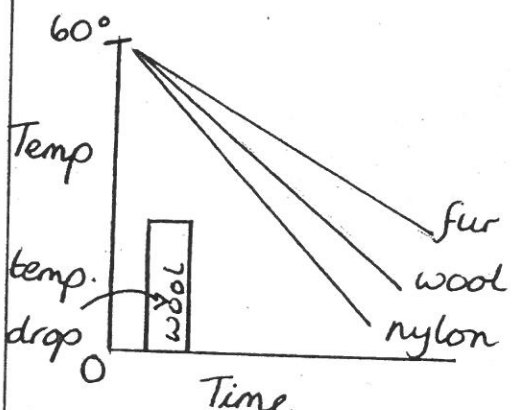
APPARATUS





POSSIBLE GRAPHS

TYPE OF GRAPH bar or line(s)



(bar - material/thickness)

POSSIBLE PUPIL CONCLUSIONS

'(Fur) is the best insulator to stop heat escaping, (nylon) is the worse'

'the more cups/thicker the insulation - the slower the water cools'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** SEPARATING MATERIALS

INVESTIGATION WHAT MATERIAL FILTERS QUICKEST?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Storms/ hurricanes have devastated an island and left the water supplies contaminated with sand. The people have to find a way to clean the water quickly. What methods could they use? What materials would be easily available to them?	bar	1 & 2	Different materials for filtering e.g. newspaper, cotton, nylon, wrapping paper etc. funnels, measuring beakers or cylinders, stopwatches or clocks

BRAINSTORM

What I could change

The material	

What I could measure

How long it takes for a fixed volume of water to pass through	How much water passes through in a given time

Notes: 'Dirty' water can be made by mixing sand and water. The investigation is testing which is the fastest filter not which cleans the water the most thoroughly. This will need to be discussed with the pupils at the end of the investigation.

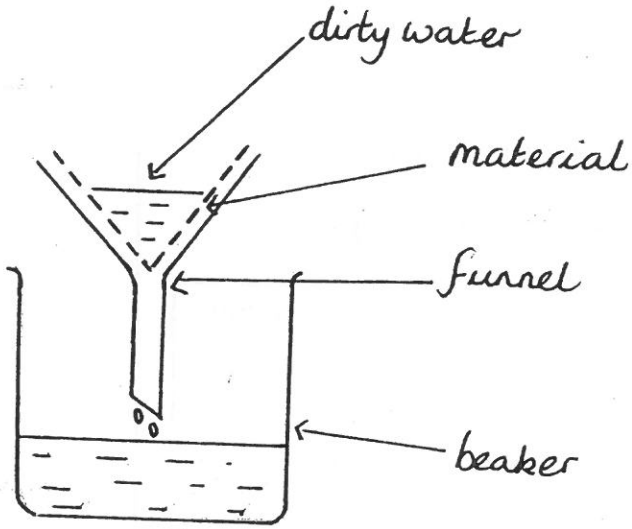
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Type of material	How long it takes for a fixed volume to pass through OR How much in a given time

POSSIBLE RESULTS TABLE

I changed Material	I measured Time for 100cm³ to pass thragh
Cotton	45
Nylon	33
Newspaper	72
Wool	18

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar

POSSIBLE PUPIL CONCLUSIONS

'Nylon would be the best filter because its faster. Newspaper would take too long'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** FORCES- FRICTION

INVESTIGATION COMPARING THE FRICTION OF DIFFERENT SURFACES

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Show the children pictures of building such as the pyramids, old castles etc. Ask pupils how they think the stones were moved into place. Why was it so hard? What might have made it more difficult to move the stones (friction)? Do all surfaces have the same friction? Would the angle of the ground make a difference?	bar or line	1,2 & 3	Housebricks with string attached, a variety of surfaces, forcemeters (range 0-15 or 0-30N suitable)

BRAINSTORM

What I could change

The surface	The angle of the slope

What I could measure

The force needed to move the brick	

Notes: The angle of the slope can be changed by placing books underneath.

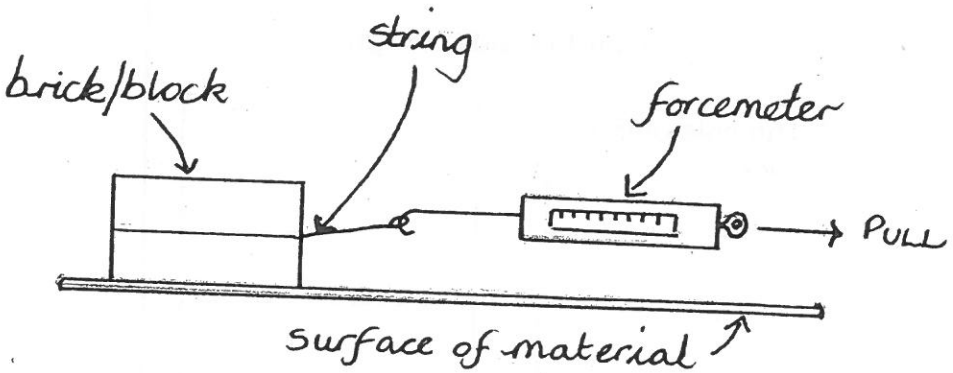
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Type of surface	Force required to move the brick

POSSIBLE RESULTS TABLE

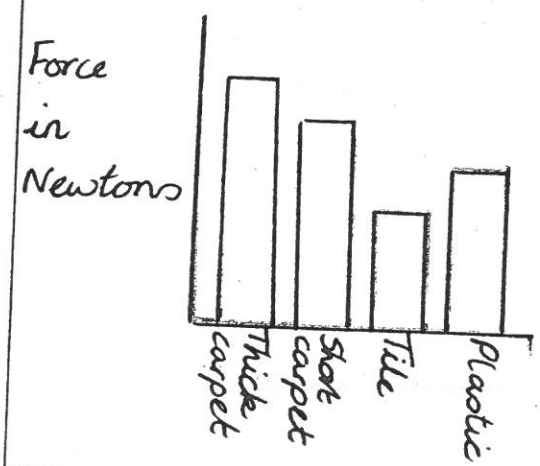
I changed	I measured
Surface	Force to move (Newtons)
Thick carpet	55
Short carpet	45
Tile	24
Plastic	35
Sand	60

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'The brick moved easiest on the tile - it was the most slippery'

'Tiled surfaces have the least friction - sand has the most'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** FORCES- FRICTION

INVESTIGATION WHICH SHOES HAVE THE BEST GRIP?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
My niece/nephew likes to play outside all through the year. Unfortunately during the winter he/she keeps on falling over. His/her mother says that it is because they are wearing the wrong shoes and the ground is too slippery. What do the pupils think? Are some shoes more/less slippery than others? How can they test their ideas?	bar	1 & 2	A variety of different soled shoes/trainers a consistent test surface, forcemeters

BRAINSTORM

What I could change

The sole of the shoes	

What I could measure

The force needed to move the trainer	

Notes: The shoes may need to be placed on an inclined surface in order to obtain sensible readings.

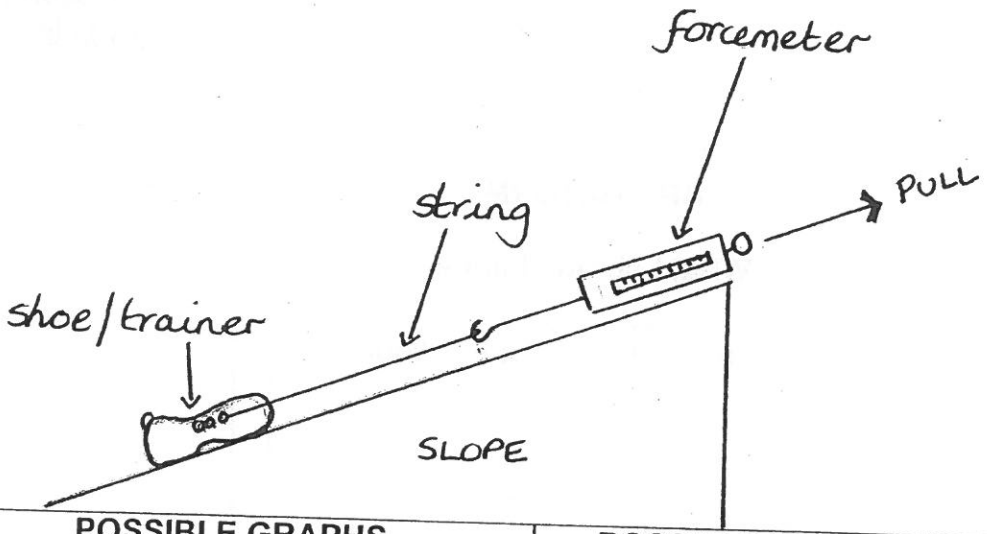
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Types of shoe/ trainers	Force needed to move the shoe (measured with a forcemeter)

POSSIBLE RESULTS TABLE

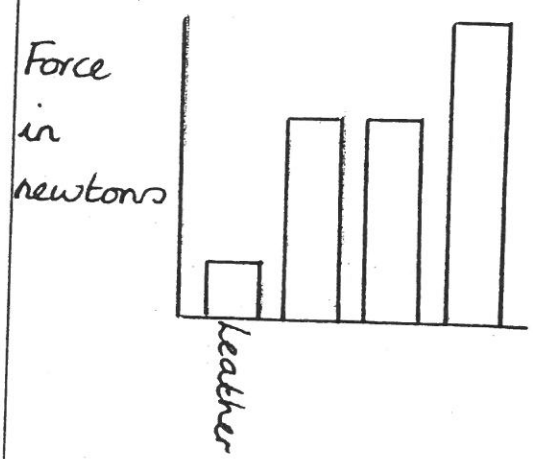
I changed Shoe	I measured Force to move (Newtons)
Leather sole	10
'Nike' trainers	35
'Adidas' "	35
Football shoes	50
Squash trainers	30

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'Football shoes have the best grip - they were hardest to move'

'Football shoes have the most friction - leather soles the least'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** SOLIDS, LIQUIDS AND GASES

INVESTIGATION WHAT AFFECTS THE FLOW OF LIQUIDS

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Are all liquids the same? Do they behave in the same way? Have the children ever poured oil/treacle? How is it different from pouring water? How can we test what affects the way that liquid flows?	1, 2 & 3	bar or line	Suitable ramp to pour liquid down, a variety of liquids of different consistencies, e.g. oil, treacle, water, washing up liquid, stopwatches, measuring cylinders

BRAINSTORM

What I could change

Thickness of liquid	Type of liquid
Amount of liquid	

What I could measure

Time liquid takes to travel down slope	

Notes: The liquid can be watered down by adding different measured amounts of water to it.

POSSIBLE VARIABLES

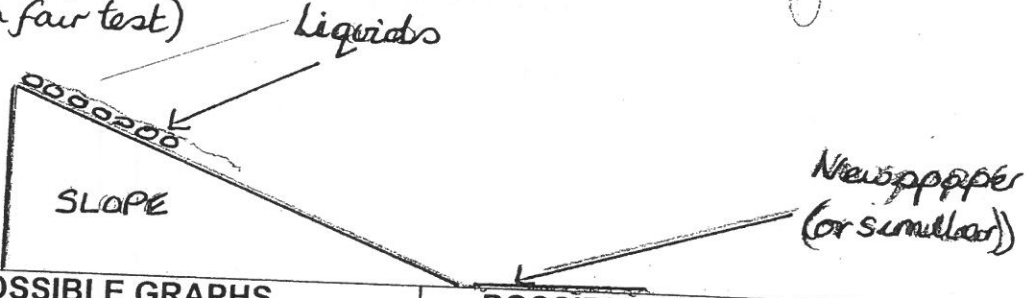
What pupils could change	What pupils could measure
Thickness of liquid OR Type of liquid OR Amount of liquid	Time liquid takes to travel down slope

POSSIBLE RESULTS TABLE

I changed	I measured
Amount of liquid (ml)	Time to travel down slope
5	
10	
15	
20	
25	

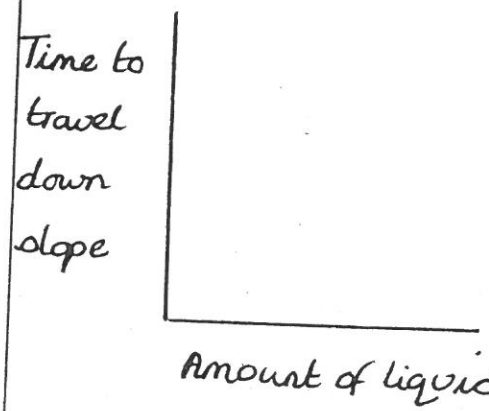
APPARATUS

NB Pupils should drop liquid from the same place on the slope (for a fair test)



POSSIBLE GRAPHS

TYPE OF GRAPH bar or line



POSSIBLE PUPIL CONCLUSIONS

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** FORCES- FRICTION

INVESTIGATION IS IT EASIER TO SWIM/FLOAT IN SOME LIQUIDS THAN OTHERS?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Some people think it is easier to swim/float in the sea than in a swimming pool. Even non-swimmers seem to stay afloat in the Dead Sea in Israel. How is this possible? Are all liquids the same or are some thicker than others? How can we test this? OR Some liquids are most likely to block up pipes in a factory? How can we test which liquids will pass through the pipes more easily?	bar	1 & 2	A variety of liquids of different viscosities, 10 or 20cm syringes, beakers, test tubes, stopwatches, glass/metal marbles

BRAINSTORM

What I could change

The liquid	

What I could measure

How long it takes for a given volume to pass through an empty syringe	How long it takes a glass marble to pass to the bottom of a test tube of liquid

Notes:

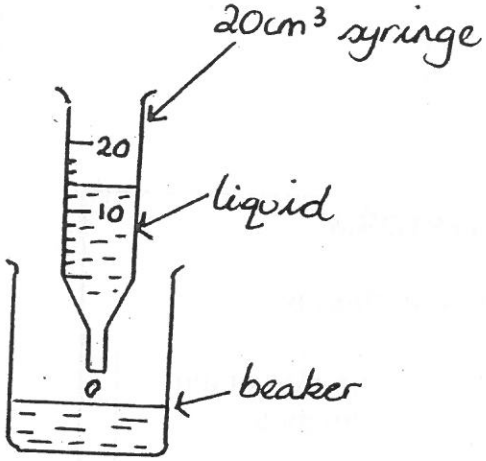
POSSIBLE VARIABLES

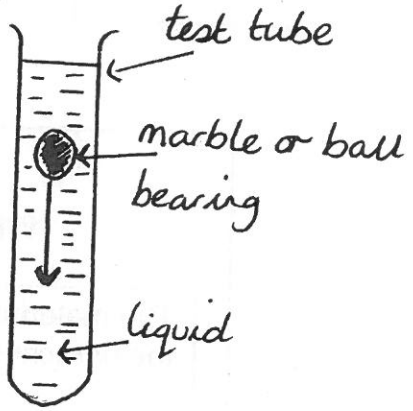
What pupils could change	What pupils could measure
Type of liquid	Time to pass through a syringe OR Time for marble to pass through liquid

POSSIBLE RESULTS TABLE

I changed	I measured
Type of liquid	Time to pass (secs)
Water	12
Olive oil	25
Washing-up liquid	32
Honey	73
Wallpaper Paste	80

APPARATUS

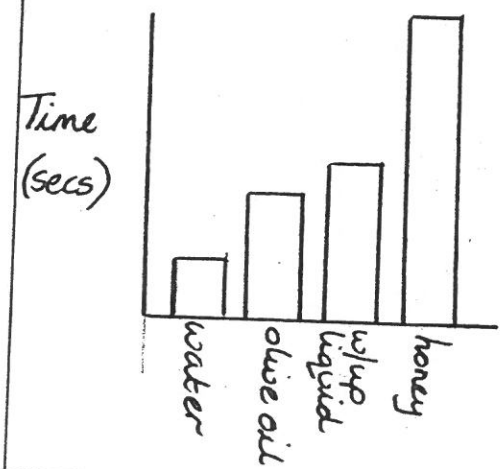




OR use long glass/ plastic tube

POSSIBLE GRAPHS

TYPE OF GRAPH bar



POSSIBLE PUPIL CONCLUSIONS

'Honey took the longest time as it was the thickest'

'The thicker the liquid, the longer it took'

'Water is the thinnest liquid, honey the thickest. Honey would block up pipes more easily'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** FORCES- FRICTION

INVESTIGATION WHAT MAKES A GOOD PARACHUTE?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Why do parachutes slow parachutists down? Do all parachutes look the same? Are they all made of the same material? Are they all the same size? How do the pupils think they could test which is the best parachutes?	bar or line	1, 2 & 3	A selection of different materials, rulers/tapes, scissors, string, wool or cotton, weights, a convenient (and **safe**) dropping area, stopwatches

BRAINSTORM

What I could change

The material of the parachute	The size of the parachute
The shape of the parachute	

What I could measure

How long it takes for the parachute to fall	

Notes:

POSSIBLE VARIABLES

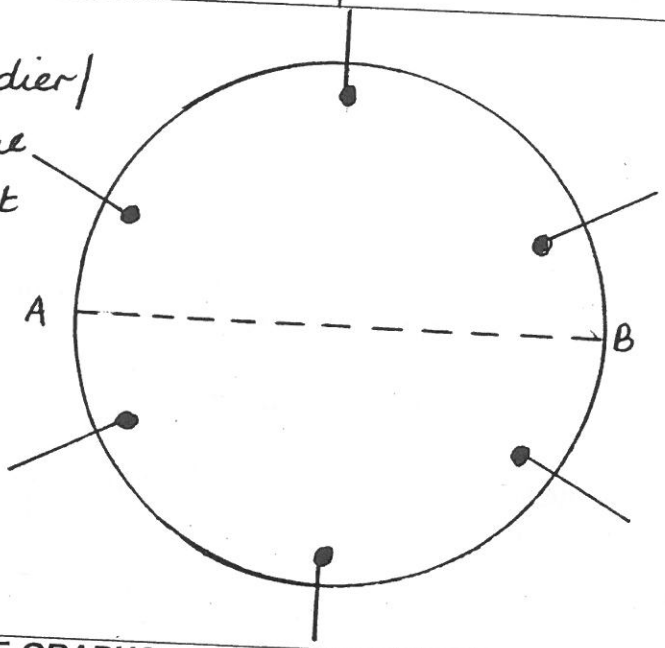
What pupils could change	What pupils could measure
parachute material OR parachute size OR parachute shape	Time to fall to ground (from a fixed height)

POSSIBLE RESULTS TABLE

I changed size (diameter) cm.	I measured Time to fall secs.
5	2
10	3
15	5
20	7
25	8

APPARATUS

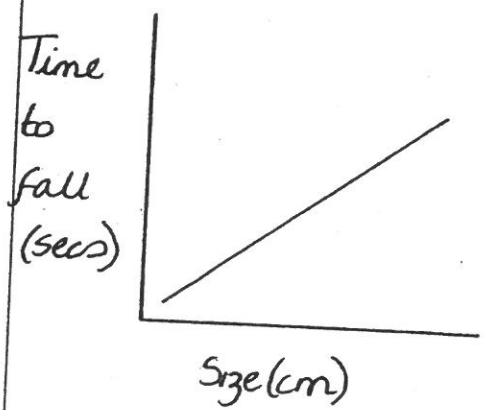
Attach toy soldier/ plastecine/blue tac as weight



Pieces of thread should be twice A-B measurement

POSSIBLE GRAPHS

TYPE OF GRAPH bar or line



POSSIBLE PUPIL CONCLUSIONS

'The biggest parachute took longest to fall'

'The bigger the parachute the longer it takes to fall - this is because bigger parachutes have more air friction/resistance'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** FORCES- FRICTION

INVESTIGATION WHAT MAKES PAPER FALL FASTER?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Remind children of the work on air resistance and ask them to explain how air resistance slows things down. Link to parachutes and the way they work. What do pupils think could change the speed that paper falls to the ground? How can they test their ideas?	bar or line	1, 2 & 3	Different sized pieces of paper, card of the same size but different thickness, same sized paper for folding, screwing up etc, metre sticks, stopwatches.

BRAINSTORM

What I could change

The thickness of the paper	The size of the paper
The shape of the paper	

What I could measure

How long it takes for the paper to fall	

Notes: Pupils often find timing difficult during this investigation but can identify results that appear 'wrong'. They can give reasons for unexpected results.

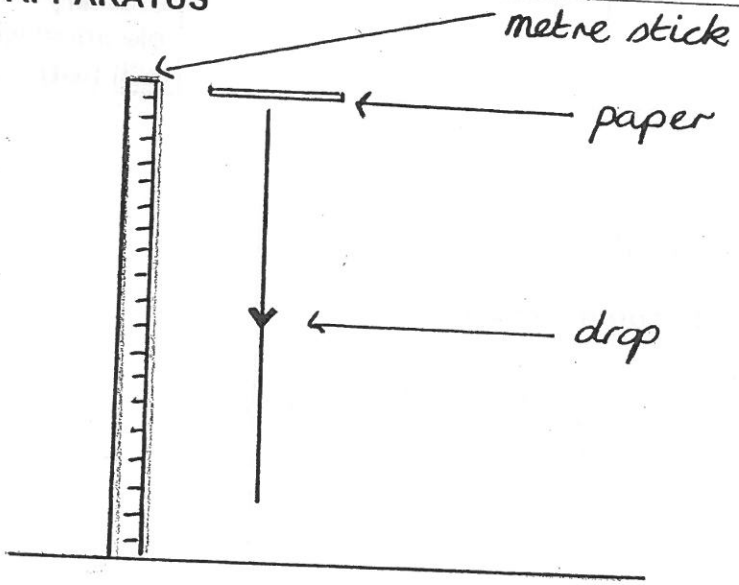
POSSIBLE VARIABLES

What pupils could change	What pupils could measure
Thickness of paper OR Size of paper OR Shape of paper	How long it takes for paper to fall

POSSIBLE RESULTS TABLE

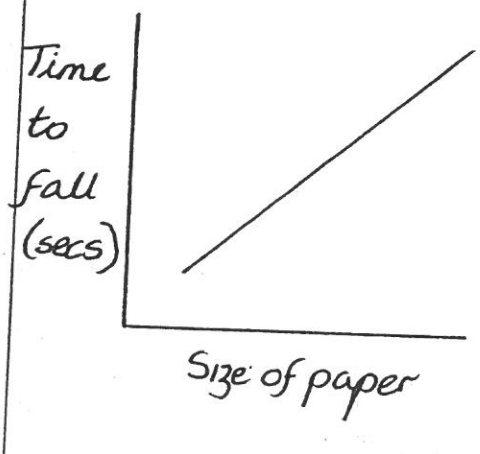
I changed Size of paper (cm^2)	I measured Time to fall
10	1
20	3
30	3.5
40	4
50	4.5

APPARATUS



POSSIBLE GRAPHS

TYPE OF GRAPH bar or line



POSSIBLE PUPIL CONCLUSIONS

'The small paper took less time to drop'

'The larger the paper the longer it took to fall'

'The smaller the paper the less time it took to fall as it has less air resistance/friction'

SCIENCE INVESTIGATIONS FOR PRIMARY SCHOOLS

KEY STAGE 2 **TOPIC** CIRCUITS AND CONDUCTORS

INVESTIGATION WHAT AFFECTS THE BRIGHTNESS OF BULBS IN A CIRCUIT?

SCENE SETTER	TYPE OF GRAPH POSSIBLE	1. WORDS/WORDS 2. WORDS/NUMBERS 3. NUMBERS/NUMBERS	RESOURCES REQUIRED
Are bulbs always the same in a circuit? Have you seen/used a dimmer switch? What does it do? What about the brightness control on the T.V. What do you think might affect their brightness? How can we test our ideas?	1, 2 & 3	bar or line	Batteries, bulbs, wires, ammeters. (Different lengths of high resistance wire will affect the brightness of bulbs- ordinary electrical wire **will not**)

BRAINSTORM

What I could change

- Number of bulbs
- Length of wire
- Voltage of battery
- Number of batteries*

What I could measure

- The brightness of the bulb (observation)
- The current in the circuit (use ammeters)

Notes: Ammeters can be borrowed from the local comp. If the voltage or number of batteries are changed then the bulbs are likely to blow! If you budget doesn't stretch to this then divert pupils from this investigation giving appropriate reasons.

POSSIBLE VARIABLES

What pupils could change	What pupils could measure
No. of bulbs OR Length of wire OR Battery voltage OR No. of batteries	Brightness of bulb OR Current reading on ammeter

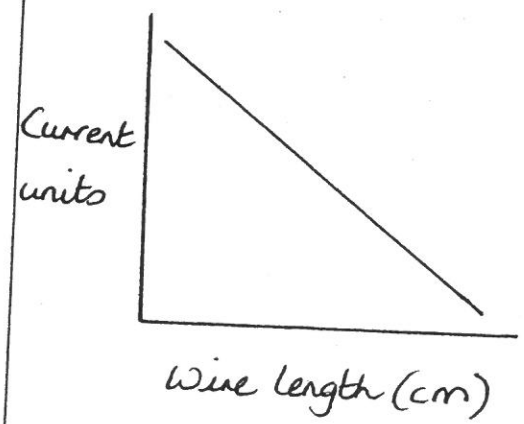
POSSIBLE RESULTS TABLE

I changed Length of wire (cm)	I measured Current - ammeter reading
10	18 units
20	14 "
30	10 "
40	7 "
50	3 "

APPARATUS

POSSIBLE GRAPHS

TYPE OF GRAPH line



POSSIBLE PUPIL CONCLUSIONS

'The reading gets less as the wire gets longer'

'As the wire gets longer the current falls'