



Examples of Work
Lucas

**Properties and changes of materials - Year 5** 









Topic Year 5

Properties and changes of materials

#### Focus of assessment (National Curriculum statements)

Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.

#### Description of activity

As an initial activity to recall their previous learning about materials, the pupils were taken on a tour of the school building, identifying different materials used for different purposes and why they were appropriate.

	EVIDENCE OF LEARNING	Assessment
Oral evidence	Examples of work	Knowledge
Teacher observations	Material type Where did you see it?  Clay/Bricks Clay/	Lucas identifies a number of different materials – clay, bricks, steel, rock, metal and plastic – and uses some properties to describe them – strong, does not decay, does not rust. The scaffolded approach to recording here limits his capacity to demonstrate the full range of materials and properties that he may be familiar with.  Working scientifically



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#### Description of activity

As a class, the pupils discussed the materials identified in the first lesson and why they were fit for purpose. They were then asked to select materials to write about stating why they were used for a particular purpose based on their properties.

	EVIDENCE OF LEARNING	ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations  The writing about rubber shows an understanding of friction.  In Year 5, it would be expected for Lucas to use the word 'transparent' rather than 'seethrough' when describing glass.	Steel:  Steel is a great material for bikes is made in a tube shape because it is guite lithely and it is very stoma. Steel can rusk wit comes in contact.  with water yor along time. Steel can be used for buycle st grames wheel rods and baskets and spotes.  Rubber is an ideal material for bike wheels these wheels are filled up with air. They are called oneumatic times. Is wheels are cover in Rubber it gives you a smooth ride and alones you to broke easily on ust or dong surgeres. The rubber grips on modes and congromente so you don't slide.  Windows  Glass is is a great material for windows because you can see thorugh the windows and it alones light to pass through it Thiss is stong; however, it has the potential to break is any pressure is applied to it Glass is waterproof and it is not a brookent.	This writing shows that Lucas draws on a range of properties when describing the materials and can link these to a particular use. He is secure in the knowledge objectives from previous year-groups about materials and their properties.  Working scientifically



# Focus of assessment (National Curriculum statements)

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.

# Description of activity

The pupils were given four bags to handle and asked to think about which would be the best to recommend to Mr Bryant, a store manager, who wanted to purchase new carrier bags.

	EVIDENCE OF LEARNING					
Oral evidence	Examples of work	Knowledge				
	Prediction:  I think that bag D is the best bag for Mr Bryant because it is quite sleable and it sits alot of objects.  It will last a long time and it has comfortable handles that don't sut into your hands. It is durable and it can stretch. It can sustain alot of weight.	Lucas identifies and considers a range of properties that are important when making a plastic bag – flexibility, durability, stretchiness and ability to hold weight.				
Teacher observations	and a second of the second of	Working scientifically				
Lucas uses some key property vocabulary and shows his understanding of these in relation to the use of the bag.						
The key vocabulary 'strength' is missing.						



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# Description of activity

The pupils were shown a method to test carrier bags. The bags were hung on a round coat peg that had modelling clay smoothed over it. A heavy weight was added to the bag. The extension of the handles was measured and the depth of the indent in the modelling clay.

	ASSESSMENT					
Oral evidence	Oral evidence Examples of work					
Teacher observations	RESULTS TABLE  Record your results in this table.  Type of bag How far did the handle cut into the modeling clay? Measure in millimetres (mm)  Bag A OSM Spring The handles got smaller  Bag B Grun 7 The handles got smaller  Bag C 3 Man The bag hardle did this bag  Which carrier bag would you recommend?  Why because notwers that the bag hardle did this bag  Which carrier bag would you recommend?  Why because notwers that handles?  It which bag is the strongest but marks your hands the least?  What do you notice about the handles?  all of the bags made of plantic their handles stretched.  Are they of a particular design?  They are bags you like a All of the bag of handles the bag of the bags made of plantic their handles stretched.  What do you notice about the handles?  all of the bags made of plantic their handles stretched.  What was a hard you hand sharp bags are bags are be strong and as much.  5 Must there be a compromise between strength and comfort?  No. Estates a hard as much.	Working scientifically  Through the structured questions, Lucas has analysed his results and identified the implications of his findings in terms of the use of the bags.				



# Focus of assessment (National Curriculum statements)

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.

# Description of activity

To consolidate their learning, the pupils were asked to write a letter to Mr Bryant to explain why they would recommend their chosen bags based on their evidence.

	EVIDENCE OF LEARNING	ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	Having completed our test we have sound that bag D would be the best for you because it can hold heaver winghts. In our test we bag D had the smallest imprint (Imm) this means that your elderly and young customers can carry heaverfoods for a long distance without the bag cutting in the hand. I is durable and for slexible meaning the leagean hold numerous items and objects. The handle is comfortable when carrying goods. Meanwhile, in our lest not we sound that the other ordinary plustic bags a more likely to brake and they have a pretty small mass. It is not likely to tear or brake. Well done Can approximate what the word durable means to be long will last along time and it doesn't wear down	Ucas uses the appropriate vocabulary to describe the properties.  Working scientifically  The conclusion letter uses evidence collected from the investigation to support his recommendations.



Fopic Properties and changes of materials

#### Focus of assessment (National Curriculum statements)

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.

# Description of activity

The teacher presented the pupils with the problem of selecting the most suitable material to keep his drink warm. They were given a range of materials to handle and consider as possible options. The vocabulary 'thermal insulator' was introduced to the pupils.

	EVIDENCE OF LEARNING	ASSESSMENT
Oral evidence	Examples of work	Knowledge
Oral evidence  Teacher observations	Dediction:  Prediction:  Think that the paper sell will be the best thermal insulator because the material is quite dense and it has sever holes which means that less warmth will escape. This is called energy transfer. This also means that the temperature of the air inside the can will stay that the temperature of the air inside the can will stay.	This prediction shows that Lucas understands that a thermal insulator will keep the liquid warm for longer but that, if left for a long period of time, it will still cool to room temperature.  Working scientifically
	temperature will drop to room temperature. Compared to the other materials, selt is normally warm and is strong. It is made of wood unlike the other materials.	



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# Description of activity

As the teacher wanted to focus the lesson around writing a conclusion, the pupils were given a method to follow and a table to complete. They were then asked to share and compare their results with a group who had tested different materials.

EVIDENCE OF LEARNING								ASSESSMENT				
Oral evidence		Examples of work						Knowledge				
"The temperature loss for both our materials was quite similar whereas for your tin foil the				-	Number	Time of minute	s after the s	start			Total temperature loss (°C)	
temperature loss was much bigger. Tin foil is not a good thermal insulator."	Temperature (°C) of	Start 39°C	5 40°c	10 39°c	15 38°C	20 36°C	25 35°c	35°C	35°	33%	6°C	
Teacher observations	Temperature (°C) of water  Discuss your results with Draw a line graph to sho	38°C	41°C	39%	37°C	36℃	350%	34°c	34°C	3 <b>3°</b> c	X°C S	Working scientifically  Lucas compares the results from different groups and uses his knowledge of thermal insulation to explain the differences.



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materials

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# Description of activity

As the teacher wanted to focus the lesson around writing a conclusion, the pupils were given a method to follow and a table to complete. They were then asked to share and compare their results with a group who had tested different materials. (Continued from the previous page.)

	EVIDENCE OF LEARNING							
Oral evidence	Examples of work	Knowledge						
Teacher observations	GRAPH SHOWING WHICH MATERIAL IS THE BEST THERNAL INSULATOR  = FELT  SO  45  45  40  55  65  65  65  65  66  75  76  76  76	Working scientifically  Lucas draws and labels the axes, adds the scale and plots the points on his line graph. He adds a key to identify the materials and a title.						



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# Description of activity

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	EVIDENCE OF LEARNING					
Oral evidence	Examples of work	Knowledge				
	Think that the bubble wrap was the best thermal insulator because it Kept the water warmer for a bigger period of time. Our results show that the water temperature stayed higher for over a period of 40-mins and it Kept the water temperature at 37°C.	Lucas uses his understanding about thermal insulators to explain his findings.				
Teacher observations	Empared to the other material, the pubble wrop has	Working scientifically				
This response to the marking question shows that Lucas recognises that felt is also a good thermal insulator.	Small air pockets which helps to keep the warm air inside the can. Acording to our resold resolts the bubble wrap is a better thermal insutation than felt.  Well done Markets - Well done Markets - What other materials do you think would make good thermal insulation? Felt because it is made of yould	Lucas writes a conclusion based on the evidence gathered.				



Year 5

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# Description of activity

First, the pupils had a little instant snow on their hands and they were amazed at how this changed when drops of water were added. They were then asked to investigate systematically by adding 5ml of water at a time and measuring the height of the 'snow' in a beaker.

	ASSESSMENT	
Oral evidence	Examples of work	Knowledge
	ml.   5   10   15   20   25   30   35   40   45	The observation comments show good use and understanding of scientific vocabulary.
Teacher observations	height 26mm 34mm 51mm 57mm 65mm 70mm 76mm 84mm 92mm of snow.  Observation Typew _ > There was still	Working scientifically
Lucas uses appropriate vocabulary from Key Stage 1 without prompting.	Observation Therew allot It absorbed ald of water when the water of the near point	



# Focus of assessment (National Curriculum statements)

Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.

# Description of activity

The pupils were asked to write a conclusion based on their observations and measurements from their investigation.

	EVIDENCE OF LEARNING							
Oral evidence	Examples of work	Knowledge						
Teacher: "What could this be used for?"  Lucas: "It would be really good to have this inside a cloth that you were using to dry something."  Teacher observations	In our investigation the gound out that the more water you added the more the polymer open in terms of volume. The polymer didn't reach saturation point but the polymer started to look like very wet snow or transparent jelly. When I added 5ml it reached 26 mm. By the time I added 45ml it reached 92mm. The reason I thought this happened was because it absorbed the water.	This investigation again shows that Lucas uses evidence from a comparative test to give reasons for the uses of a particular material.  Working scientifically  Lucas writes a conclusion based on both his observations and measurements.						



Year 5

Topic

Properties and changes of materials

# Focus of assessment (National Curriculum statements)

• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

#### Description of activity

This was an introductory activity to the work on dissolving. The pupils placed Skittles sweets on a shallow layer of water on a plate and observed the effect over time.

	EVIDENCE OF LEARNING	ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Lucas shows an understanding of the process of dissolving. He uses the term 'dissolve', although it has not been explicitly taught.
Teacher observations		Working scientifically
	Conclusion:  I sound out that as soon as a put the stitles in the water the colour started to instantly blood out. The sugar bits were braking apart. It you let the skattes in the water over night the sugar with eventually disolve and it will become a solution of sugar, food colouring andwater.	



# Focus of assessment (National Curriculum statements)

Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

# Description of activity

The pupils first explored the contents of a mixture and were then shown the resources they would be able to use to try and separate it. Before starting, they recorded their plan.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"Our first sieve separated the rice and lentils from the sand and salt. We then made the holes a little bigger to separate the lentils and rice."	I think that we will be able to separate the pasta using our hands because they are quite big. We can separate the paperclips using a magnet because they are made of metal however the sand and salt are the same size so it will be impossible to separate them, rice is easy because you can use a sieve and lentils using the same tecquique	This plan shows that Lucas is already aware of some separating techniques – using a magnet and sieves.  At this stage, Lucas is not secure on how to separate a soluble and insoluble material.
Teacher observations	Pasta=We got it out withour gargers  Paperdips=We took it out with the magnet  Rice=Sieve  Lentils=Sieve  Sand/Salt=It is impossible to separate them.	Working scientifically



Topic Properties and changes of materials

# Focus of assessment (National Curriculum statements)

• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

# Description of activity

The pupils were shown the materials that they would be adding to water and asked to select one that they thought would dissolve and one that they thought would not dissolve. They were then asked to write a couple of sentences to justify their thinking.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	I think that the sugar will disolve because it is solved and will disolve into a solution. I think this because when I make correct for my mum. I put some sugar and it dissolve. I think that green tea leaves will not disolve because it is insolvable and it will make a mixture, the leaves will gall to the bottom and the water will get colour	This writing shows that Lucas has a good understanding of the key vocabulary shared by the teacher – 'dissolve', 'soluble', 'insoluble', 'solution', 'mixture'.  Working scientifically



Properties and changes of materials

# Focus of assessment (National Curriculum statements)

• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.

#### Description of activity

The pupils mixed a range of solids with water and observed what happened. They used key vocabulary to describe their observations and draw conclusions.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	Bath Salt-Har disolved it turned blue as soon as it hit the water. It didnot help stirring  Flour= It didnot he glour would have been gloubing. The glour sunk to the bottone  Coffee= It all completely dissolved it helped stirring. The water becare brown inediately  4= Green tea = It has coloured the water green, the leaves are youting I sunk. As soon as it hit the water it sunk and turn green.  6= Bicorbonate of Sada - Turned grey once in water completely disolves, disolved as soon as it gled in the water  6= Brown sugar= Dissolved completely. I didnot change straight away = It helped stirring. Nothing happened inidually it slowly became golden  Conclusion: I gound out that.  Not all the solids dissolved, they coloured the water and sor of them dissolved e.g. bicarloonate of social sugar, bath salt, og the glove sunk and the your at the bottom looked and set like dough. The bath salt slowly coloured the water and there a a couple they lumps of both salt at the bottom that hadnot dissolved.	Lucas is consistently using the key vocabulary – 'dissolved'.  Working scientifically  Lucas uses his observations to explain which materials dissolved and which didn't.



opic Properties and changes of materials

# Focus of assessment (National Curriculum statements)

Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.

# Description of activity

The pupils were provided with a range of materials to use as filters in order to try to separate a mixture of solids in water.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	Prediction: How can we purisy materials?  Prediction:  I think that we can purisy a material buy Usina, several silterina stages which will catch some of the unwanted solids from the mixture. The solitids that have dissolved in the water will get passed through the degreent silters. We have 3 degreent silters, the first one is netting either which will hopefully catch all of the bigs solids that have not clissolved in the water. The 2nd stage is hessian and the last silter is insulation self. The way to recover the salt that dissolved in the water is by evaporation	This writing shows that Lucas has a good understanding that multiple filters can be used to separate solids of different sizes.  He also understands that filtering cannot be used to separate a solid that has dissolved. He now knows that this will need to be done by evaporating the water away.  Working scientifically



# Overall summary

# Secure

Lucas compares everyday materials by observing their properties. He suggests materials appropriate for particular uses based on their properties and the results of comparative tests. Lucas makes observations of dissolving and investigates the separation of solids from liquids using filters, sieves and evaporation.

#### NB

These examples do not cover all the Year 5 materials objectives as the teacher chose to teach objectives relating to reversible changes and changes that produce new materials in a separate unit.