PLAN
Planning for assessment

Examples of Work

Lucas

Properties and changes of materials - Year 5

Primary Science
Education Consultancy

THE
Partnership

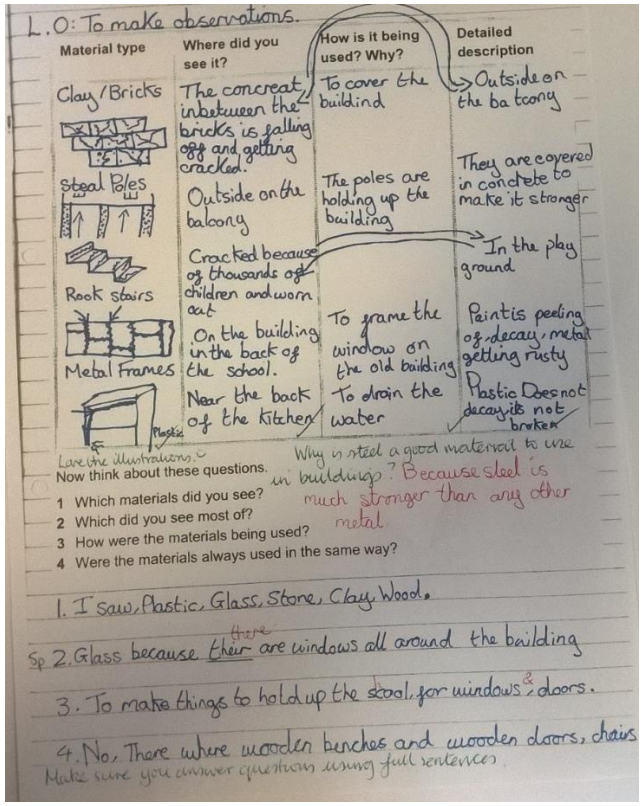
Year	5	Topic	Properties and changes of materials

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
		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.
Teacher observations		Working scientifically

Year	5	Topic	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 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

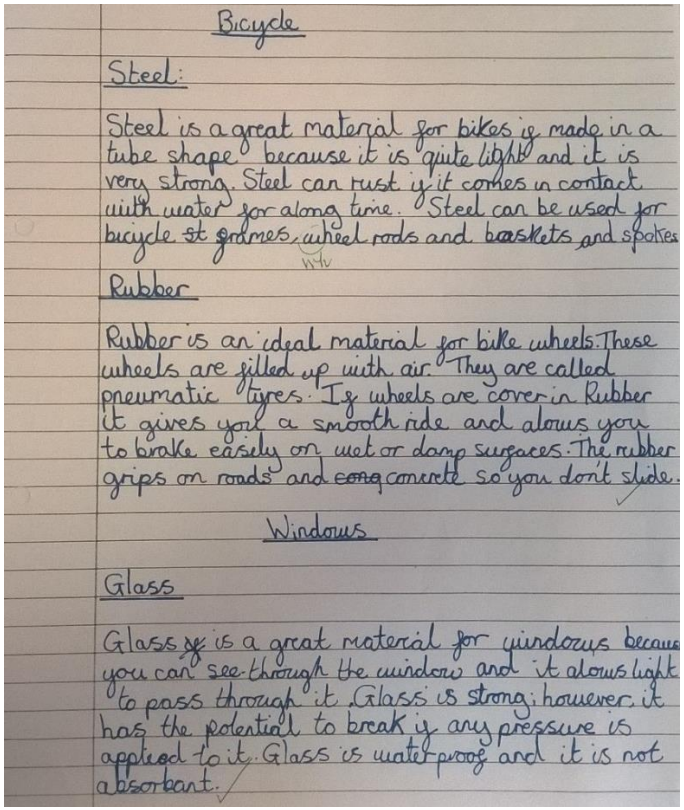
Oral evidence

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 'see-through' when describing glass.

Examples of work



Bicycle

Steel:

Steel is a great material for bikes is made in a tube shape because it is quite light and it is very strong. Steel can rust if it comes in contact with water for along time. Steel can be used for bicycle st frames, wheel rods and baskets and spokes

Rubber

Rubber is an ideal material for bike wheels. These wheels are filled up with air. They are called pneumatic tyres. If wheels are cover in Rubber it gives you a smooth ride and alows you to brake easely on wet or damp surfaces. The rubber grips on roads and concrete so you don't slide.

Windows

Glass

Glass is a great material for windows because you can see through the window and it alows light to pass through it. Glass is strong; however, it has the potential to break if any pressure is applied to it. Glass is waterproof and it is not absorbant.

ASSESSMENT

Knowledge

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

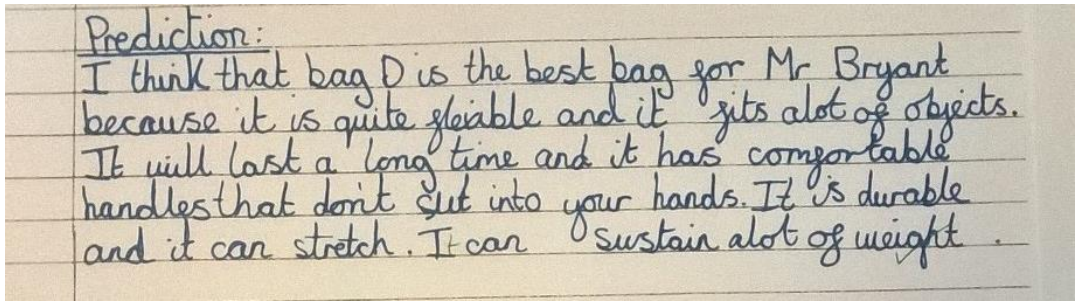
Year	5	Topic	Properties and changes of materials

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 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		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 Prediction: I think that bag D is the best bag for Mr Bryant because it is quite flexible and it fits alot of objects. It will last a long time and it has comfortable handles that don't cut 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		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.		

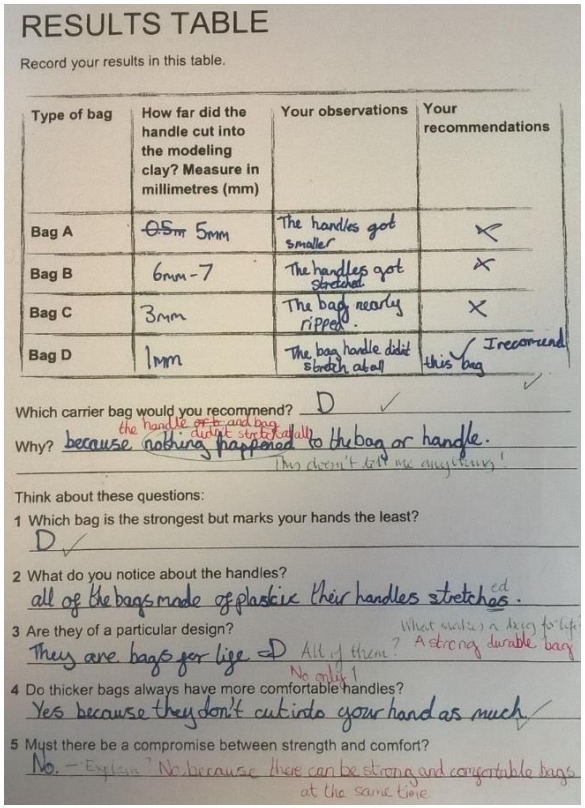
Year	5	Topic	Properties and changes of materials

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 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.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		
Teacher observations		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.

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)	Your observations	Your recommendations
Bag A	~~05m~~ 5mm	The handles got smaller	✗
Bag B	6mm-7	The handles got stretched	✗
Bag C	3mm	The bag nearly ripped.	✗
Bag D	1mm	The bag handle didn't stretch at all	✓ I recommend this bag

Which carrier bag would you recommend? D

Why? because nothing happened to the bag or handle. (the handle got stretched a bit, didn't stretch at all) This doesn't tell me anything!

Think about these questions:

1 Which bag is the strongest but marks your hands the least?
D

2 What do you notice about the handles?
all of the bags made of plastic their handles stretched.

3 Are they of a particular design?
They are bags for life ☺ All of them? No only 1 (What makes a bag for life? A strong durable bag)

4 Do thicker bags always have more comfortable handles?
Yes because they don't cut into your hand as much

5 Must there be a compromise between strength and comfort?
No. – Explain: No because there can be strong and comfortable bags at the same time

Year	5	Topic	Properties and changes of materials

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- 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
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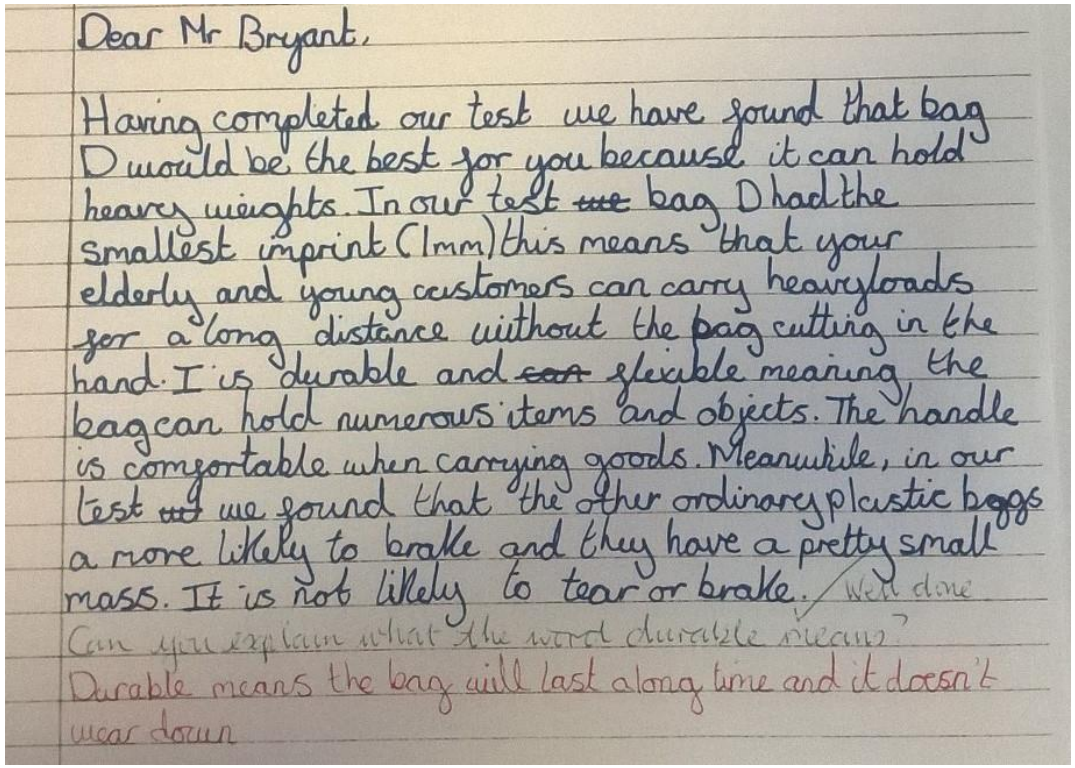
		Lucas uses the appropriate vocabulary to describe the properties.
Teacher observations		Working scientifically
		The conclusion letter uses evidence collected from the investigation to support his recommendations.

Dear Mr Bryant,

Having completed our test we have found that bag D would be the best for you because it can hold heavey weights. In our test ~~we~~ bag D had the smallest imprint (1mm) this means that your elderly and young customers can carry heavyloads for a long distance without the bag cutting in the hand. It is durable and ~~can~~ flexible meaning the bag can hold numerous items and objects. The handle is comfortable when carrying goods. Meanwhile, in our test ~~we~~ we found that the other ordinary plastic bags a more likely to brake and they have a pretty small mass. It is not likely to tear or brake. Well done

Can you explain what the word durable means?

Durable means the bag will last along time and it doesn't wear down

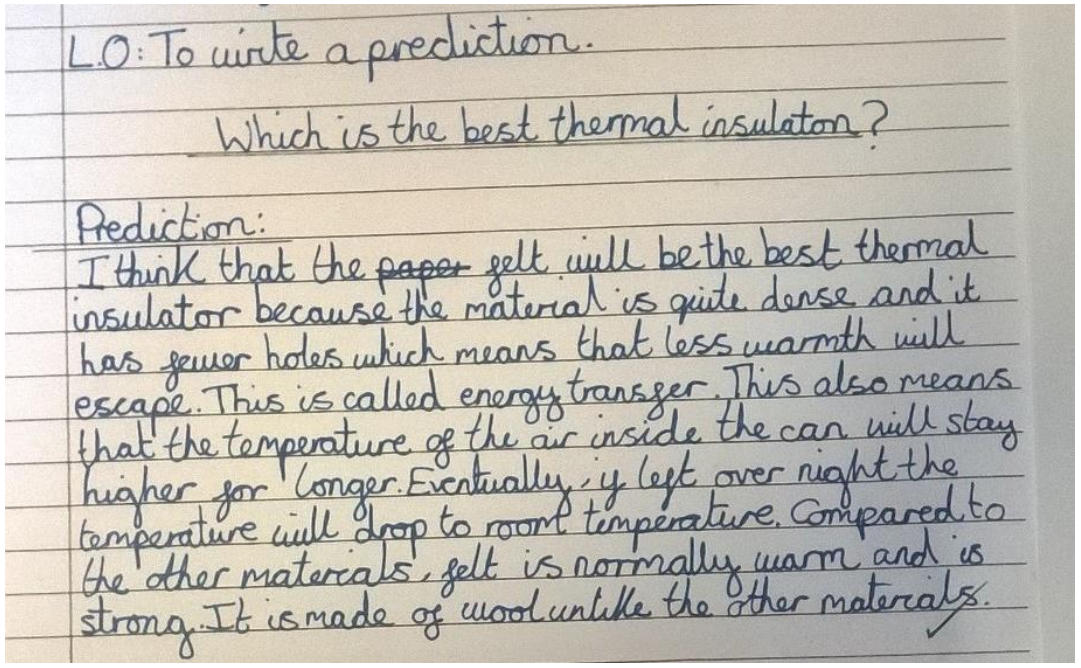
Year	5	Topic	Properties and changes of materials

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
		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.
Teacher observations		Working scientifically

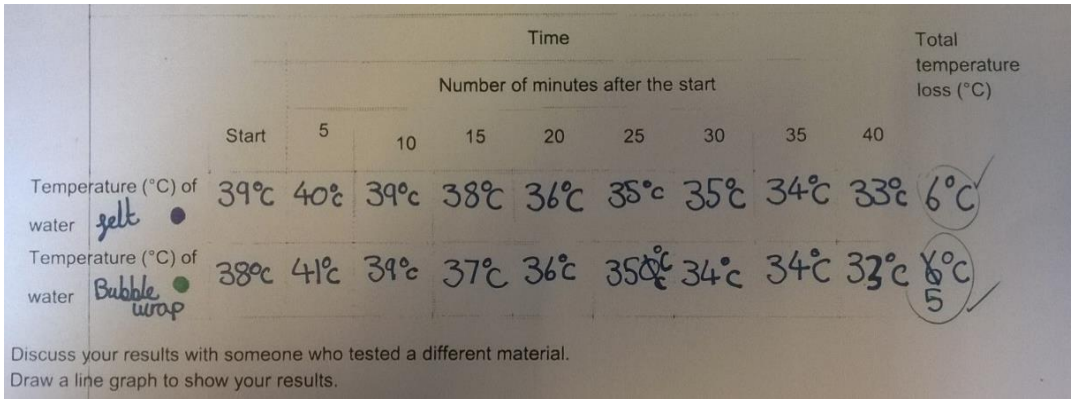
Year	5	Topic	Properties and changes of materials

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

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 temperature loss was much bigger. Tin foil is not a good thermal insulator."		
Teacher observations		Working scientifically
		Lucas compares the results from different groups and uses his knowledge of thermal insulation to explain the differences.

Year	5	Topic	Properties and changes of materials

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- 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

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.)

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	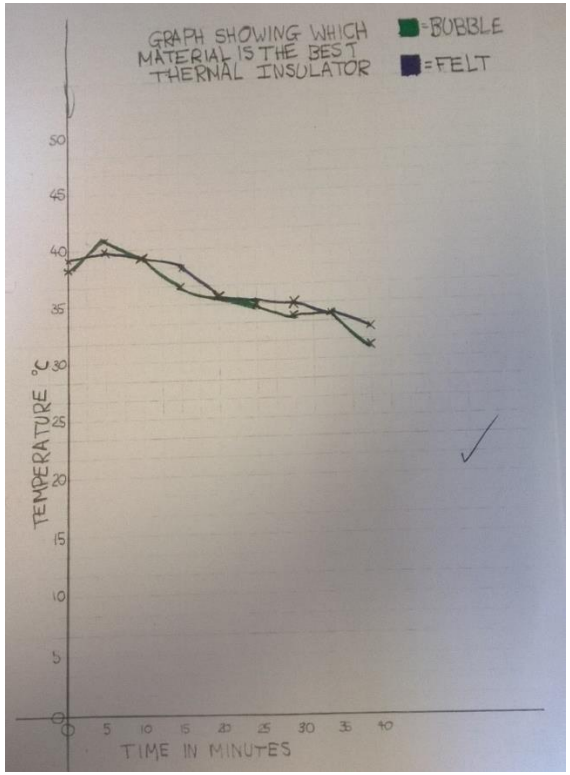	
Teacher observations		Working scientifically
		Lucas draws and labels the axes, adds the scale and plots the points on his line graph. He adds a key to identify the materials and a title.

Year	5	Topic	Properties and changes of 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.)

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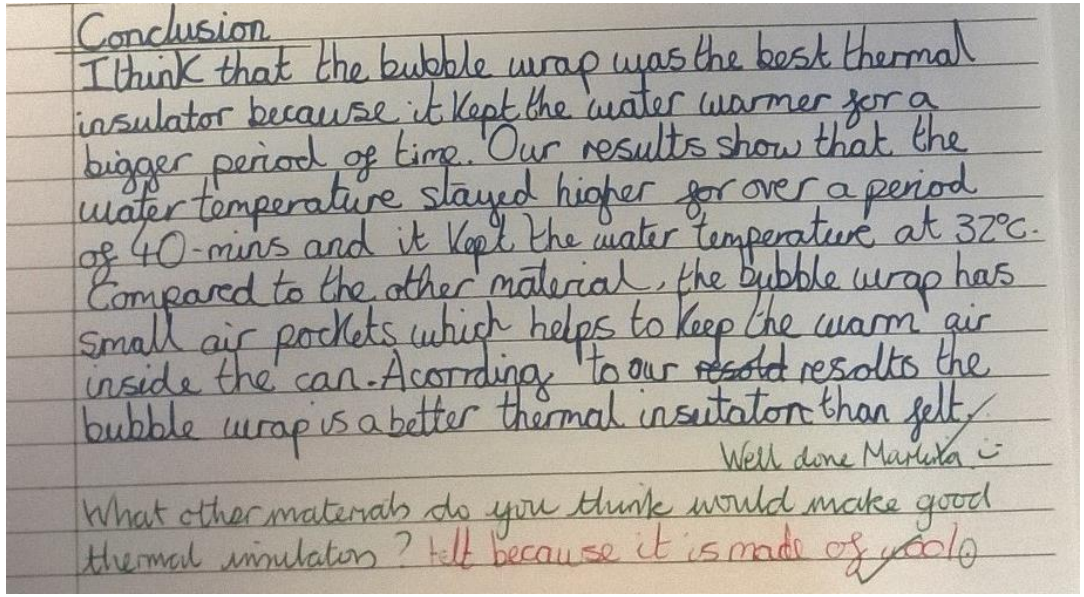
		Lucas uses his understanding about thermal insulators to explain his findings.
Teacher observations		Working scientifically
This response to the marking question shows that Lucas recognises that felt is also a good thermal insulator.		Lucas writes a conclusion based on the evidence gathered.

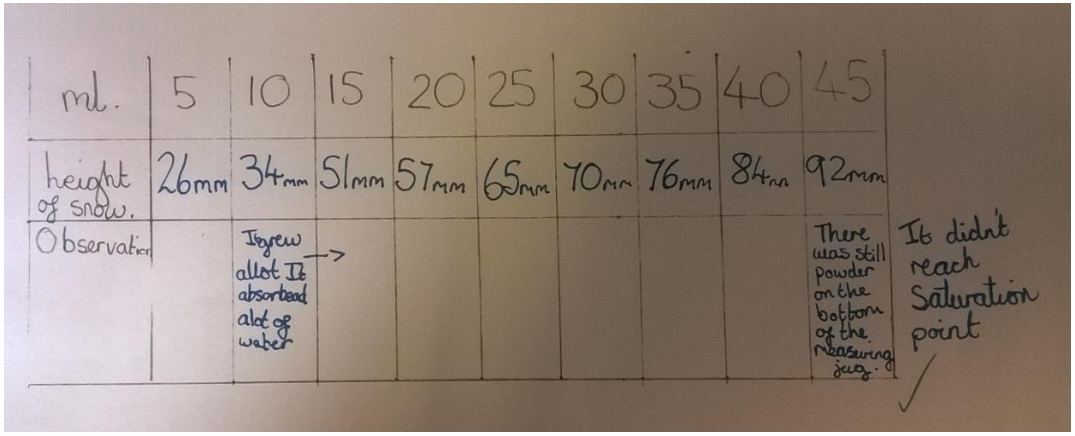
Year	5	Topic	Properties and changes of materials

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

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.

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		The observation comments show good use and understanding of scientific vocabulary.
Teacher observations		Working scientifically
Lucas uses appropriate vocabulary from Key Stage 1 without prompting.		

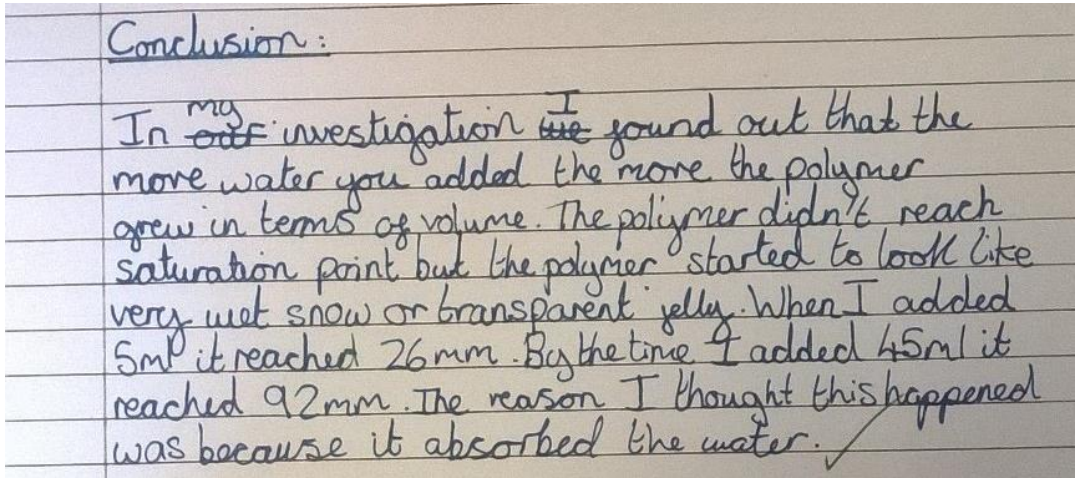
Year	5	Topic	Properties and changes of materials

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

EVIDENCE OF LEARNING		ASSESSMENT
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."		This investigation again shows that Lucas uses evidence from a comparative test to give reasons for the uses of a particular material.
Teacher observations		Working scientifically
		Lucas writes a conclusion based on both his observations and measurements.

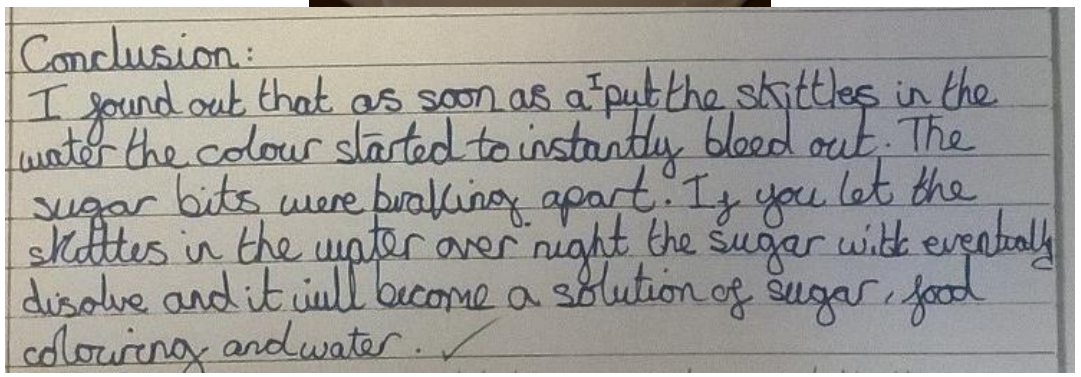
Year	5	Topic	Properties and changes of materials

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 found out that as soon as a I put the skittles in the water the colour started to instantly bleed out. The sugar bits were braking apart. If you let the skittles in the water over night the sugar will eventually dissolve and it will become a solution of sugar, food colouring and water. ✓	

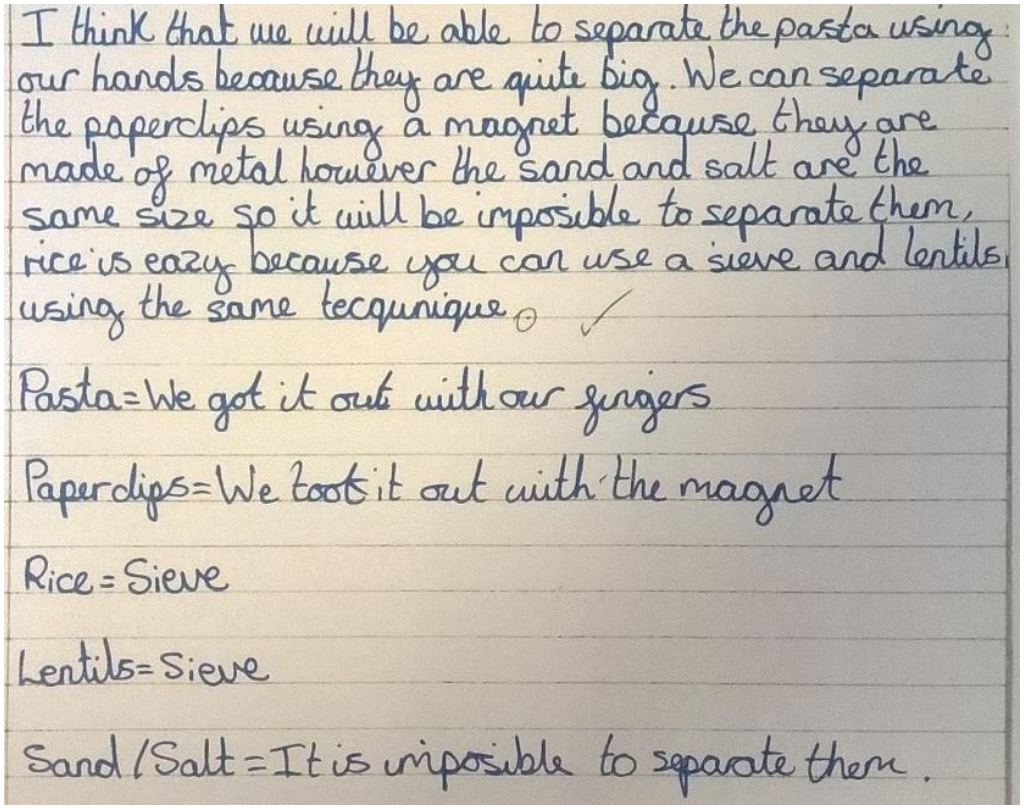
Year	5	Topic	Properties and changes of materials

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 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."		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		Working scientifically

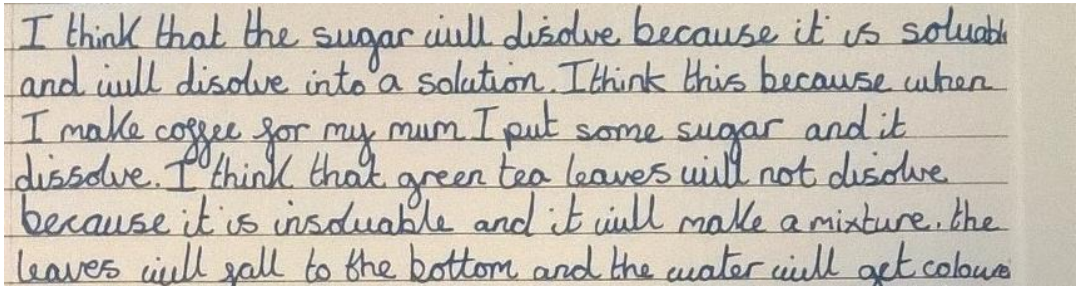
Year	5	Topic	Properties and changes of materials

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

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
		This writing shows that Lucas has a good understanding of the key vocabulary shared by the teacher – 'dissolve', 'soluble', 'insoluble', 'solution', 'mixture'.
Teacher observations		Working scientifically

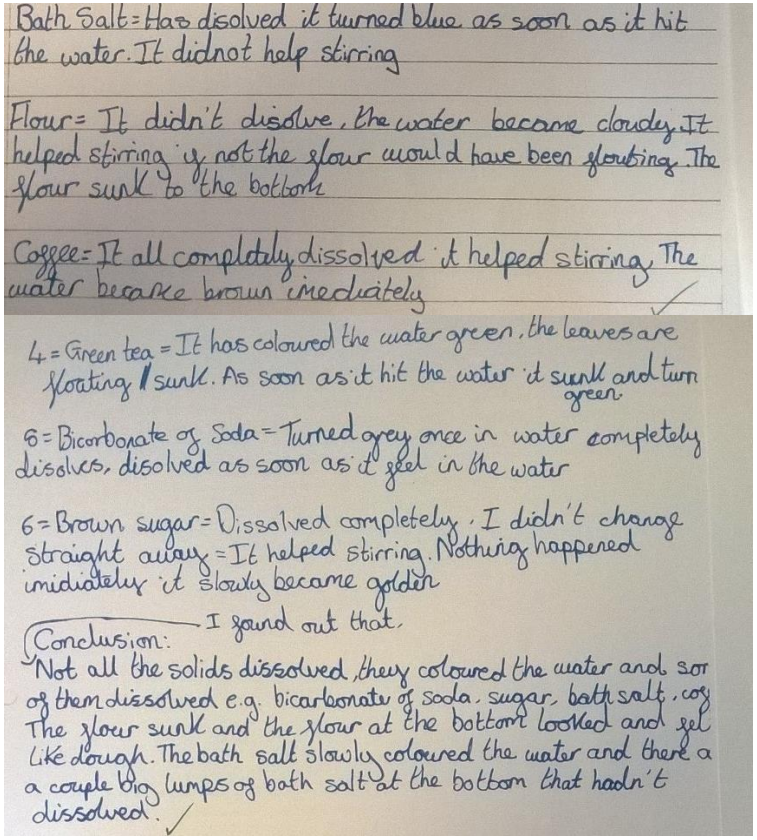
Year	5	Topic	Properties and changes of materials

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

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
		Lucas is consistently using the key vocabulary – 'dissolved'.
Teacher observations		Working scientifically
		Lucas uses his observations to explain which materials dissolved and which didn't.

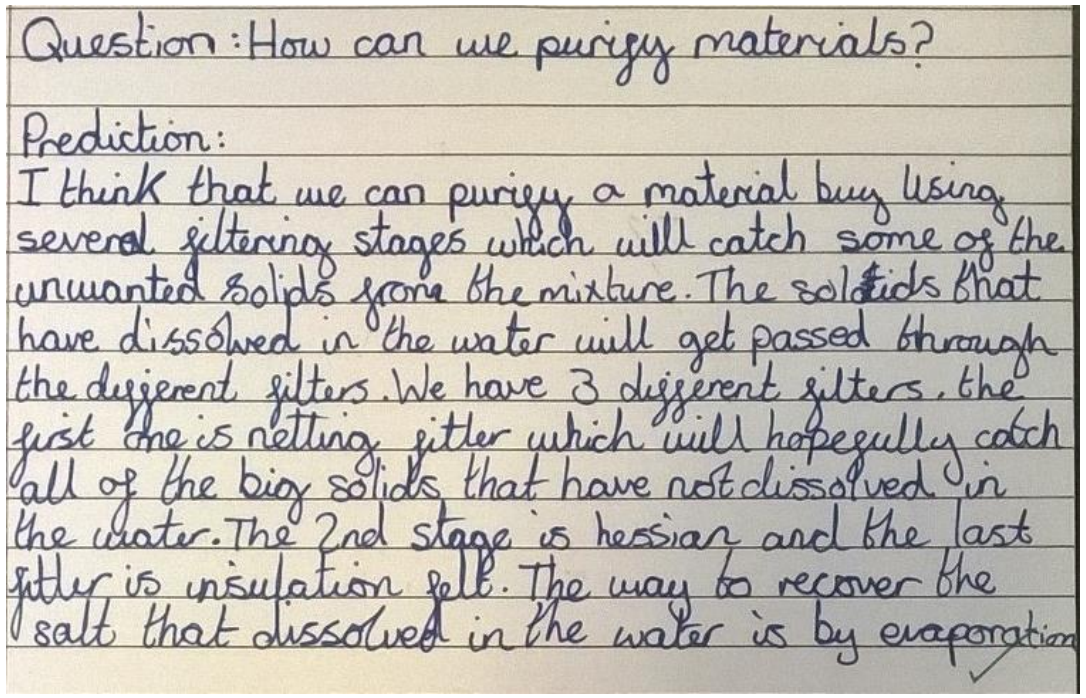
Year	5	Topic	Properties and changes of materials

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
		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.
Teacher observations		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.