

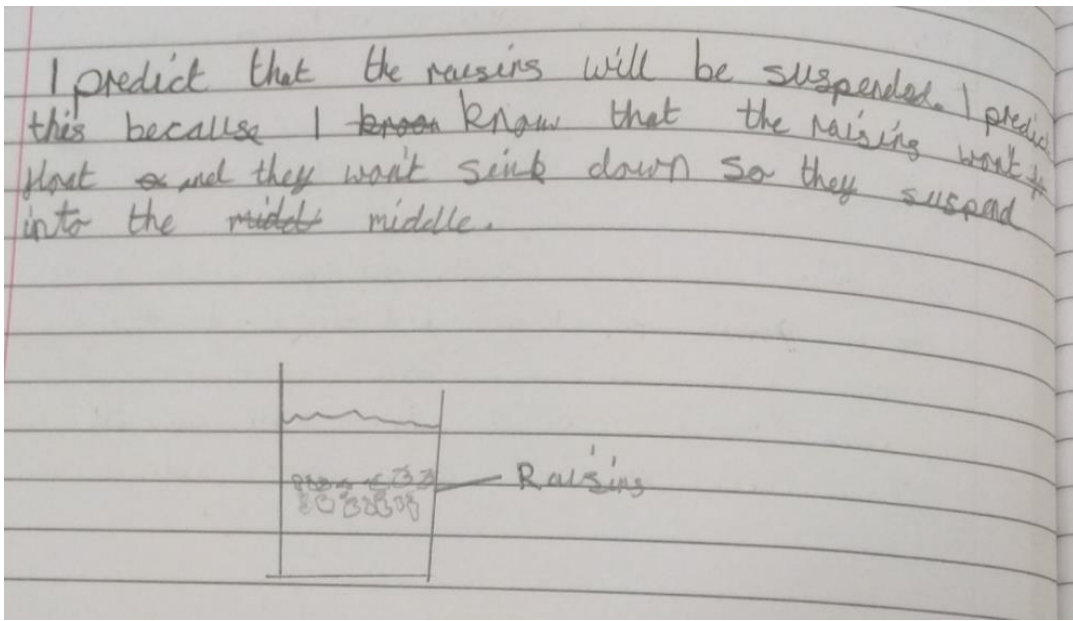


Examples of Work

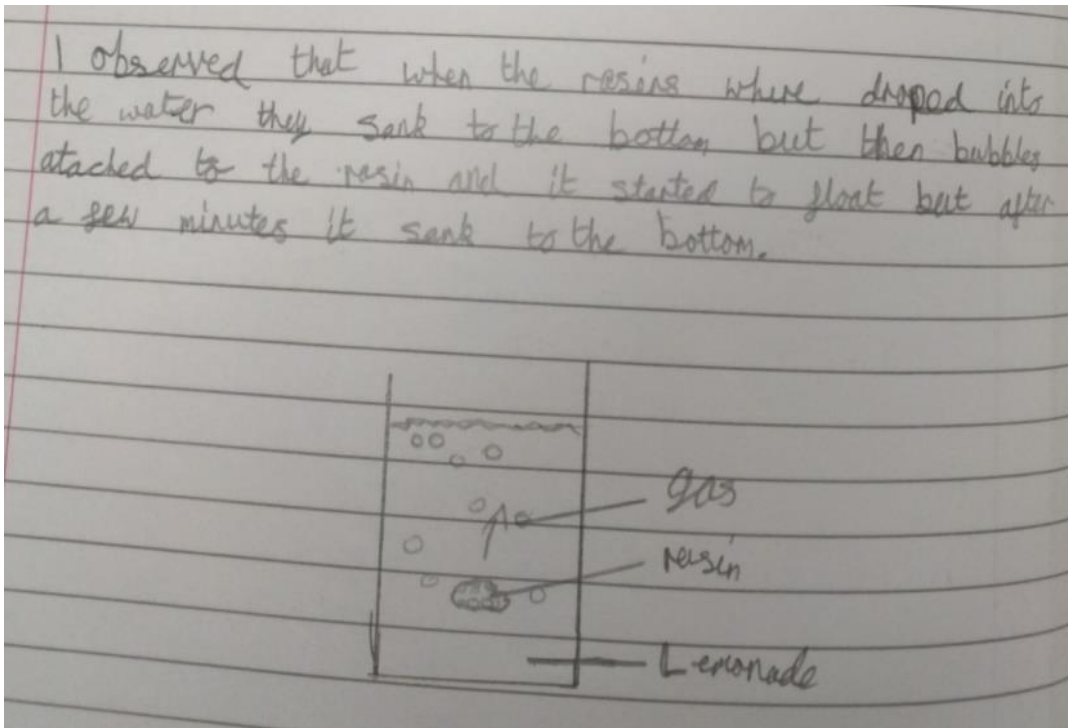
Diogjena

Properties and changes of materials - Year 5

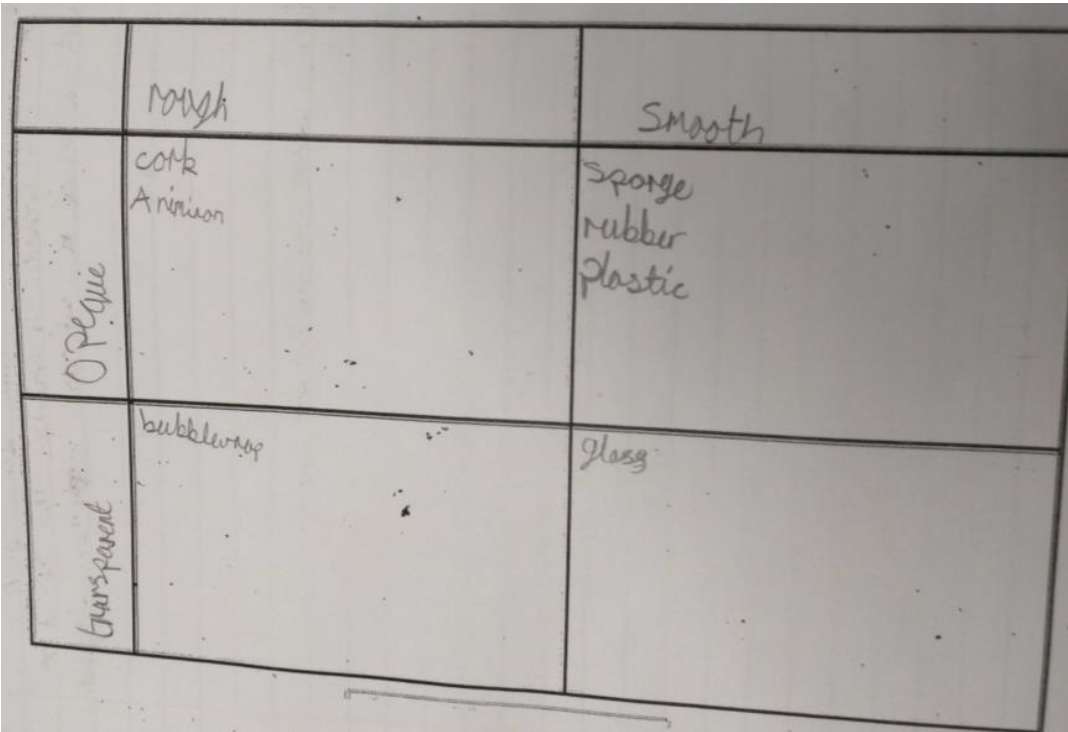
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	• Compare and group materials together, according to whether they are solids, liquids or gases. (Y4)			
	Description of activity			
	The children were given some raisins to handle and then shown a bottle of lemonade and asked to think what might happen when the raisins are added to the lemonade.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Diogjena does not include the key terms 'solid', 'liquid' or 'gas' learnt in Year 4.
Teacher observations The writing shows a good understanding of the word 'suspended'.		Working scientifically

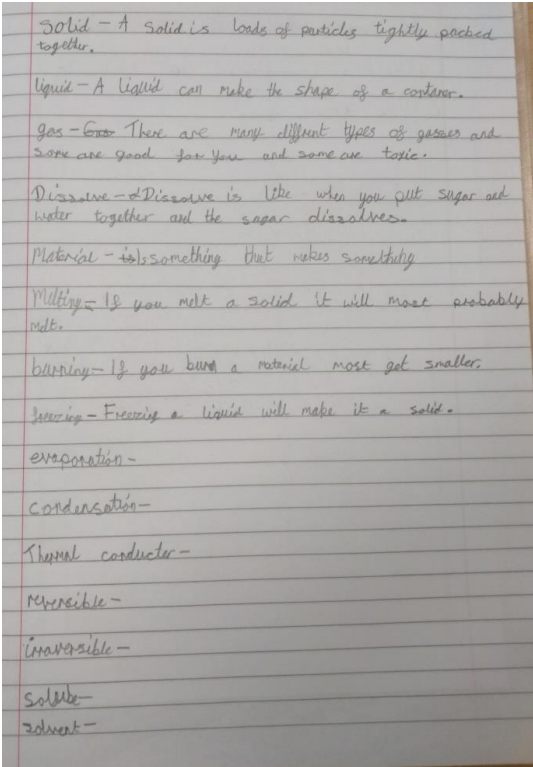
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	• Compare and group materials together, according to whether they are solids, liquids or gases. (Y4)			
	Description of activity			
	The children made close observations of adding the raisins to the lemonade.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Diogjena now includes the word 'gas' in her writing.
Teacher observations		Working scientifically
		Diogjena makes a close observation and notices the effect the bubbles have on whether the raisins float or sink.

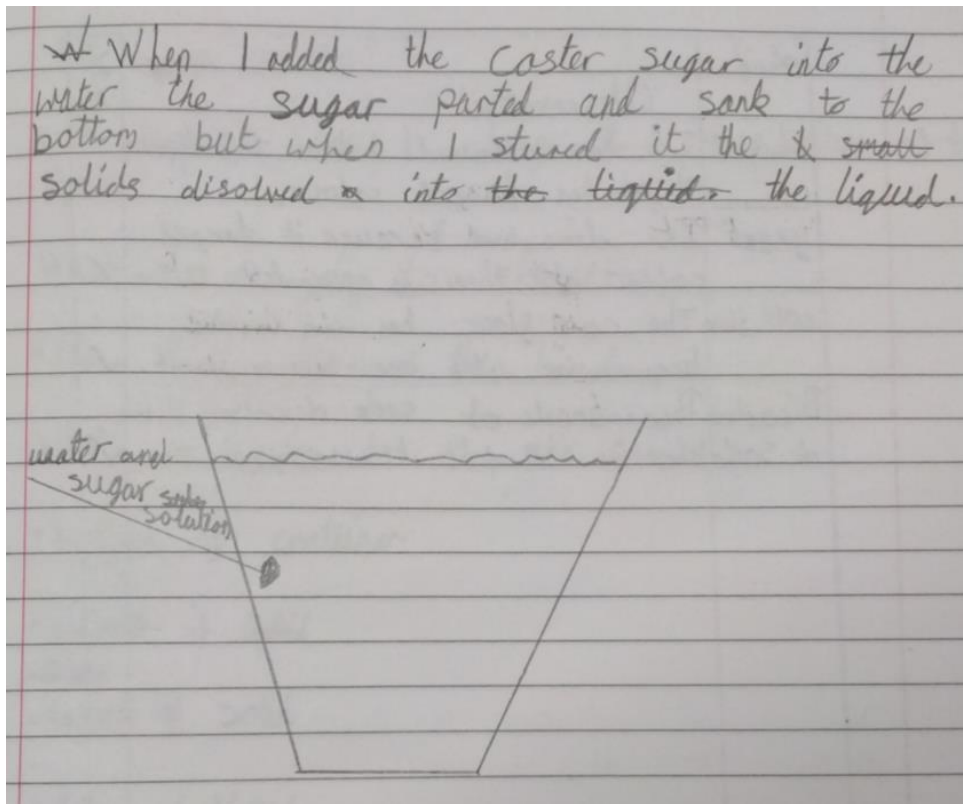
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.			
	Description of activity			
	In groups, the children were given a selection of materials to handle. They talked about them and thought about different ways that they could be sorted. The children were then shown a range of ways that they could present their sorting.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		
Teacher observations		Working scientifically
Diogjena chose to use a Carroll diagram to present her classification. Other children in the class chose to classify using different criteria and present it using other methods, such as intersecting Venn diagrams.		Diogjena chooses two appropriate properties as her sorting criteria, and sorts the materials correctly using a Carroll diagram.

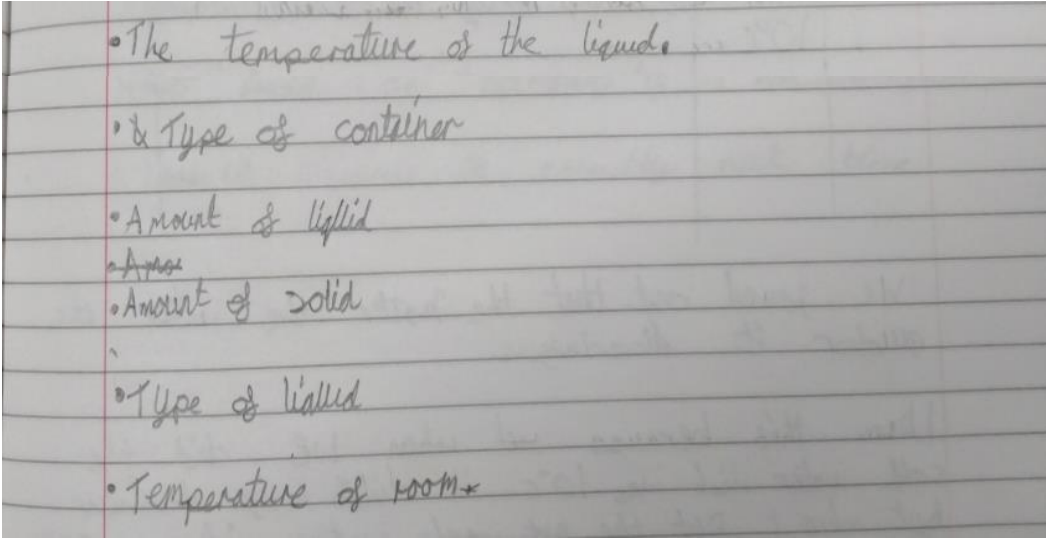
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	• Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets. • 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 children were given the key words for the topic on cards. They sorted these with their partner into words they had heard before and new words. Starting with the words they felt most familiar with, they were asked to write definitions for each word.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		The definition of 'freezing' is the only one that is clear and concise.
Teacher observations		Working scientifically
Diogjena was familiar with a number of the words but was unable to write clear definitions. 'Evaporation' and 'condensation' are words that Diogjena should be familiar with from Year 4 but she could not recall what these meant. This was an issue with the majority of the class, so additional activities were planned to reinforce learning about evaporation as this is necessary for the Year 5 statement about separating materials.		

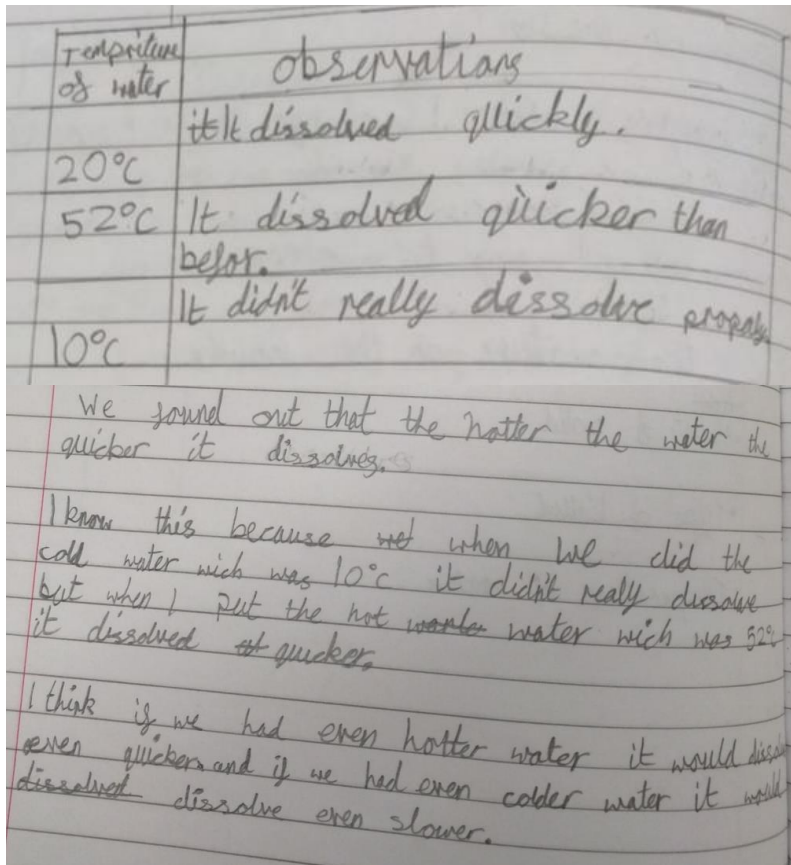
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.			
	Description of activity			
	The children were asked to add some sugar to water and observe it closely. During the discussion that followed, the teacher ensured that the children understood that the sugar had not disappeared, but had dissolved and was still in the cup. She also explained that the sugar and water had now become a solution.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Here Diogjena shows an awareness that a solid can dissolve in a liquid by breaking down into smaller pieces. She has used the word 'solution' when labelling her diagram. This is not sufficient evidence to show that she is secure with the concept of dissolving yet.
Teacher observations		Working scientifically
When asked what she meant by 'the sugar parted', she said it broke up into littler bits.		

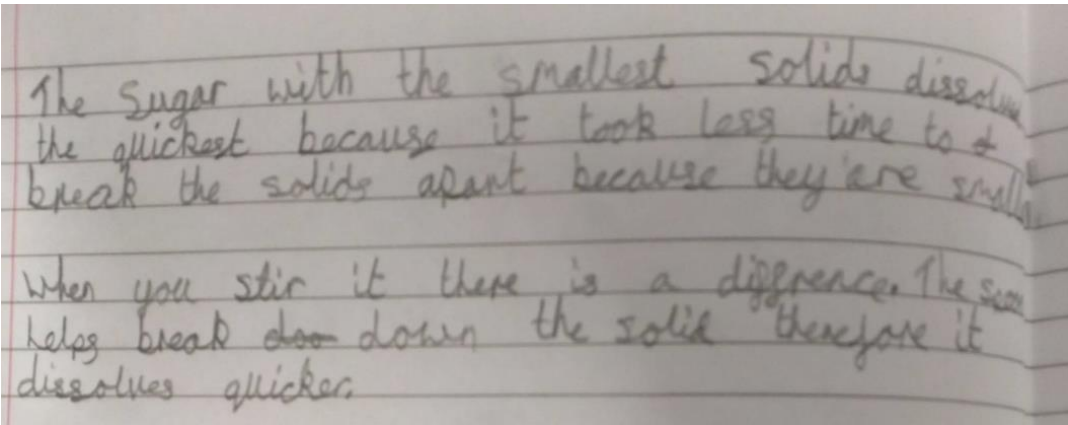
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	Focus of assessment (National Curriculum statements)			
	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.			
	Description of activity			
	The children were asked to discuss in small groups and write down what they could change that might affect the speed of sugar dissolving. Using these ideas and the fair test planning board, each group chose their own investigation.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"I don't think the type of container will make much difference, or the temperature of the room very much."		
Teacher observations		Working scientifically
Diogjena's group chose to investigate how the temperature of the liquid affected the time it takes to dissolve.		Diogjena is able to identify independent variables and also comment on the significance of them.

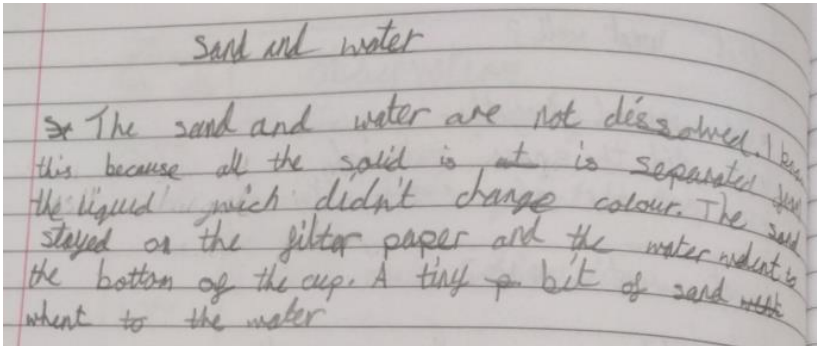
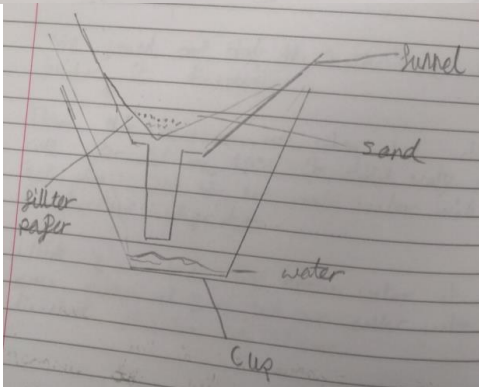
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	Focus of assessment (National Curriculum statements)			
	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.			
	Description of activity			
	Each group was then given time to complete their chosen investigation and asked to interpret their results.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		This piece of writing shows that Diogjena is confidently using the key vocabulary 'dissolve'. She has not, however, linked her observations to her subject knowledge to explain why the hotter water caused the sugar to dissolve more quickly.
Teacher observations		Working scientifically
		Diogjena carries out the investigation controlling variables appropriately. She draws her own table to record her results and interprets these, including using the results to make further predictions.

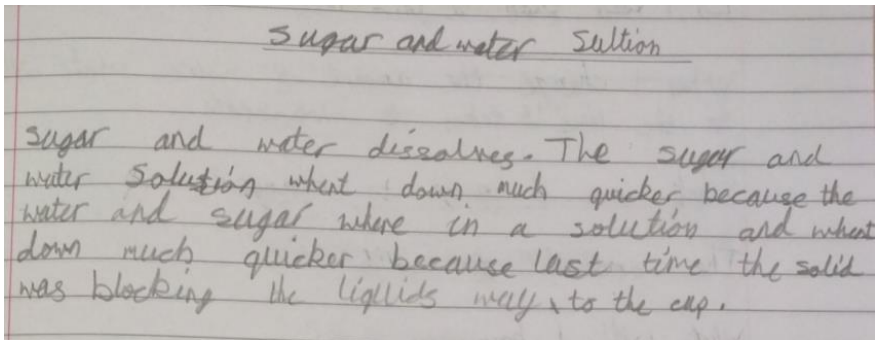
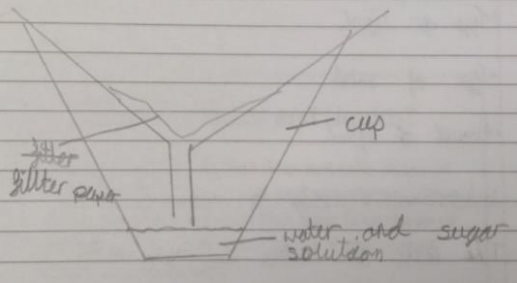
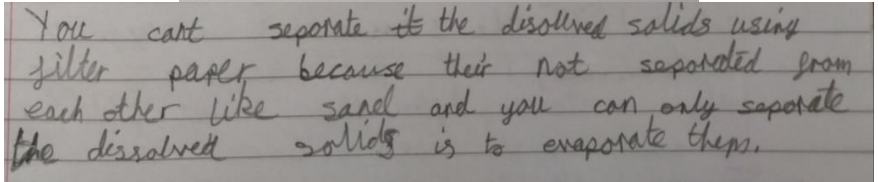
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	Focus of assessment (National Curriculum statements)			
	Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.			
	Description of activity			
	The children were given granulated sugar, caster sugar and a sugar cube to look at closely and then explore whether they would take the same amount of time to dissolve. They were also asked to explore the difference that stirring makes.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		This shows a good understanding of the process of dissolving by linking observations made clearly to the process of the particles being broken down. Diogjena understands that smaller particles will be more quickly broken down so they will dissolve more quickly and that stirring will also break them down more quickly speeding up the dissolving process.
Teacher observations		Working scientifically
Diogjena refers to the particle size as big or small solids.		

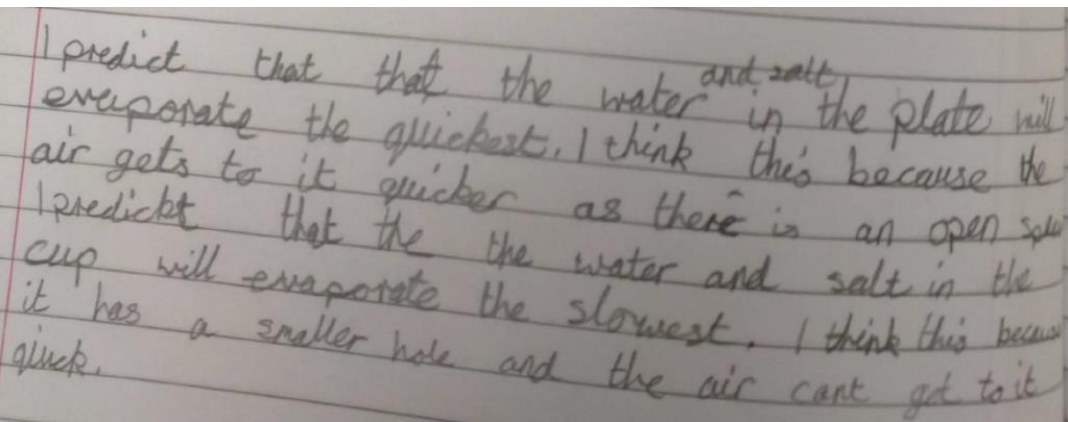
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	Focus of assessment (National Curriculum statements)			
	• Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution. • Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.			
	Description of activity			
	The children were shown how to filter by folding the paper correctly, placing it in the funnel and carefully pouring water through it so that it did not go over the sides of the filter paper. They were then asked to make a mixture of water and sand and to see what happened when they filtered this.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Diogjena recognises that the sand has not dissolved and is able to explain how she knows this.
Teacher observations		Working scientifically
		She successfully filters the mixture to separate the sand from the water.

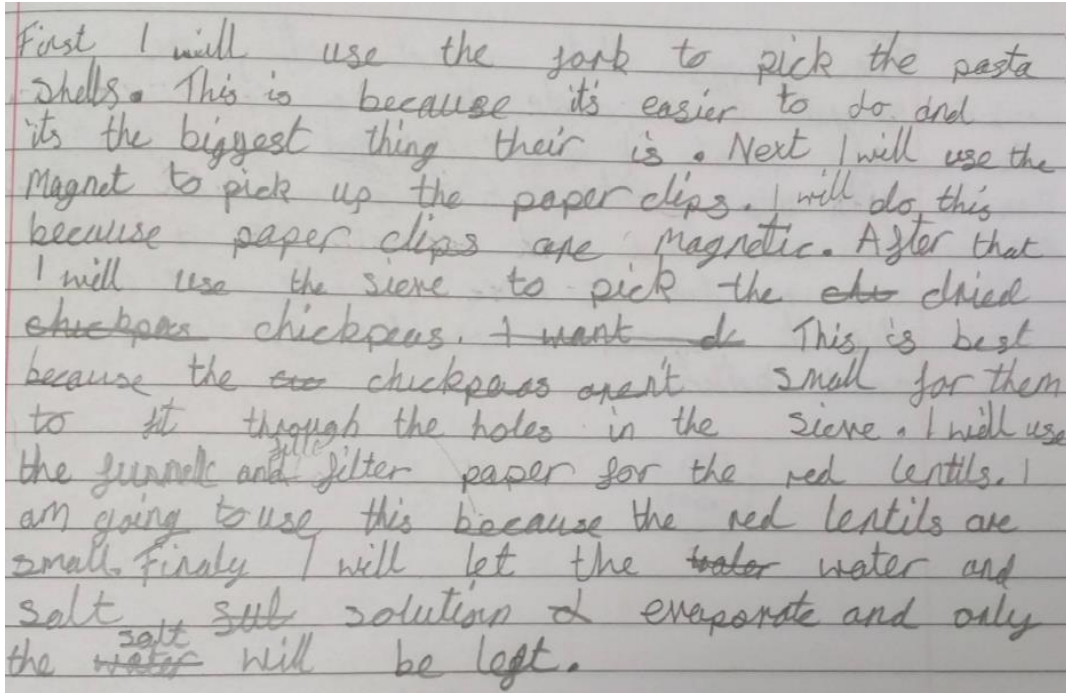
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	Description of activity			
	The children then repeated this process with a water and sugar mixture that they prepared.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	  	Although in the initial assessment activity Diogjena showed no recall of evaporation, unprompted she has used this knowledge here.
Teacher observations		Working scientifically
Diogjena is using the words 'dissolve' and 'solution' accurately consistently.		

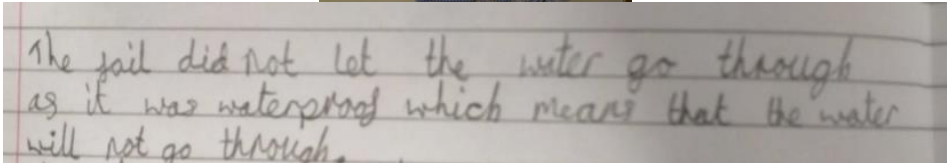
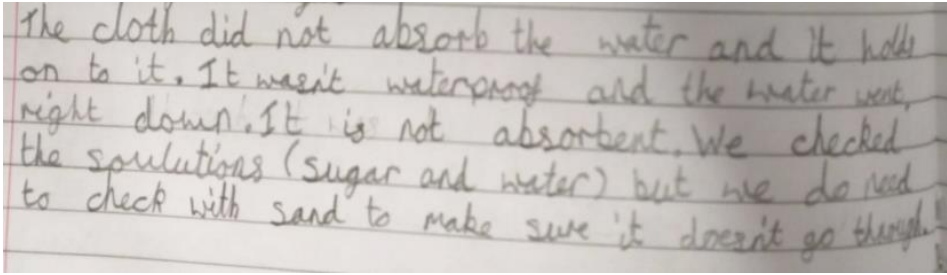
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	Description of activity			
	The children were given a salt solution and asked to think about what may affect the speed of evaporation. They were asked to make a prediction using their understanding of evaporation.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		This shows that Diogjena has the required knowledge about evaporation from Year 4 and is able to apply this to separating mixtures.
Teacher observations Diogjena's group chose to put the same amount of the solution into different types of containers left in the same place. When asked if the salt would evaporate, Diogjena showed a good understanding that the water not the salt would evaporate, "The salt will be left in the plate or bowl."		Working scientifically Diogjena sets up a comparative test, appropriately controlling variables (the amount of the solution, the place the containers were left).

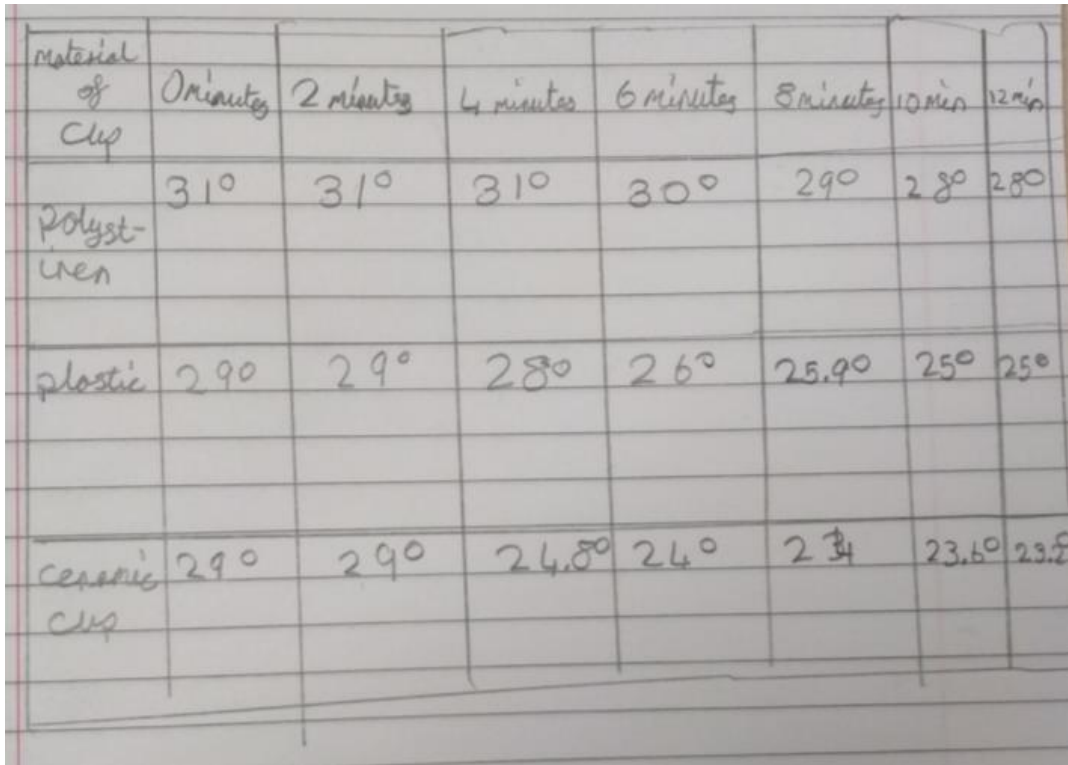
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	Description of activity			
	The children were given a mixture of pasta shells, paperclips, chickpeas, lentils and salt, and a range of equipment to use. They were asked to plan how they would separate the mixture.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Diogjena uses her knowledge to successfully separate the given mixture and explains her method using all the expected vocabulary correctly.
Teacher observations Diogjena does not make it clear in her plan when she will add the water, but she added it after sieving the chickpeas.		Working scientifically

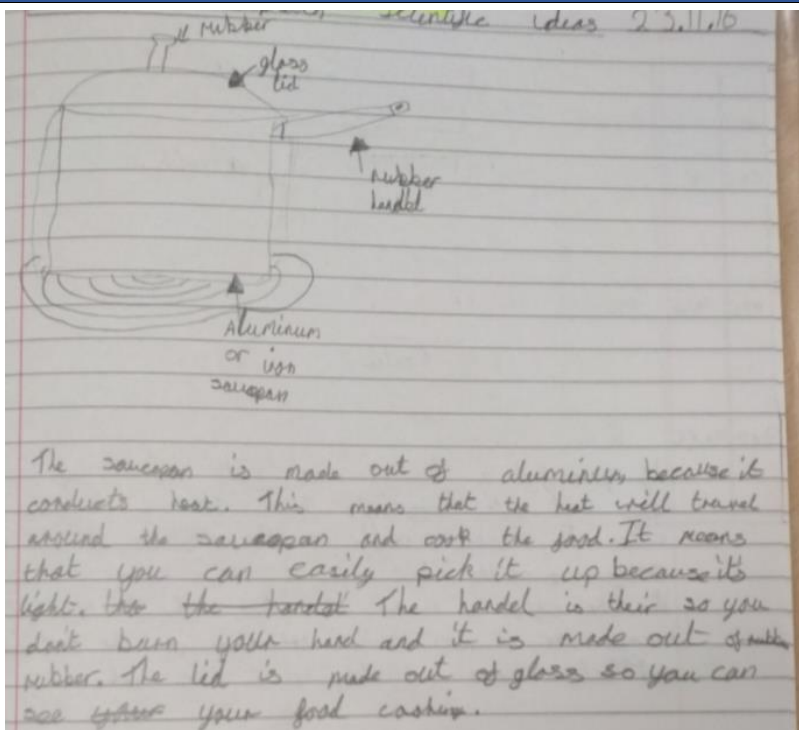
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	• Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic. • Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.			
	Description of activity			
	The children were given a range of materials to explore whether they could be used, instead of filter paper, to separate sand from a sugar solution. They were given just a sugar solution to use.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"The sponge will not work as the solution will be absorbed by it."		Diogjena considers both absorbency and waterproofness when using her results to consider which materials could be used instead of filter paper.
Teacher observations		Working scientifically
Diogjena's group tested the materials by placing them over a beaker, squirting on the solution using a syringe, and observing the solution going into the beaker. Diogjena realised that, to be useful for filtering, it was also important that the sand would not go through the holes.	Diogjena reread the first sentence below and explained that she meant the cloth did not hold on to the water.  	

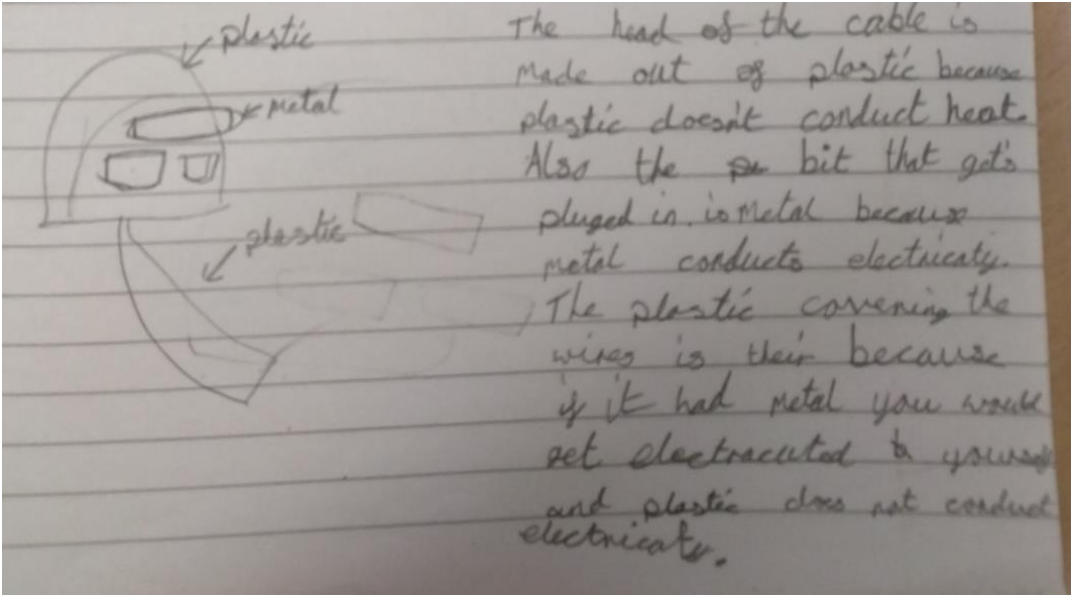
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	Description of activity			
	The children were asked to set up an investigation to explore how well different types of cups would keep a drink warm.			

EVIDENCE OF LEARNING		ASSESSMENT																																
Oral evidence	Examples of work	Knowledge																																
“The water in the plastic cup and the ceramic cup was at 29°C, but it cooled more in the ceramic cup showing this is not such a good thermal insulator. The water in the plastic cup and the polystyrene cup was at a different temperature to start with and the temperature change was quite similar, so it is difficult to compare how good they are as thermal insulators.”	 <table><thead><tr><th>material of cup</th><th>0 minutes</th><th>2 minutes</th><th>4 minutes</th><th>6 minutes</th><th>8 minutes</th><th>10 min</th><th>12 min</th></tr></thead><tbody><tr><td>polystyrene</td><td>31°</td><td>31°</td><td>31°</td><td>30°</td><td>29°</td><td>28°</td><td>28°</td></tr><tr><td>plastic</td><td>29°</td><td>29°</td><td>28°</td><td>26°</td><td>25.9°</td><td>25°</td><td>25°</td></tr><tr><td>ceramic cup</td><td>29°</td><td>29°</td><td>24.8°</td><td>24°</td><td>23.4</td><td>23.6°</td><td>23.2</td></tr></tbody></table>	material of cup	0 minutes	2 minutes	4 minutes	6 minutes	8 minutes	10 min	12 min	polystyrene	31°	31°	31°	30°	29°	28°	28°	plastic	29°	29°	28°	26°	25.9°	25°	25°	ceramic cup	29°	29°	24.8°	24°	23.4	23.6°	23.2	Diogjena uses the words ‘thermal insulator’ correctly when interpreting her results.
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polystyrene	31°	31°	31°	30°	29°	28°	28°																											
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ceramic cup	29°	29°	24.8°	24°	23.4	23.6°	23.2																											
Teacher observations		Working scientifically																																
Diogjena’s group decided to record the temperature in each cup every two minutes.		Diogjena records her results in a table.																																

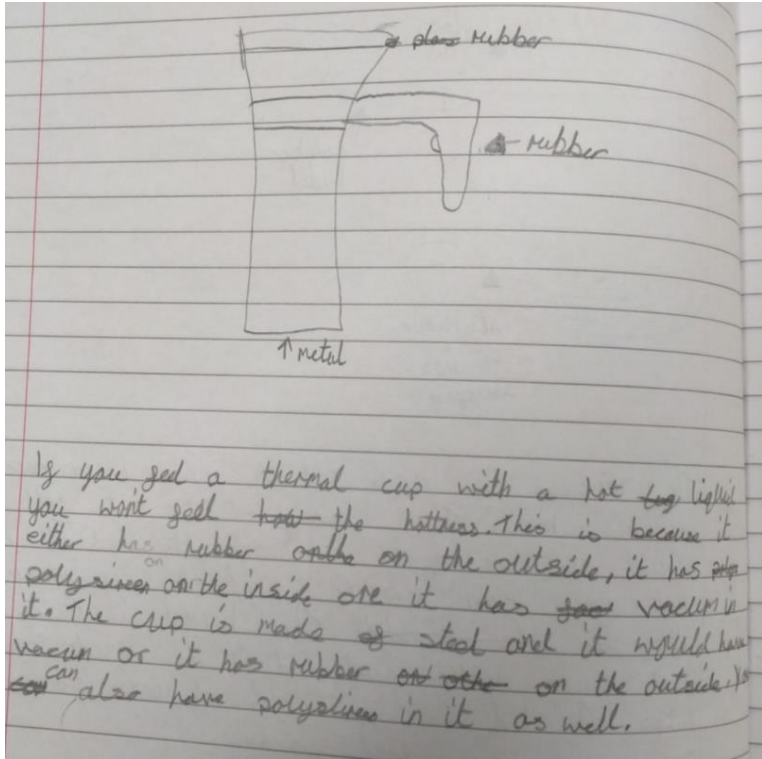
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	Description of activity			
	The children were given some objects to explore and identify the materials they were made from and consider why these materials were chosen.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		This shows a good understanding of thermal conduction and insulation.
Teacher observations		Working scientifically
Diogjena considered the following properties – heat conduction, weight and transparency (although this word is not used here).		

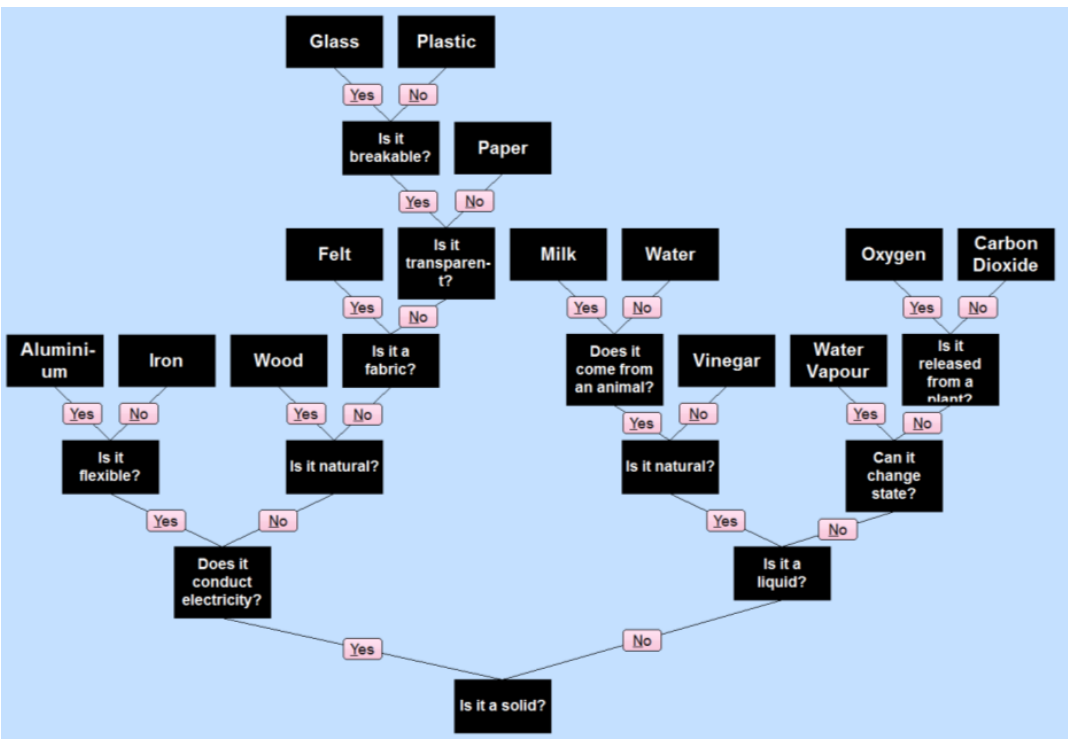
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	Description of activity			
	Continued from the previous page.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		This shows a good understanding of electrical conduction and insulation.
Teacher observations Electrical conductivity is considered here.		Working scientifically

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	Description of activity			
	Continued from the previous page.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 If you get a thermal cup with a hot top liquid you won't feel how the hotness. This is because it either has rubber on the outside on the outside, it has polymer polystyrene on the inside or it has vacuum vacuum in it. The cup is made of steel and it would have vacuum or it has rubber on the outside on the outside. It can also have polystyrene in it as well.	Diogjena shows that she knows that steel is a good conductor and yet the cup does not feel hot on the outside, so there must be another material in the cup also. She uses her subject knowledge about thermal insulators, gained from her previous investigation, to suggest what this material might be – polystyrene.
Teacher observations		Working scientifically
Heat conduction is considered here.		

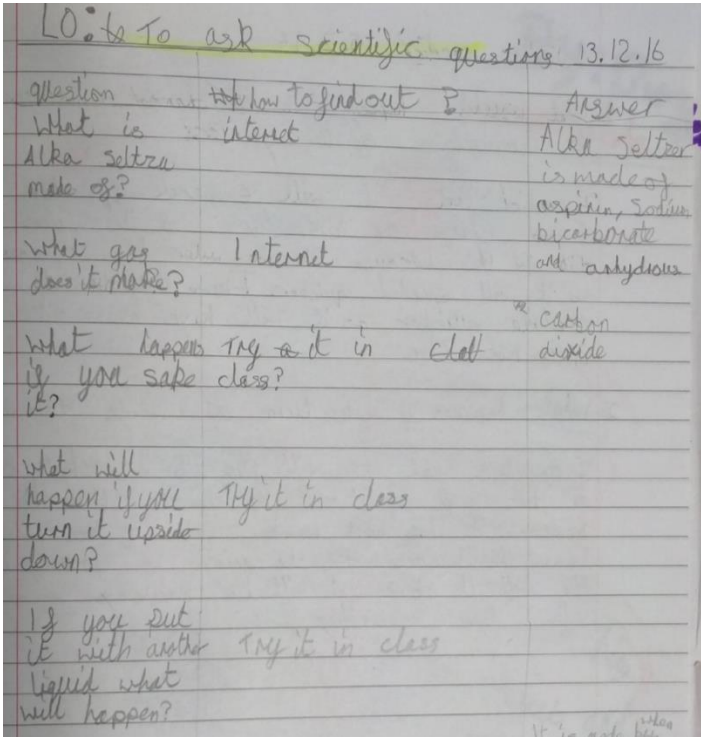
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	Description of activity			
	The children were given labelled images and asked to design a classification key to separate them.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		
Teacher observations		Working scientifically
Diogjena's classification key indicates a misconception about gases not being able to change state. The children were shown a video clip of dry ice to show that a gas can change state.		Diogjena asks appropriate questions to create the key.

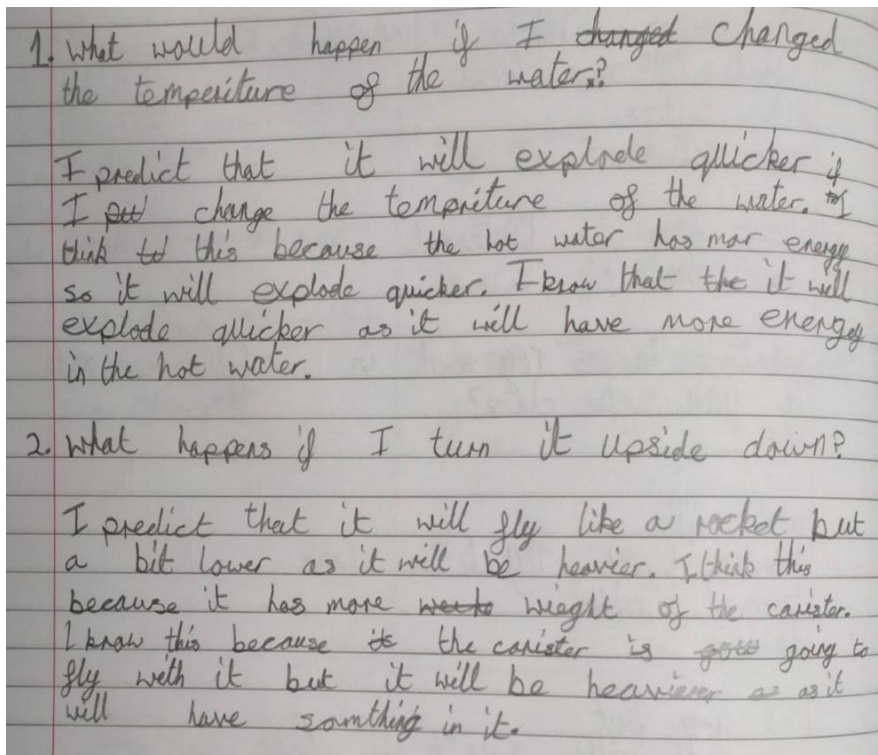
	Year	5	Topic	Properties and changes of materials
	Focus of assessment (National Curriculum statements)			
	• Demonstrate that dissolving, mixing and changes of state are reversible changes. • Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.			
	Description of activity			
	The terms ‘reversible change’ and ‘irreversible change’ were displayed on the board and the children were asked to discuss what they thought these might mean and to think of some examples of reversible and irreversible changes.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Diogjena's current understanding is based on it not being possible to get the original materials back, rather than the creation of new materials. This needs clarification.
Teacher observations		Working scientifically
Diogjena identifies changes of state as reversible changes and cooking and burning as irreversible changes. However, at present, she includes making a salt solution as an irreversible change.		

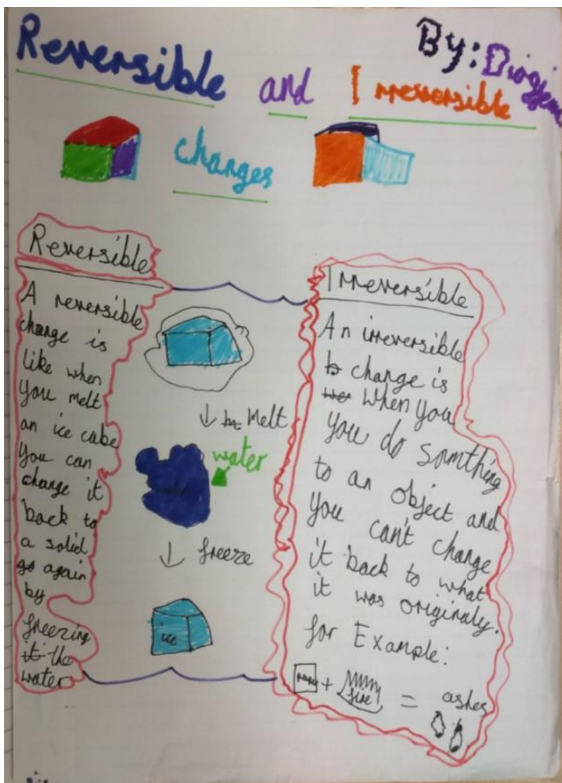
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	Description of activity			
	The children observed a fizzy tablet in water to notice the gas being produced. The teacher stressed that this was a new material that was produced during the chemical reaction. The teacher then demonstrated using a fizzy tablet to explode a film canister, and the children then generated their own questions and thought about how they might answer them.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Working scientifically
Teacher observations		Diogjena asks some relevant questions which could be answered through practical work in class and which she could research using the internet, which she did.

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	Description of activity			
	The children shared their questions with a partner and chose one question of their own and one from their partner to talk about in more detail.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
"When the water is hotter, the gas is produced more quickly so the pot explodes quicker."		
Teacher observations		Working scientifically
		Diogjena uses her scientific knowledge to justify her predictions, to which she was able to add further detail when asked by the teacher.

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	Description of activity			
	The children were asked to present their understanding about reversible and irreversible changes.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher: "In which of these changes is a new material produced?" Diogjena: "Well, ice and water are both the same material, but one is solid water and the other is liquid water. When the paper burns, it turns into ash. Ash is the new material. Also, when the Alka Seltzer tablet was put in the water, new carbon dioxide was produced."		Diogjena gives an example of both a reversible change (melting and freezing) and an irreversible change (burning). She understands that, in an irreversible change, a new material is produced.
Teacher observations		Working scientifically
The oral comment shows that Diogjena understands about a new material being produced.		

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	Description of activity			
	Not many children had included dissolving in their posters as a reversible change, so the teacher set up a talk activity to clarify this. They were shown three images and asked to discuss which is the odd one out.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Diogjena: "The fizzy tablet is the odd one out, as a new material has been produced, so it is an irreversible change." Teacher: "Are you sure the sugar in water is reversible?" Diogjena: "Yes, because you still have sugar and water, and you can get the sugar back by evaporating the water."	  	Diogjena demonstrates clearly that she is secure about reversible and irreversible changes.
Teacher observations		Working scientifically



Overall summary

Secure

Diogjena names a wide range of materials, including solids, liquids and gases. She talks about their properties, based on observable features and properties she has tested. She explains why a material is suitable for a purpose, based on a range of properties. She understands that some solids dissolve in water to form a solution. She has carried out investigations into the rate of dissolving and can relate her results to her understanding. She separates mixtures using a range of techniques. She explains which changes are reversible and which are not reversible, based on the production of a new material.