










Examples of Work
Chaya
States of matter - Year 4




	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	The children were asked to discuss in small groups the question, 'What would life be like without solids?'			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"We wouldn't have tables to do our writing on or pencils to do our work.</p> <p>"We would be standing up all the time as we wouldn't have chairs.</p> <p>"We wouldn't be able to eat things so we wouldn't survive very long."</p>	<div style="border: 1px solid black; padding: 10px; text-align: center; margin-bottom: 20px;"> <p>WHAT WOULD LIFE BE LIKE WITHOUT SOLIDS?</p> </div>    	<p>Chaya names objects that are made of solids. The last statement links back to previous learning about the digestive system and nutrients from food. Although the images shown included natural solids, Chaya did not discuss these with her group.</p>
Teacher observations		Working scientifically

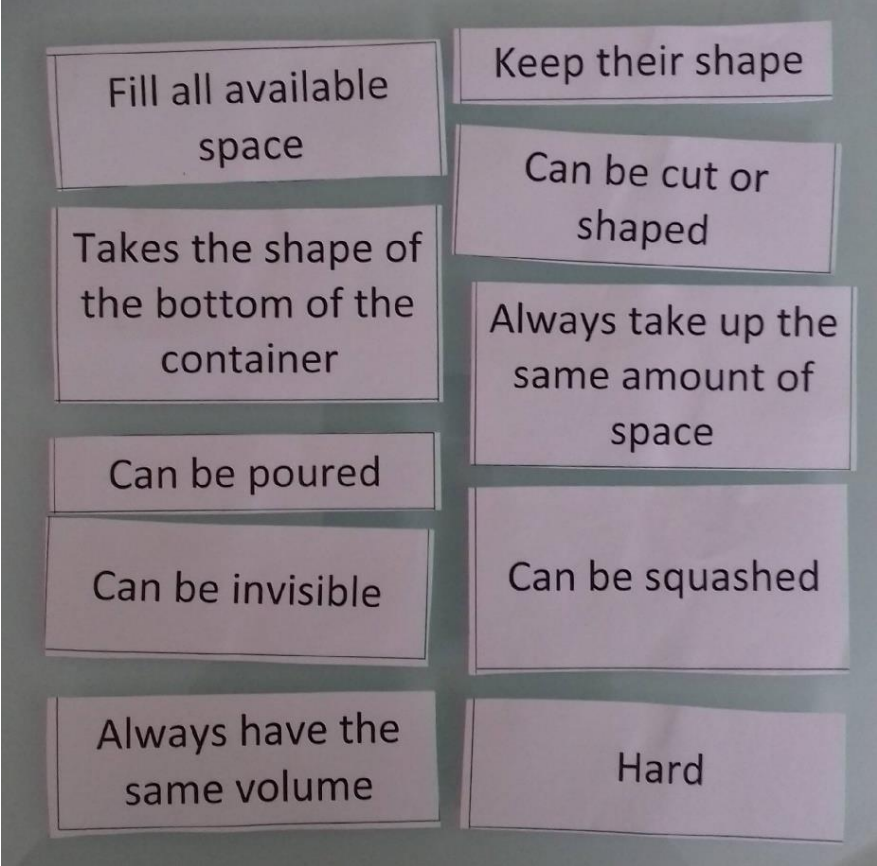
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
<p>The children were given time to observe what happens when currants are added to lemonade. After the initial observation and discussion, the children were given three cards with the words 'solid', 'liquid' and 'gas' written on them and asked to explain their observations to their partner using these three words.</p>				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"The currants go up and down. The bubbles make the currant lighter, so it floats to the top, then the bubbles burst so it sinks.</p> <p>"The bubbles, which are made of gas, stick to the surface of the solid currants. They float up through the liquid lemonade to the surface. The gas bubbles burst, and the solid currants sink to the bottom of the liquid again."</p>		<p>After being given the vocabulary, Chaya confidently uses the words solid, liquid and gas.</p>
Teacher observations		Working scientifically

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	The children were asked to think about what they already knew about solids, liquids and gases. After a quick discussion with their partner, the teacher collated their ideas on the whiteboard.			


EVIDENCE OF LEARNING			ASSESSMENT
Oral evidence	Examples of work		Knowledge
	Solid	Liquid	Gas
<p>it's hard you can hold it it can't be changed</p>	<p>You can drink them. You can swim through them you can hold in a cup</p>	<p>invisible</p> <p>you can't see it. breathe it</p> <p>oxygen is a gas</p>	<p>At this point, all the children are finding it hard to explain the differences between solids, liquids and gases.</p>
<p>Teacher observations</p> <p>Nobody in the class contradicted the final statement about a solid by talking about how the shape of some solids can be changed by applying a force or by melting.</p> <p>Nobody in the class discussed coloured gases that can be seen, or that you can see the effect of gases.</p>			<p>Working scientifically</p>

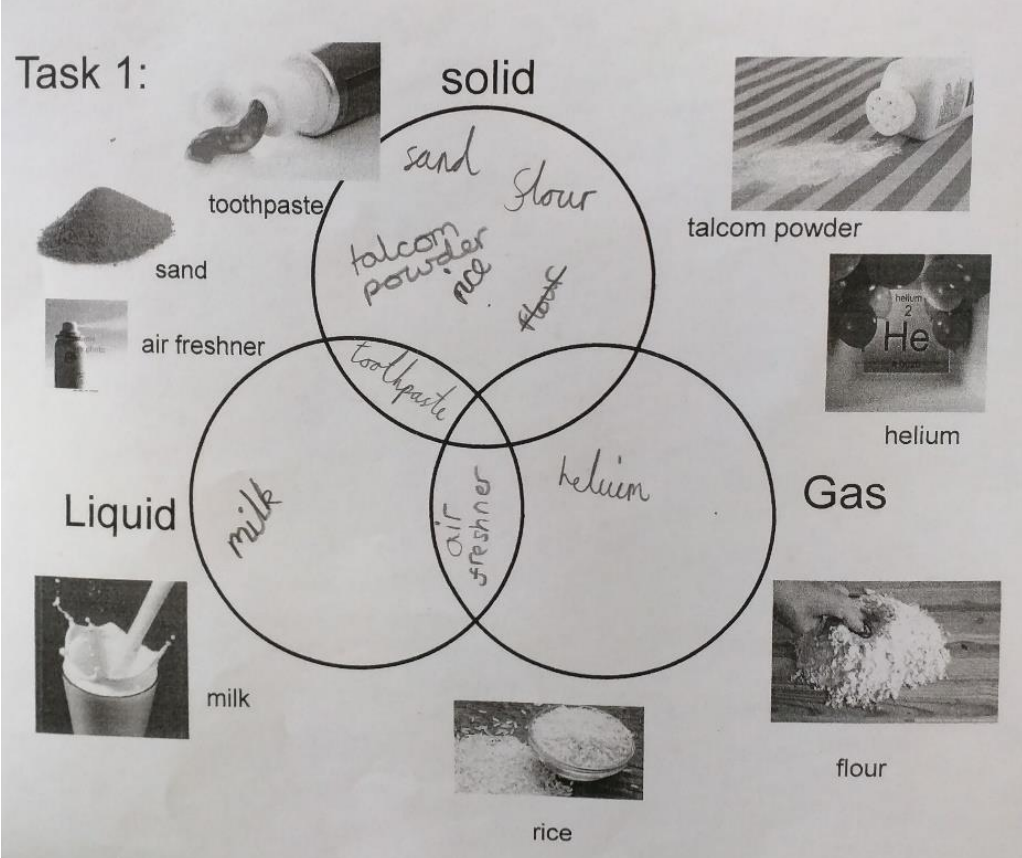
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
<p>The children were given a set of cards with some properties of the three states. In small groups, they discussed each statement and decided whether it applied to a solid, liquid or gas or more than one of these.</p>				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“When you pour water into a cup it fills the bottom of it. You cannot make a brick any smaller. It cannot change volume. You cannot cut air or water.”</p>		<p>Chaya sorted the cards using examples to back up her ideas.</p> <p>Through this activity, Chaya learnt some key properties of the three states of matter.</p>
Teacher observations		Working scientifically

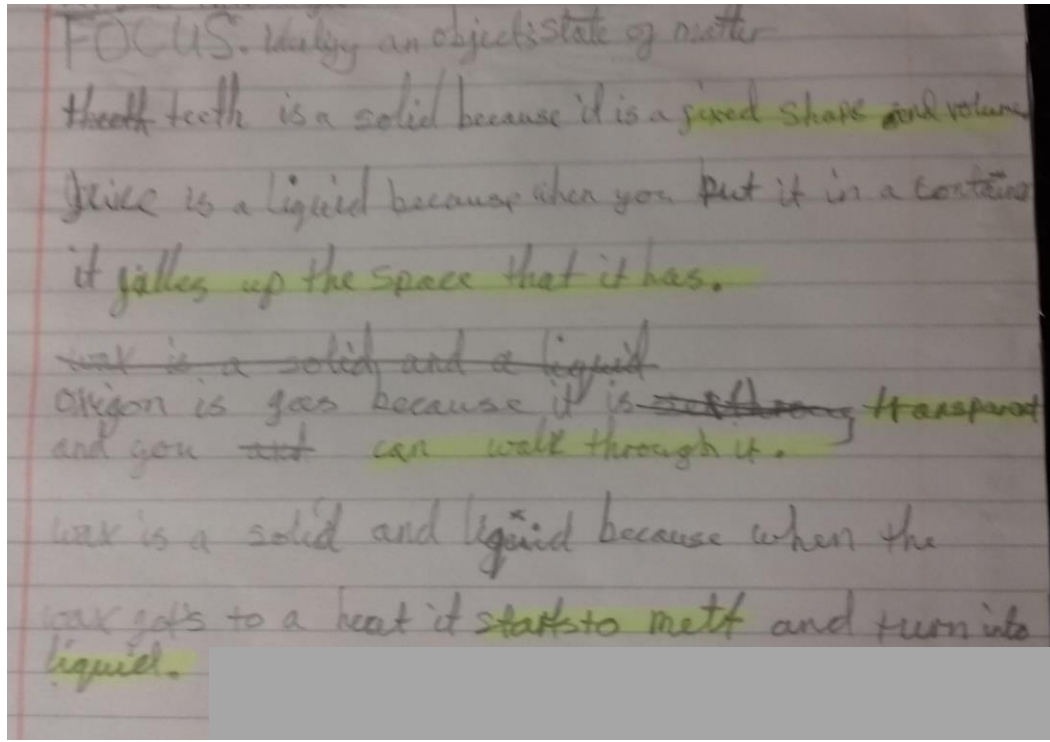
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	<p>The teacher wanted to clarify that some solids made of small particles can be poured but this does not make them a liquid. The children were given some rice to handle. They were asked to count how many grains of rice they had. They then poured the grains of rice from one person's hand to another. They then each held one grain and realised that they could not pour this.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"You can pour a bowl of rice like a liquid, as it is made up of lots of grains. You cannot pour one grain. Each grain of rice is a solid."</p>		<p>Chaya is now aware that some solids that are made up of small particles can be poured like a liquid but that each particle is in fact a solid.</p>
<p>Teacher observations</p>		<p>Working scientifically</p>

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	<p>The children were then given images and, where possible, the actual materials to consider and explore. These examples were chosen as the state is harder to define. The children were asked to discuss and justify their ideas.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“Toothpaste is a little bit like a solid, as it keeps its shape, but also like a liquid, as you can squeeze it out of the tube.</p> <p>“You can pour the sand, flour and talcum powder, but they are not liquids.</p> <p>The air freshener is a liquid, but the smell then fills the room like a gas.”</p>		<p>Chaya is using the properties of the three states to justify her opinions.</p>
Teacher observations		Working scientifically


	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	The children were asked to write what they now understood about solids, liquids and gases.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		<p>This writing, in conjunction with the oral comments in the previous card sort activity, show that Chaya is secure in identifying solids, liquids and gases and can give some properties of each.</p>
Teacher observations		Working scientifically
<p>The statement about gases is not very scientific.</p> <p>The statement about wax shows that Chaya is aware of changing state which is the next area of learning.</p>		

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	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Compare and group materials together, according to whether they are solids, liquids or gases. 			
	Description of activity			
	The children were given some foam burst shower gel in a small container to observe.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"You can squash it in to fill the bottom of the cup.</p> <p>"It isn't rigid and it doesn't keep its shape, so it is not like a solid.</p> <p>"But you can't pour it, so it's a bit like a solid.</p> <p>"I can now see bubbles which are a gas."</p>	<p>Initially</p>  <p>After a few minutes</p> 	<p>In this activity, Chaya uses properties of all three states when talking about her observations.</p>
Teacher observations		Working scientifically

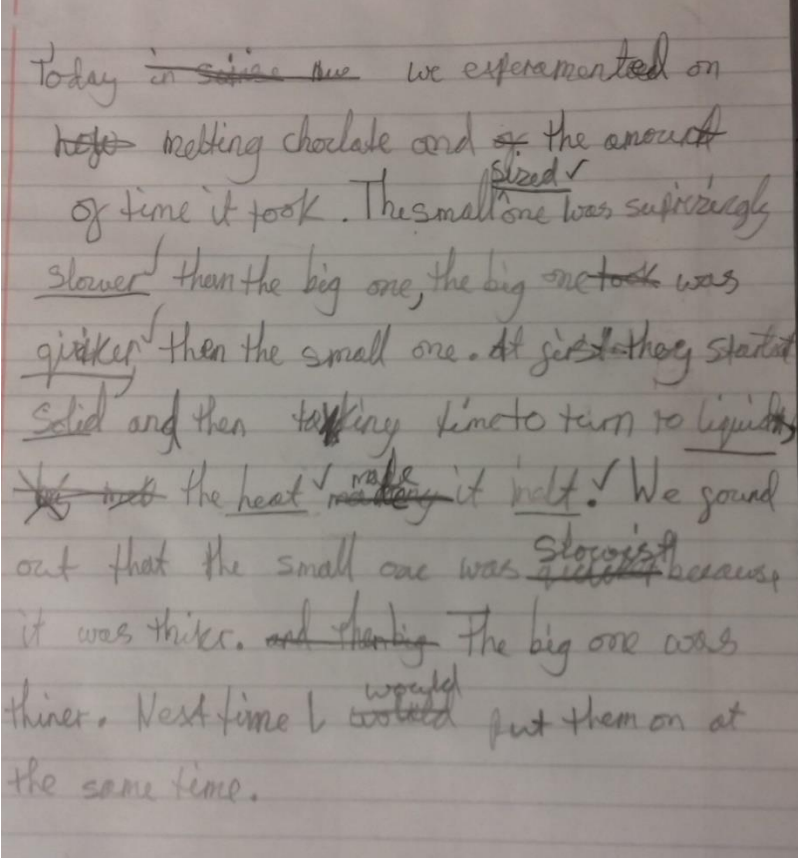
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). 			
	Description of activity			
	The children were asked to share their ideas about chocolate chairs.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>Chaya: "Plus - You can eat it. Minus - It would melt because our bodies are hot. Interesting - It could be made into any shape I want."</p> <p>Teacher: "What happens when chocolate melts?"</p> <p>Chaya: "When the chocolate gets warm, it turns from a solid into a liquid. This is the same as when an ice cube melts."</p>		<p>Chaya understands that chocolate melts if it gets warm and that this can be used to change the shape of the chocolate. She confidently explains the process of melting.</p>
Teacher observations		Working scientifically



	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). 			
	Description of activity			
	The children were given two chocolate buttons to look at and consider how they were the same and different. They were asked to predict which chocolate button they thought would melt the quickest and given equipment to test this out.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“Both are milk chocolate. They are both round. They both have a flat bottom with writing on them.</p> <p>“One is bigger than the other. The small one is thicker than the big one.”</p>		
Teacher observations		Working scientifically
Chaya and the rest of the class thought that the small button would melt the fastest.		Chaya makes careful observations of the similarities and differences between the two types of chocolate buttons.

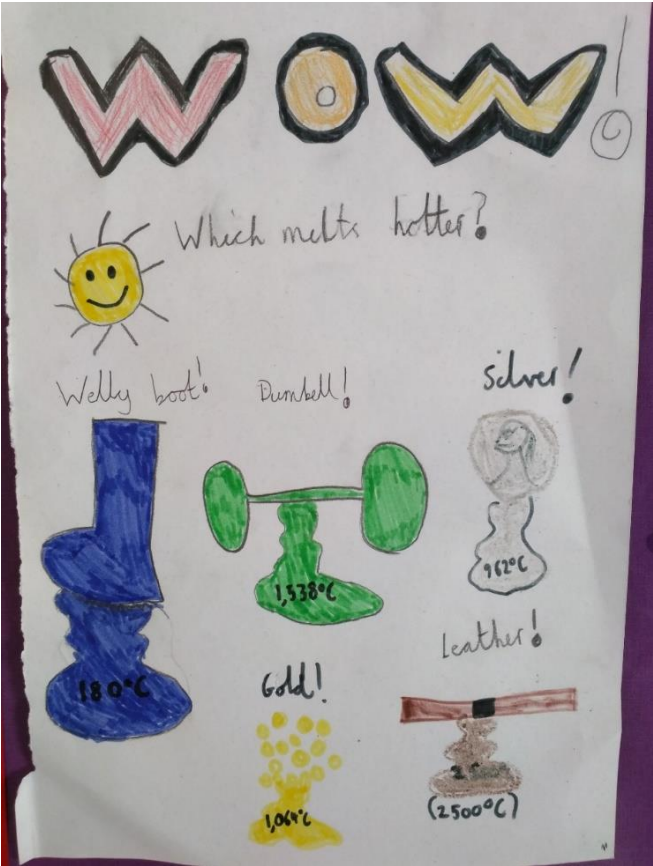
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). 			
	Description of activity			
	The children carried out the enquiry and wrote a conclusion.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations		Working scientifically
<p>Chaya makes good use of the key vocabulary throughout – solid, liquid, heat, melt.</p> <p>Chaya's group decided the test would be better if they melted both buttons at the same time as the temperature of the water may have changed.</p>		<p>Chaya is secure in explaining the process of melting.</p> <p>This conclusion shows that the results did not match Chaya's prediction, but she has thought about this and come up with a new reason – the thickness is more important than the size.</p> <p>Chaya makes a suggestion of how to improve the method.</p>

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C). 			
	Description of activity			
	The children were given small amounts of seven liquids to explore. The teacher had previously put these liquids in an ice cube tray and placed in them in the freezer. The children were then given the frozen cubes to explore.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“They are all liquids because they fill the bottom on the pot and the surface is flat. Some of them are thicker and are not as easy to pour.</p> <p>“You can push your finger in the honey cube. It hasn’t really changed. It is still a thick liquid. The salt water cube is white and doesn’t feel as smooth. The oil melted back into a liquid quickly.”</p>	<p style="text-align: center;">Before freezing</p>  <p style="text-align: center;">After freezing</p> 	<p>Chaya describes how things change as they are heated and cooled.</p>
Teacher observations		Working scientifically
		Chaya makes careful observations of the similarities and differences between the liquids and the frozen cubes.


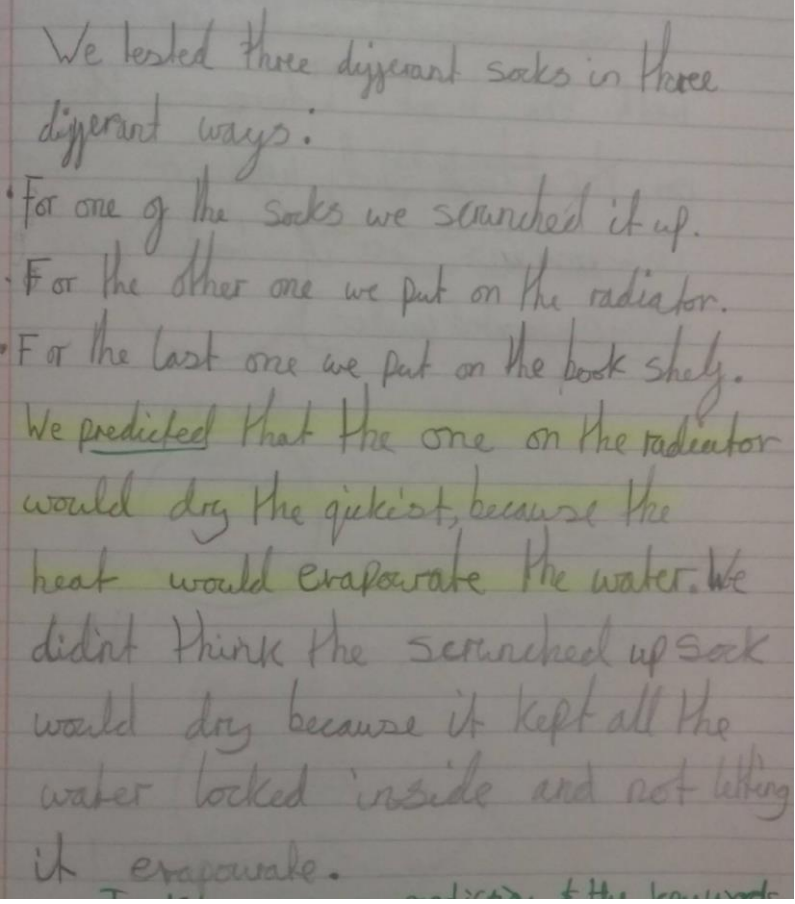
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius ($^{\circ}\text{C}$). 			
	Description of activity			
	For homework, the children were asked to research the temperature at which different materials melt.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“The rubber had the lowest melting point and the leather the highest. You would have to heat the leather much more for it to melt.</p> <p>“The melting points of the metals were fairly similar.”</p>		<p>Chaya recognises that materials melt at different temperatures.</p>
Teacher observations		Working scientifically
		<p>Chaya interpreted her research and could explain the significance of the numbers.</p>

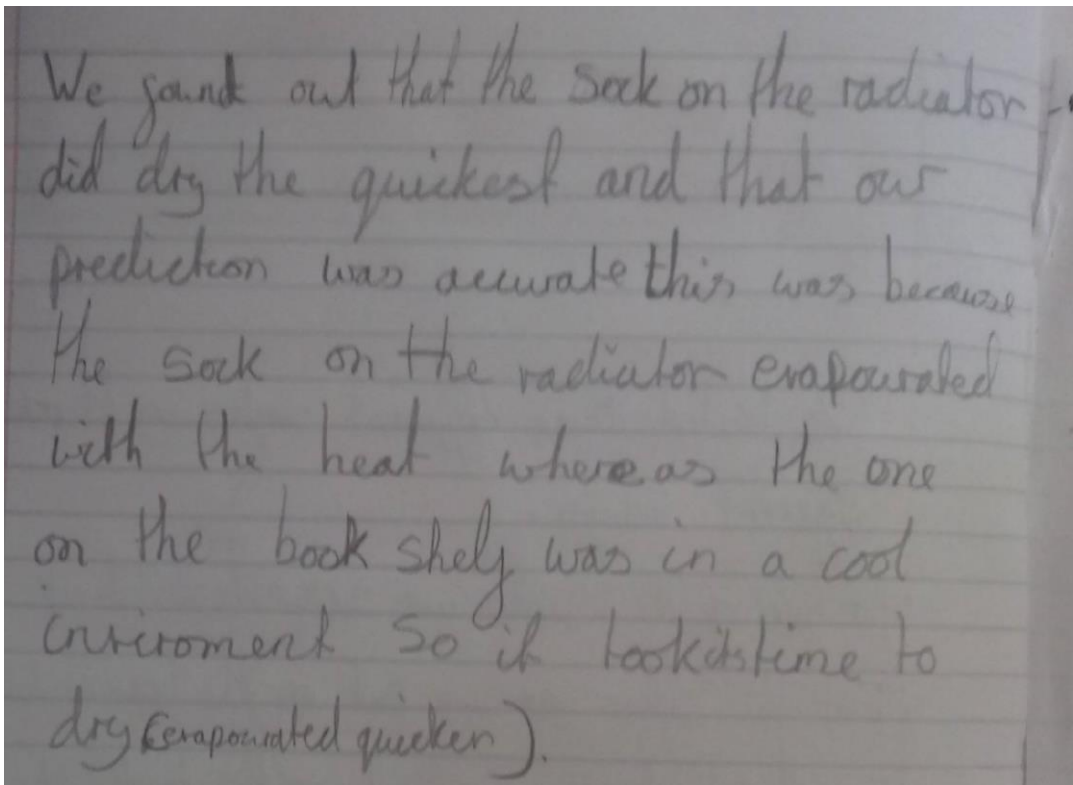
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	<p>Before they went out for lunch, the children were asked to make a handprint on a paper towel using water. They immediately started to see that the print was changing. When they came back after lunch, the prints had disappeared.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>"It's getting smaller. It's fading away."</p>		
<p>Teacher observations</p> <p>The children did not use the word evaporate at this point, so this key word was introduced and explained. We discussed how evaporation is the process by which washing dries and puddles dry up.</p>		<p>Working scientifically</p> <p>Chaya describes the changes she sees.</p>

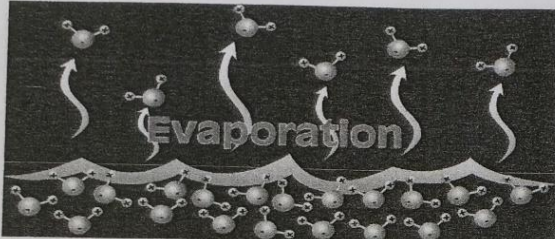
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	The children were presented with the scenario that the teacher had noticed that her socks had not dried properly and were now rather smelly. She is wondering what she could do to ensure this does not happen again.			


EVIDENCE OF LEARNING		ASSESSMENT	
Oral evidence	Examples of work		
Teacher observations			Knowledge
<p>The class came up with a number of suggestions: putting them on the radiator; seeing if they dried differently if they were scrunched up or not; hanging them up by an open window; and squeezing more water out.</p> <p>Each group were given three socks and asked to decide how they would set up their test.</p>		Working scientifically	
		<p>Chaya shows a good understanding of the process of evaporation as she recognises that heat will make the process quicker and that, if the sock is scrunched up, it is harder for the water to evaporate.</p> <p>This should be a comparative test, but Chaya's group did not consider carefully the variables they were changing or controlling. However, she is still learning about evaporation.</p>	


	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	Continued from the previous page.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Chaya links the rate of evaporation to the temperature.
Teacher observations		Working scientifically

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	Using a word bank, the children were asked to explain what they understood by the word 'evaporation'.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	<p>Process of evaporation. What happens?</p>  <div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>Word bank:</p> <p>disappear Process ✓</p> <p>Heat ✓ Liquid ✓</p> <p>Particles ✓ Gas ✓</p> <p>Evaporate ✓</p> </div>	Chaya explains the process of evaporation but, at this stage, is relying on a word bank being provided.
Teacher observations	<p>Go to your tables and explain what evaporation is in your books:</p> <p>Evaporation is <u>the process of a liquid becoming (evaporating) a gas and the water particles expanding.</u> which is affected by <u>the heat.</u></p>	Working scientifically
	<p>The particles do not actually expand but they get further apart.</p> <p>This was a common misconception across the class which was later clarified.</p>	


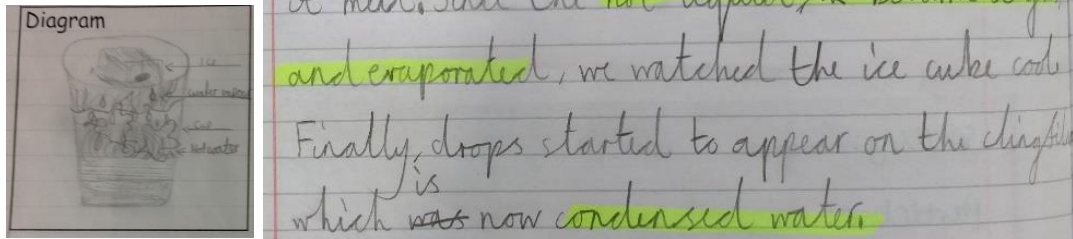
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	<p>The children were shown an image to talk about. After the discussion, the teacher showed them a kettle boiling and highlighted that boiling and evaporating are the same state change, but they happen at different temperatures. She also held a mirror over the spout of the kettle to show the formation of condensation.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>Chaya: “The drink must be hot as there is steam coming out of the mug.”</p> <p>Teacher: “There is water on the window. Is it raining outside?”</p> <p>Chaya: “Sometimes you get water on the inside of the window. At home, we get that in the bathroom when you shower.”</p>		<p>At this point, Chaya is not using the words ‘water vapour’ or ‘condensation’.</p>
Teacher observations		Working scientifically

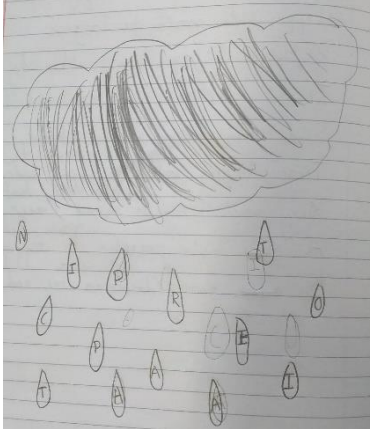
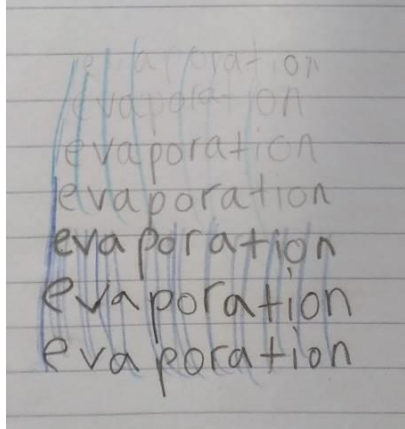
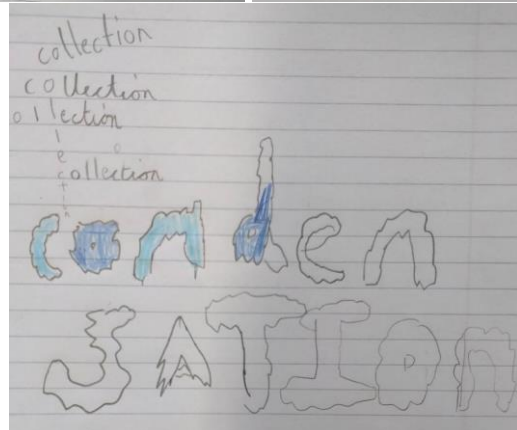
	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
The children were shown the concept cartoon to discuss.				

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
<p>“The water can’t leak out of the glass because it’s waterproof and otherwise it would leak all the time.</p> <p>“The ice can’t melt onto the outside.</p> <p>“I am not sure about the last one.”</p>		<p>Chaya is not confident about water vapour in the air condensing on the cold surface of the glass.</p>
Teacher observations		Working scientifically

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	The children placed hot water in a cup, covered it with cling film, and place ice cubes on top to observe what happened.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	
		<p>Chaya is beginning to use appropriate scientific vocabulary to describe her observations.</p>
Teacher observations		
		Working scientifically

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
The children learnt about the water cycle as part of their English work. They watched a video about the water cycle and identified some key scientific words for which they then created calligrams to help them remember them.				

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 	Chaya's calligrams show a good understanding of the key vocabulary.
Teacher observations		Working scientifically



Year

4

Topic

States of matter

Focus of assessment (National Curriculum statements)

- Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Description of activity

Guided by the teacher, the children role-played the water cycle and used this to help them to label a water cycle diagram.

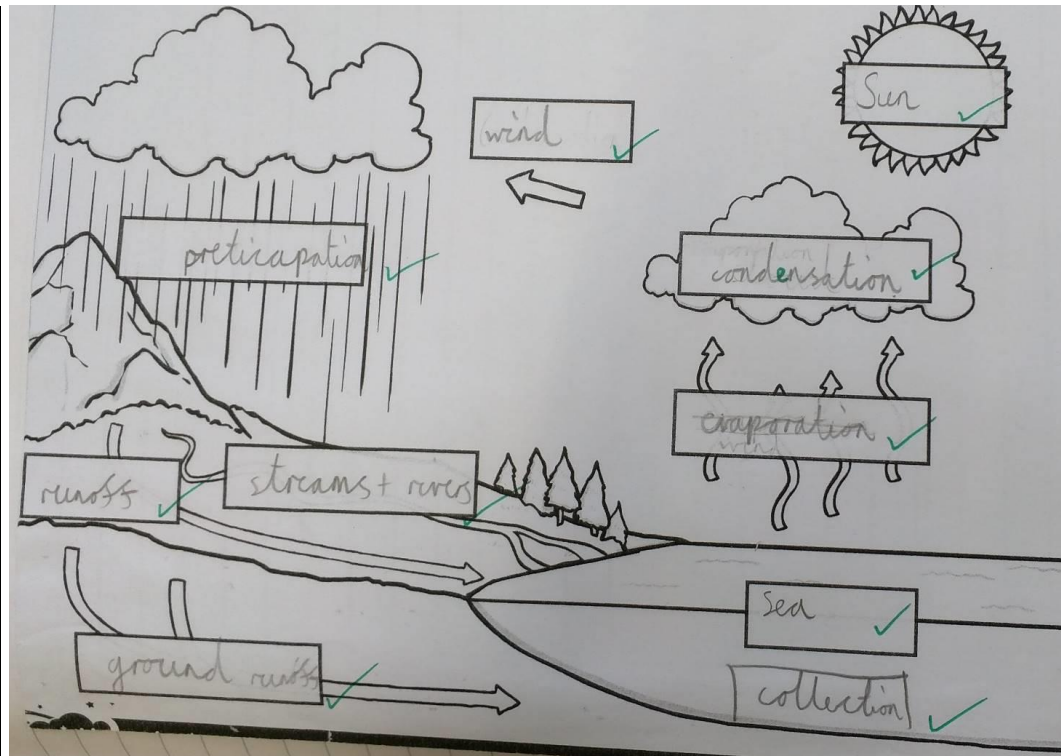
EVIDENCE OF LEARNING

ASSESSMENT

Oral evidence

Examples of work


Knowledge

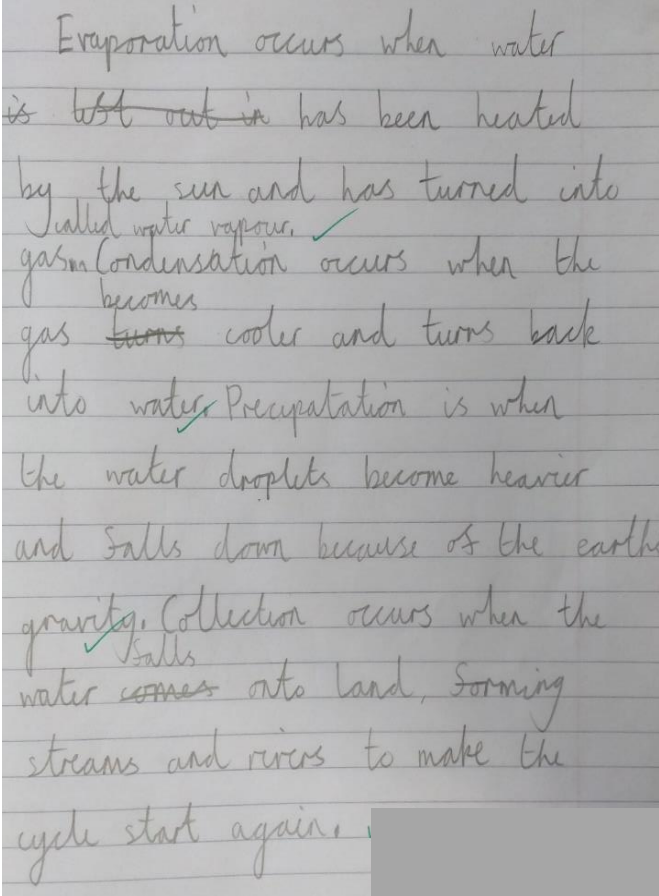


Chaya uses her knowledge gained from the role play to label the diagram of the water cycle.

Working scientifically

Teacher observations


	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	The first piece of writing the children were asked to create was factual sentences about the key scientific words.			

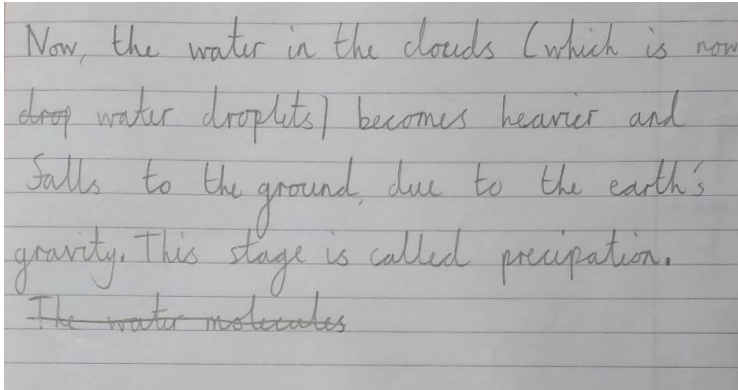
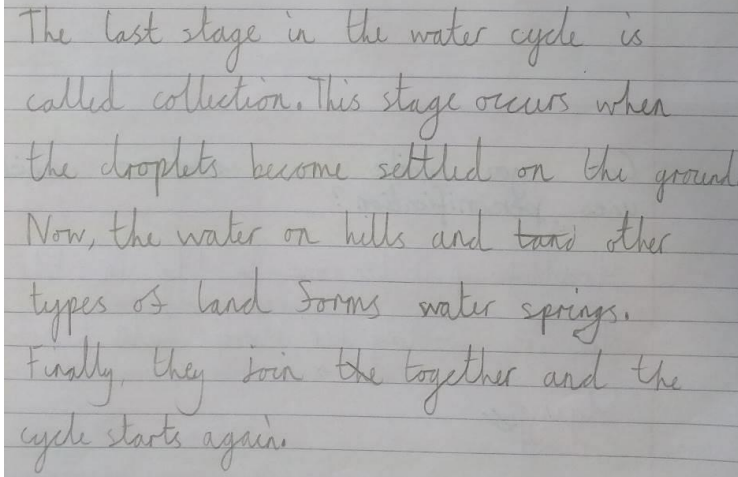
EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Chaya clearly explains the meanings of the key vocabulary for the water cycle. The writing shows she can explain the processes of evaporation and condensation.
Teacher observations		Working scientifically



Year	4	Topic	States of matter
Focus of assessment (National Curriculum statements)			
<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
Description of activity			
The children were then asked to write about the water cycle. (Continued on next page.)			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	<p>The first stage of the water cycle is evaporation. [Due] to the heat of the sun, water in rivers, lakes and seas forms into a gas called water vapour.</p> <p>① During this process, the water molecules ② molecules space out separate</p> <p>The next stage in the water cycle is condensation, which is when the water vapour gets carried ^{into the sky} by the wind and forms clouds. Up in the sky, the gas gets becomes cooler and turns into liquid again.</p>	Working scientifically

	Year	4	Topic	States of matter
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. 			
	Description of activity			
	Continued from the previous page.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		In this writing, Chaya explains the water cycle clearly, using the appropriate scientific vocabulary.
Teacher observations		Working scientifically



Overall summary

Secure

Chaya has been given the opportunity to explore a range of materials to discuss their state. She can justify the state of a material based on its properties. She understands that melting and freezing are a state change between solids and liquids. She understands that boiling and evaporation are the same state change from liquid to gas but that they occur at different temperatures. She knows that the speed of evaporation depends on a number of variables including the temperature. She describes the water cycle clearly.



Acknowledgements

- Page 20 - concept cartoon from Hamilton Trust