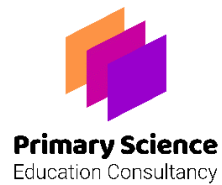





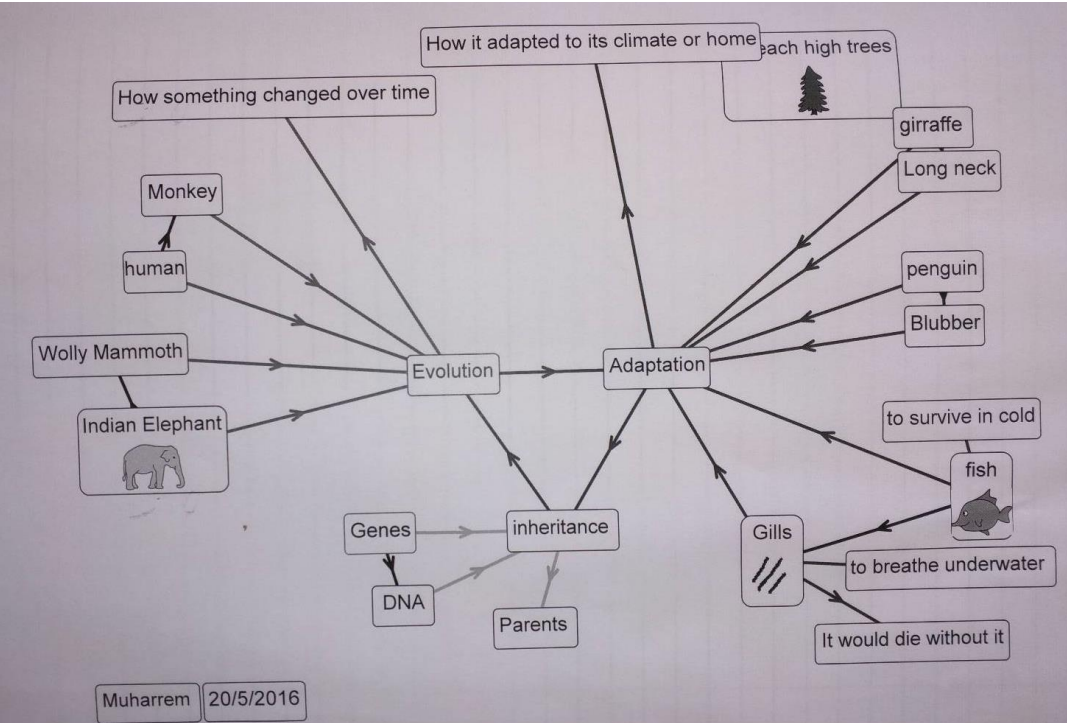
Examples of Work


Muharem

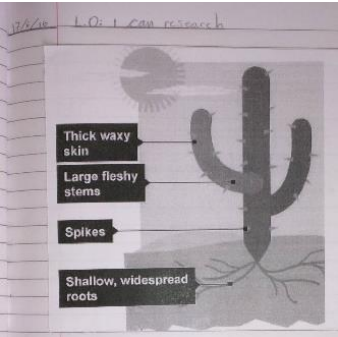
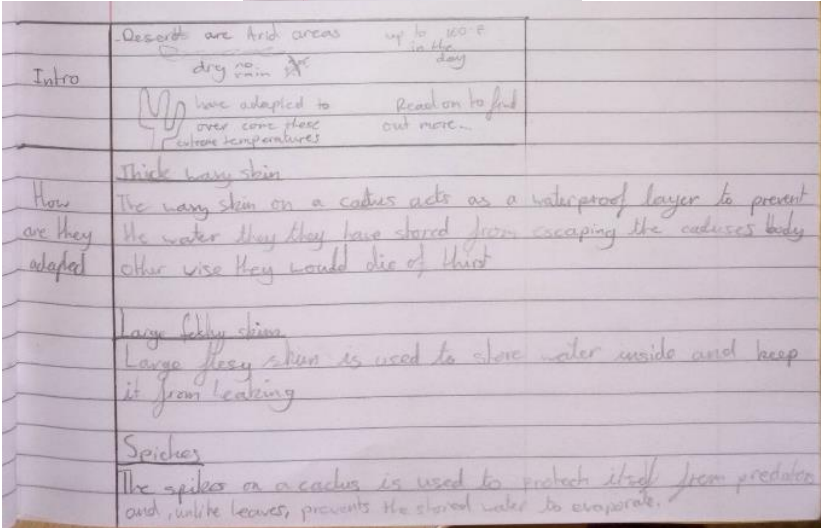
Evolution and inheritance - Year 6




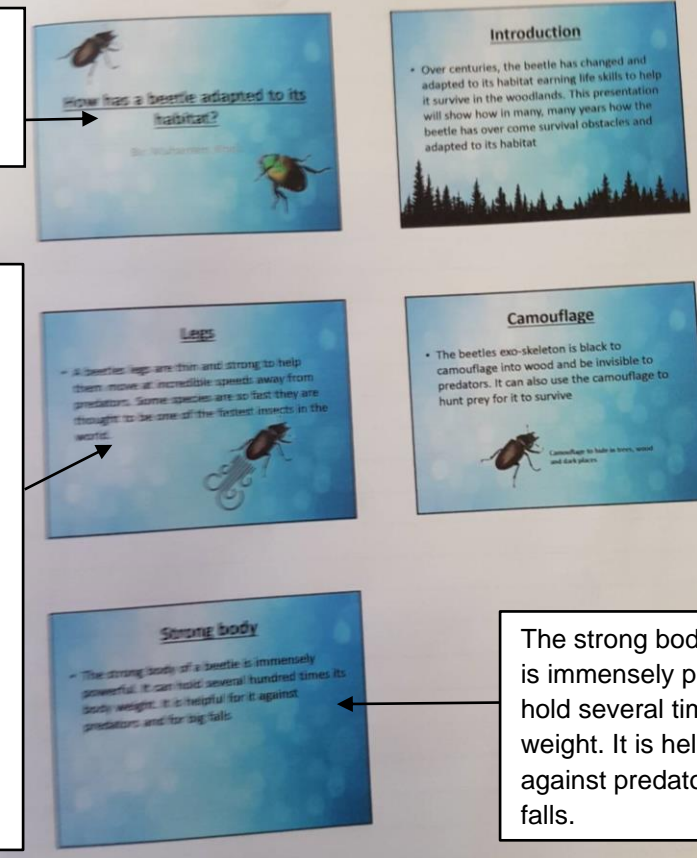
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	<p>Before starting the topic, the children were asked to create a mind map to show their understanding of the key vocabulary from the topic – ‘inheritance’, ‘adaptation’ and ‘evolution’.</p>			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations		<p>Muharem’s concept map shows that he is aware of how some animals are suited to their environment. He shows understanding that offspring inherit from their parents. He also shows an awareness that evolution is a change over time.</p>
<p>Children are not expected to learn about genes and DNA in Key Stage 2.</p>		<p>Working scientifically</p>

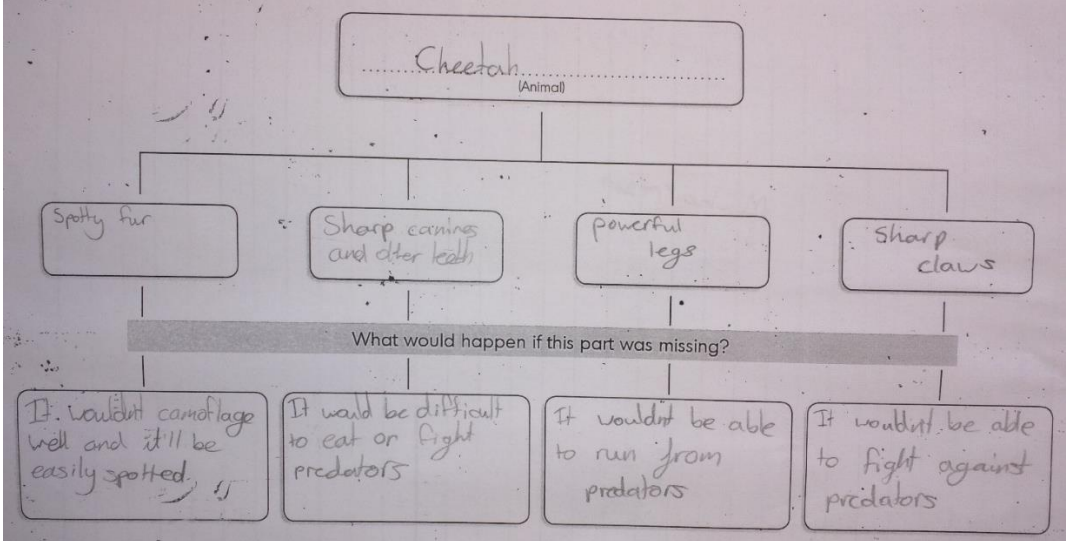
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
The children were given an image of a cactus with some key features highlighted. The children then had to think about how these adaptations enable it to live in the desert.				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Muharem identifies how these key features enable a cactus to survive in a very dry, hot habitat. He identifies key ways in which the cactus conserves water.
Teacher observations		Working scientifically

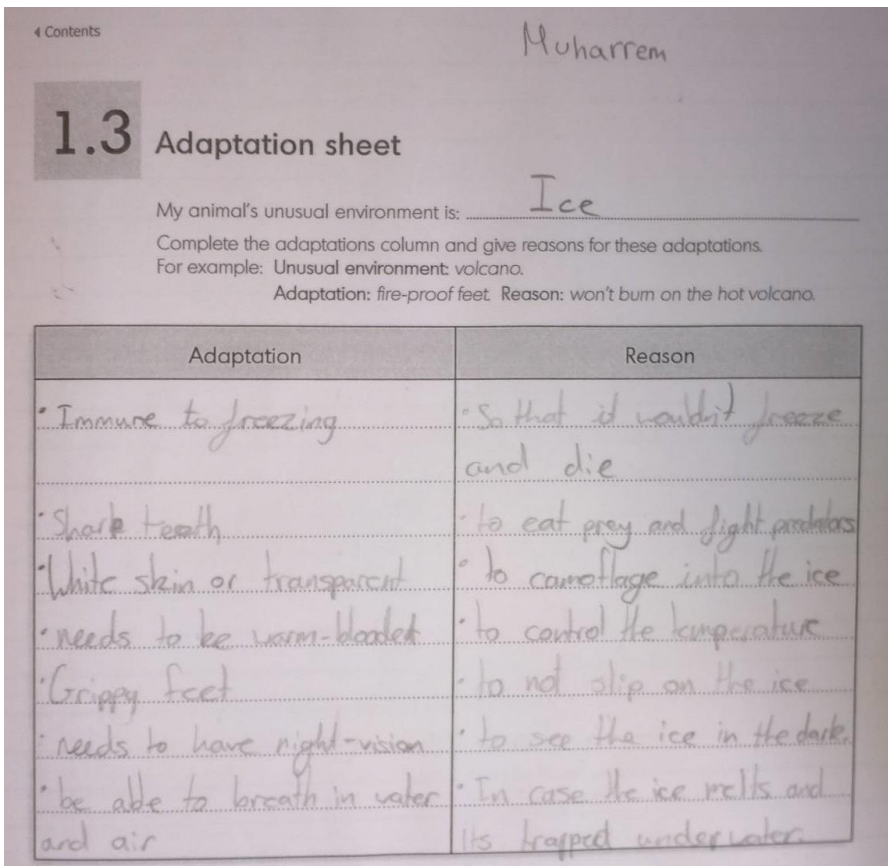
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	The children were asked to research an animal of their choice to learn how it is adapted to suit its environment. Muharem chose to research a beetle.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations		Muharem gives some key features indicating how a beetle is suited to its habitat.
Muharem looked at different websites to find suitable information.		<p>How has a beetle adapted to its habitat?</p> <p>The beetle's legs are thin and strong to help them move at incredible speeds away from predators. Some species are so fast that they are thought to be one of the fastest insects in the World.</p> <p>The strong body of a beetle is immensely powerful. It can hold several hundred times its body weight. It is helpful for it against predators and for big falls.</p>
		Muharem chooses to present his learning as a PowerPoint presentation.


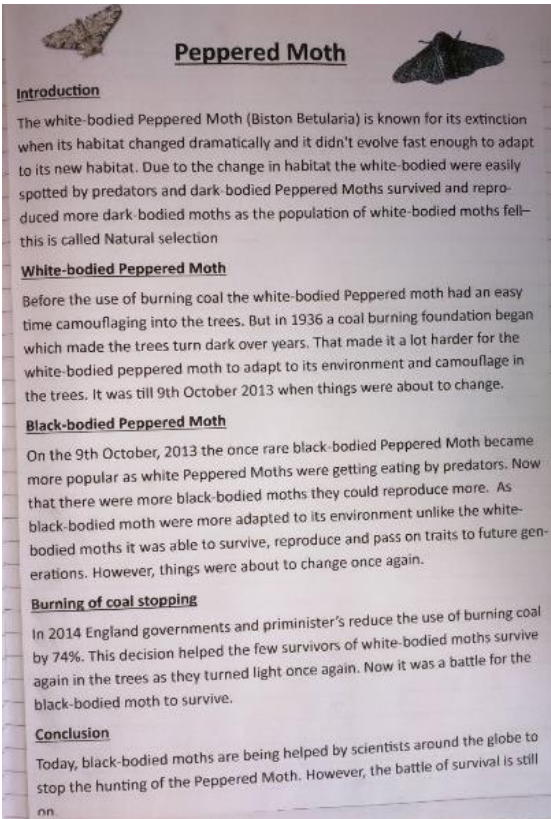
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
The children were given an animal to discuss in small groups. They had to think of some adaptations that meant it was suited to its environment and then to consider what would be the impact of not having this characteristic.				


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Muharem gives some key features indicating how a cheetah is suited to its habitat, e.g. spotty fur, and the implications of not having these characteristics. His responses do not reflect the place of the cheetah in the food web.
Teacher observations		Working scientifically
<p>Muharem recognises adaptation for camouflage.</p> <p>He is focusing on the need to escape from larger predators, which these characteristics facilitate, but has not recognised the importance of these features for the cheetah as a predator.</p>		

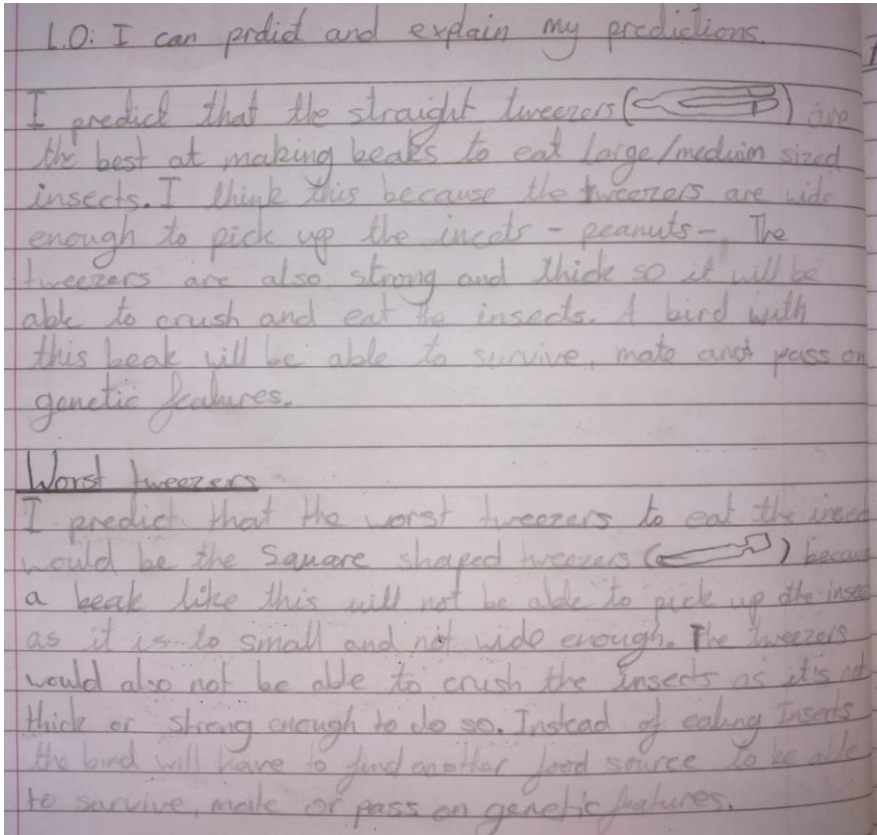
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	To consolidate this learning, the children were asked to think about an unusual environment and then consider what adaptations an animal would need to survive here, giving reasons why.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		Muharem gives some appropriate adaptations for his animal, with reasons.
Teacher observations		Working scientifically
Muharem chose to consider an icy environment.		

	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	The children were asked to research how the industrial revolution affected two varieties of peppered moths. Then, they designed a moth that would be camouflaged in a specified environment.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
Teacher observations	 	<p>Through this writing, Muharem has shown that he is aware that, over time, the numbers of white-bodied and black-bodied moths in the population varied due to the changing habitat and the change in their ability to be camouflaged. He also shows an understanding that the moths pass on their characteristics to their offspring.</p> <p>He applied this subject knowledge in his artwork when considering what the population of peppered moths might look like in a wooded area.</p>
Muharem looked at a number of websites for information and to check that it was consistent.		Working scientifically
		Muharem presents evidence about how environmental changes affected the population of peppered moths.

	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	The children were told about Darwin's research into the finches on the Galapagos Islands. The children were given different sorts of tweezers to represent the different bird beaks. They were asked to consider what food they thought each bird was best suited to eat.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 <p>L.O: I can predict and explain my predictions.</p> <p>I predict that the straight tweezers (drawing) are the best at making beaks to eat large/medium sized insects. I think this because the tweezers are wide enough to pick up the insects - peanuts - . The tweezers are also strong and thick so it will be able to crush and eat the insects. A bird with this beak will be able to survive, mate and pass on genetic features.</p> <p><u>Worst tweezers</u></p> <p>I predict that the worst tweezers to eat the insects would be the square shaped tweezers (drawing) because a beak like this will not be able to pick up the insects as it is too small and not wide enough. The tweezers would also not be able to crush the insects as it's not thick or strong enough to do so. Instead of eating insects the bird will have to find another food source to be able to survive, mate or pass on genetic features.</p>	<p>Muharem shows a secure understanding of parents passing on features to their offspring. He also shows an understanding that, if the animal is not suited to its habitat, it will not be able to survive and therefore will not breed and pass on its characteristics.</p>
Teacher observations		Working scientifically
		<p>Muharem makes good predictions based on the shape and size of the food and beaks. He talks about both the model – peanuts – and the reality – insects.</p>



Year

6

Topic

Evolution and inheritance

Focus of assessment (National Curriculum statements)

- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Description of activity

The children were encouraged to test out their predictions by 'feeding' for 10 seconds using the different 'beaks' counting up the number of peanuts each 'beak' was able to pick up.

EVIDENCE OF LEARNING





ASSESSMENT

Oral evidence

Examples of work

Knowledge


L.O: I can record my results

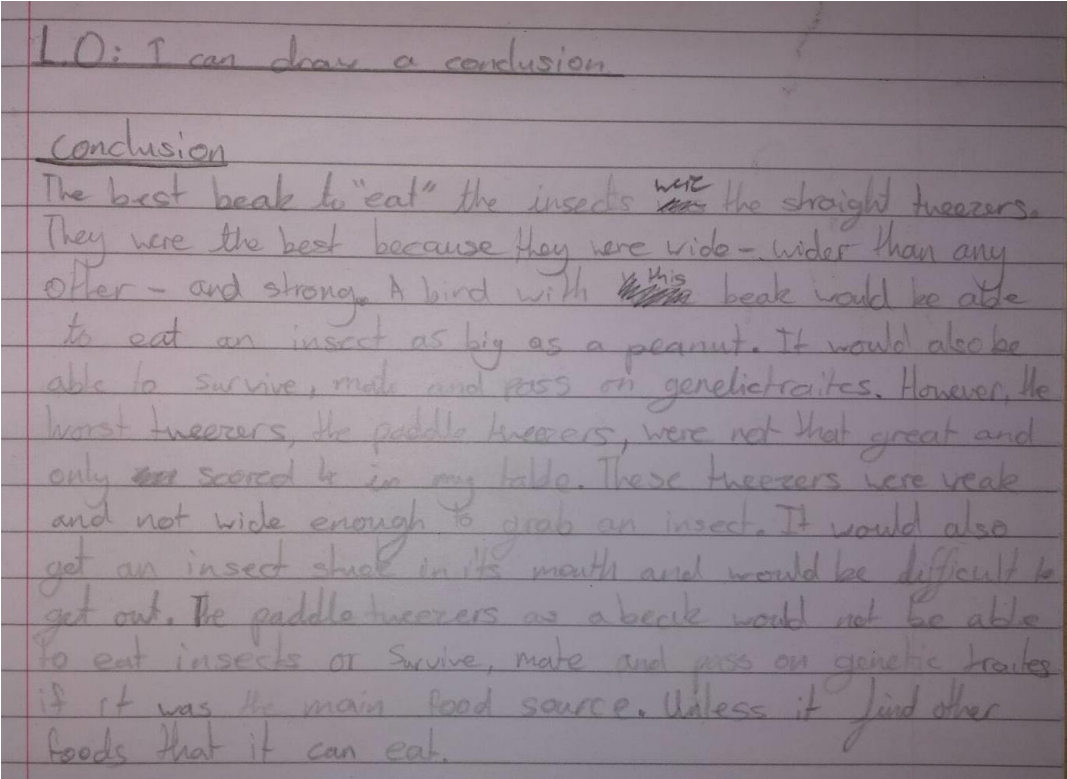
tweezer shape	observation	amount in 10sec
 straight tweezers	It was easy because the tweezers were big and wide. The peanuts were also easy to crack	11
 paddle	The paddle tweezers were not hard to pick up the peanuts. They were not wide enough or strong enough to crack it.	4
 pointy	The pointy tweezers were not the best but I managed to pick up 6. They were just wide enough but were definitely not strong enough to crack.	6
	With this tweezer the peanuts got stuck in the mouth and was difficult to get out. It also was not strong enough to crack it.	5


Working scientifically

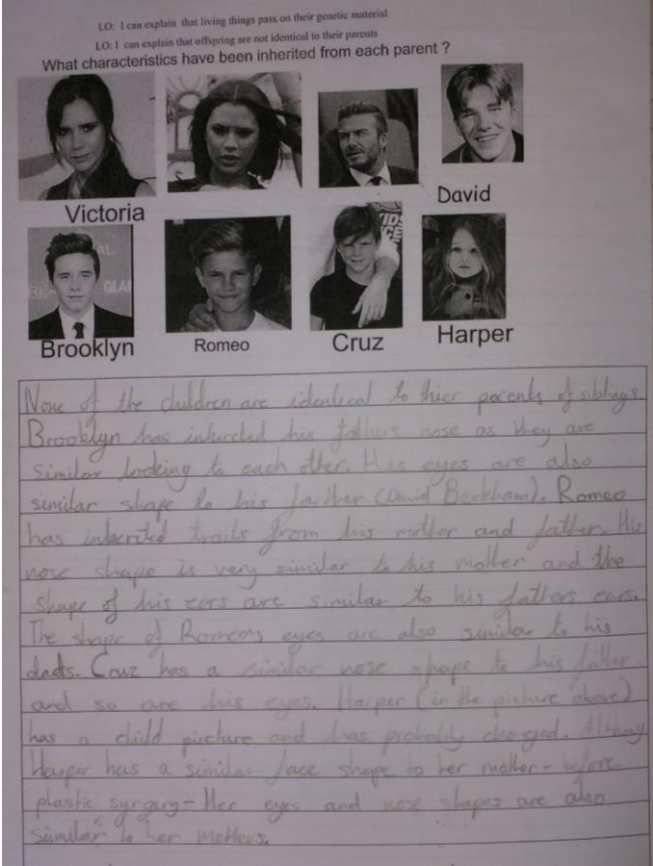
Muharem chooses to record his results in a table. He adds appropriate headings to his table.


Teacher observations

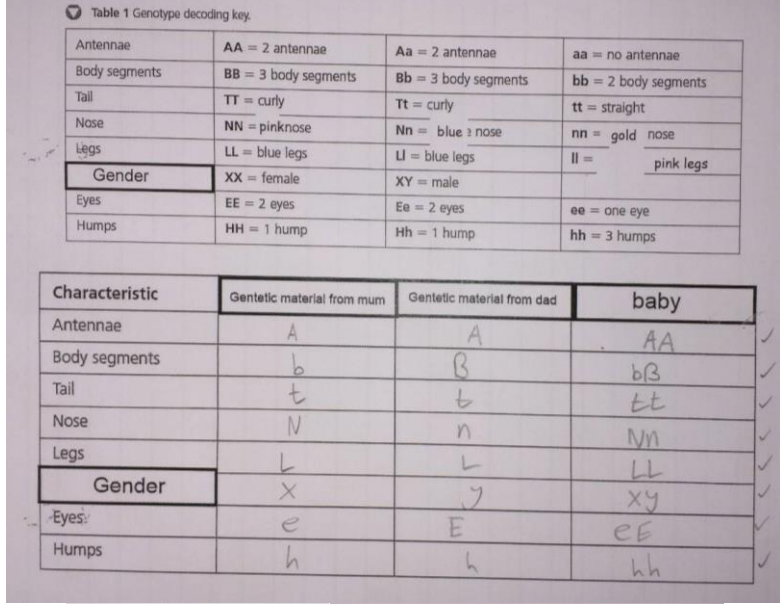

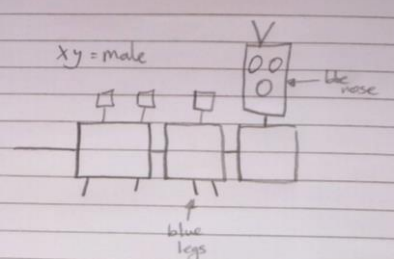
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. 			
	Description of activity			
	The children reflected on their results and considered what this would mean for the population of birds.			


EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		<p>Muharem is again showing here that he understands that, if the animal is not suited to its environment e.g. cannot eat the available food, then it will not be able to breed and pass on its characteristics to future generations.</p>
Teacher observations		Working scientifically
		<p>Muharem's conclusion describes his findings and he uses his data to support his explanation of the model and what it represents.</p>

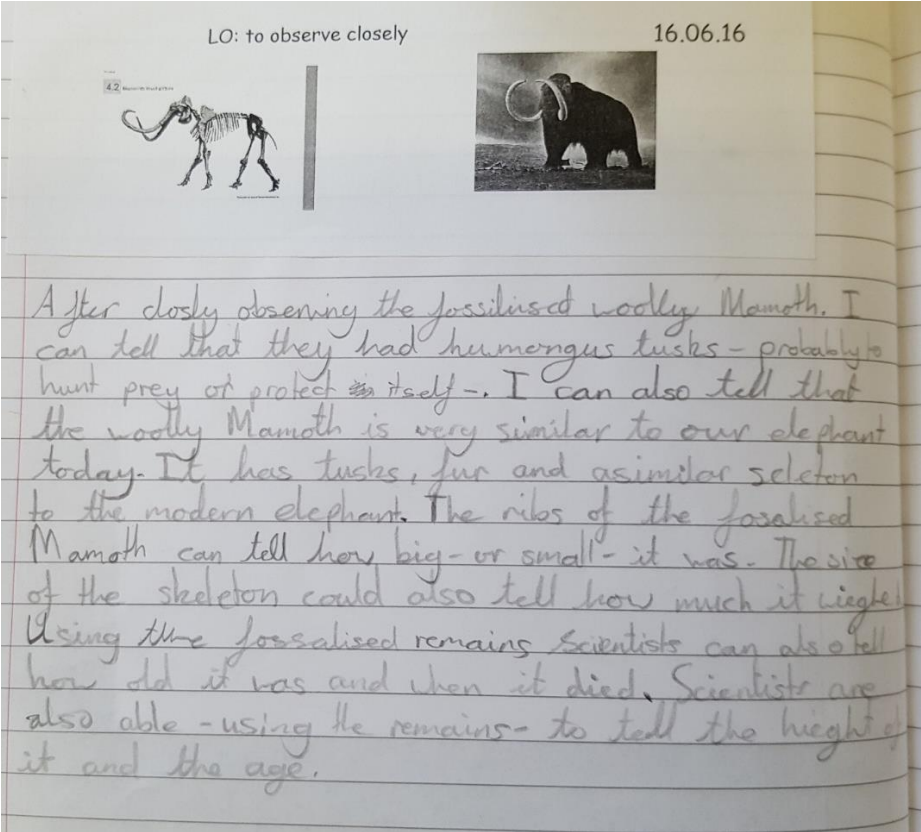
	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. 			
	Description of activity			
The children were shown images of the Beckham family and asked to discuss which features the children had inherited from which parent.				

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
	 <p>LO: I can explain that living things pass on their genetic material LO: I can explain that offspring are not identical to their parents What characteristics have been inherited from each parent?</p> <p>Victoria David Brooklyn Romeo Cruz Harper</p> <p>None of the children are identical to their parents or siblings. Brooklyn has inherited his father's nose as they are similar looking to each other. His eyes are also similar shape to his father (David Beckham). Romeo has inherited traits from his mother and father. His nose shape is very similar to his mother and the shape of his ears are similar to his father's ears. The shape of Brooklyn's eyes are also similar to his dad's. Cruz has a similar nose shape to his father and so are his eyes. Harper (in the picture above) has a child picture and has probably changed. Although Harper has a similar face shape to her mother - before plastic surgery - her eyes and nose shapes are also similar to her mother's.</p>	<p>This writing shows that Muharem has a clear understanding that offspring inherit some characteristics from each parent.</p>
Teacher observations		Working scientifically
Muharem consistently uses the key vocabulary 'inherit'.		

	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents. 			
	Description of activity			
	This activity involves randomly selecting features for the children from either parent. The baby 'Reebops' are made out of marshmallows – http://www.nuffieldfoundation.org/practical-biology/making-reebops-model-meiosis .			

EVIDENCE OF LEARNING		ASSESSMENT																																																																				
Oral evidence	Examples of work	Knowledge																																																																				
<p>"The 'Reebops' children have the same parents, but inherit different traits from their parents so they are not all the same. They are not identical to their parents either, but they have some of the same traits as their parents."</p>	 <p>Table 1 Genotype decoding key</p> <table border="1"> <tr> <td>Antennae</td> <td>AA = 2 antennae</td> <td>Aa = 2 antennae</td> <td>aa = no antennae</td> </tr> <tr> <td>Body segments</td> <td>BB = 3 body segments</td> <td>Bb = 3 body segments</td> <td>bb = 2 body segments</td> </tr> <tr> <td>Tail</td> <td>TT = curly</td> <td>Tt = curly</td> <td>tt = straight</td> </tr> <tr> <td>Nose</td> <td>NN = pinknose</td> <td>Nn = blue nose</td> <td>nn = gold nose</td> </tr> <tr> <td>Legs</td> <td>LL = blue legs</td> <td>Ll = blue legs</td> <td>ll = pink legs</td> </tr> <tr> <td>Gender</td> <td>XX = female</td> <td>XY = male</td> <td></td> </tr> <tr> <td>Eyes</td> <td>EE = 2 eyes</td> <td>Ee = 2 eyes</td> <td>ee = one eye</td> </tr> <tr> <td>Humps</td> <td>HH = 1 hump</td> <td>Hh = 1 hump</td> <td>hh = 3 humps</td> </tr> </table> <table border="1"> <thead> <tr> <th>Characteristic</th> <th>Genetic material from mum</th> <th>Genetic material from dad</th> <th>baby</th> </tr> </thead> <tbody> <tr> <td>Antennae</td> <td>A</td> <td>A</td> <td>AA ✓</td> </tr> <tr> <td>Body segments</td> <td>b</td> <td>B</td> <td>bB ✓</td> </tr> <tr> <td>Tail</td> <td>t</td> <td>t</td> <td>tt ✓</td> </tr> <tr> <td>Nose</td> <td>N</td> <td>n</td> <td>Nn ✓</td> </tr> <tr> <td>Legs</td> <td>L</td> <td>L</td> <td>LL ✓</td> </tr> <tr> <td>Gender</td> <td>X</td> <td>Y</td> <td>XY ✓</td> </tr> <tr> <td>Eyes</td> <td>e</td> <td>E</td> <td>eE ✓</td> </tr> <tr> <td>Humps</td> <td>h</td> <td>h</td> <td>hh ✓</td> </tr> </tbody> </table>  	Antennae	AA = 2 antennae	Aa = 2 antennae	aa = no antennae	Body segments	BB = 3 body segments	Bb = 3 body segments	bb = 2 body segments	Tail	TT = curly	Tt = curly	tt = straight	Nose	NN = pinknose	Nn = blue nose	nn = gold nose	Legs	LL = blue legs	Ll = blue legs	ll = pink legs	Gender	XX = female	XY = male		Eyes	EE = 2 eyes	Ee = 2 eyes	ee = one eye	Humps	HH = 1 hump	Hh = 1 hump	hh = 3 humps	Characteristic	Genetic material from mum	Genetic material from dad	baby	Antennae	A	A	AA ✓	Body segments	b	B	bB ✓	Tail	t	t	tt ✓	Nose	N	n	Nn ✓	Legs	L	L	LL ✓	Gender	X	Y	XY ✓	Eyes	e	E	eE ✓	Humps	h	h	hh ✓	<p>Muharem applies his understanding in a different context.</p>
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Teacher observations		Working scientifically																																																																				

	Year	6	Topic	Evolution and inheritance
	Focus of assessment (National Curriculum statements)			
	<ul style="list-style-type: none"> Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. 			
	Description of activity			
	Using an image of a woolly mammoth, the children were asked to think about its characteristics and how this compares to a modern elephant.			

EVIDENCE OF LEARNING		ASSESSMENT
Oral evidence	Examples of work	Knowledge
		<p>In this piece of writing, Muharem again identifies key features and explains how these may help the animal to be suited to its environment. He compares the woolly mammoth to a modern elephant and recognises that this change has happened over a long period of time.</p>
Teacher observations		Working scientifically



Year

6

Topic

Evolution and inheritance

Focus of assessment (National Curriculum statements)

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.

Description of activity

The children were given information about fossil remains of horses.

EVIDENCE OF LEARNING

ASSESSMENT

Oral evidence

Examples of work

Knowledge

Fossil evidence!!
What changes can we tell from the fossil records?

Equus	Pliohippus	Merychippus	Mesohippus	Hyracotherium
1 million years ago	10 million years ago	30 million years ago	40 million years ago	60 million years ago
1.6m	1.0m	1.0m	0.6m	0.4m
Single hoof, runs quickly over hard ground	Other toes, last as only middle hoof used	Middle toe developed into a hoof, to run faster	The last toe making further over dry ground	4 toed hoof, well spread for walking on soft ground

Muharem gives a number of features, based on the evidence provided, that show how the horse has evolved over a long period of time.

Teacher observations

Working scientifically

What can we tell from the fossil records?
We can tell - over millions of years - that the horse has evolved to have a single hoof and a larger skull. It also has grown 1.2 meters since 60 million years ago. I can also tell that the horse's Equus and Pliohippus evolved to have hair on the back of their necks. The horse also evolved its legs from a 4 toed hoof to a single hoof because of how its environment and habitat has changed over millions of years. The skull has also enlarged through millions of years - probably to look bigger and eat more.

Muharem uses the evidence from the secondary source to support his ideas about evolution.



Overall summary

Secure

Muharem has shown, in a range of contexts, that he can identify key characteristics that enable living things to survive in different environments. He understands that offspring inherit characteristics from both parents which mean the offspring are similar, but not identical, to their parents and each other. He recognises that, if the environment changes, living things that are not well suited will not survive. Only those living things that can survive in the new environment can breed and pass on their characteristics. He is able to give examples of how, over time, this leads to a change in the population e.g. peppered moths and finches.

He is able to give examples of how fossils provide evidence for this change over long periods of time.



Acknowledgements

- Page 6, 1.3 Adaptation Sheet, *Let's talk about evolution*, Millgate House Education, ASE
- Page 20, <http://www.nuffieldfoundation.org/practical-biology/making-reebops-model-meiosis>
- Page 14, Horse evolution sheet, source unknown