


Mendell Primary School

Aspire Challenge Achieve

Medium Term Plan Science



Year Group: 6	Term: Summer 1 Teacher: Sarah Wearing / Dionne Sinatti		Subject lead: Sarah Bride	Overview: Evolution and Inheritance	Key End Points: By the end of this unit children will be able to:
Common Misconceptions: Some children may think: <ul style="list-style-type: none"> • adaptation occurs during an animal's lifetime: giraffes' necks stretch during their lifetime to reach higher leaves and animals living in cold environments grow thick fur during their life • offspring most resemble their parents of the same sex, so that sons look like fathers • all characteristics, including those that are due to actions during the parent's life such as dyed hair or footballing skills, can be inherited • cavemen and dinosaurs were alive at the same time. 			Unit key Vocabulary: Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils	<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. • 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. <div style="background-color: #e91e63; color: white; padding: 2px; margin-bottom: 2px;"> Identifying, grouping and classifying <small>Making observations to name, sort and organise items.</small> </div> <div style="background-color: #00bcd4; color: white; padding: 2px; margin-bottom: 2px;"> Pattern-seeking <small>Identifying patterns and looking for relationships in enquiries where variables are difficult to control.</small> </div> <div style="background-color: #004a80; color: white; padding: 2px; margin-bottom: 2px;"> Comparative / fair testing <small>Changing one variable to see its effect on another, whilst keeping all others the same.</small> </div> <div style="background-color: #4caf50; color: white; padding: 2px;"> Research <small>Using secondary sources of information to answer scientific questions.</small> </div>	<ul style="list-style-type: none"> <input type="checkbox"/> Explain the process of evolution by natural selection <input type="checkbox"/> Explain how Darwin developed the theory of natural selection <input type="checkbox"/> Explain and identify features that individuals have inherited from their parents <input type="checkbox"/> Explain how some animals are adapted to their environment <input type="checkbox"/> To explain how adaptation is important to the survival of species <input type="checkbox"/> To explain some of the strategies animals adopt to survive winter and adaptations exhibited by animals in polar regions <input type="checkbox"/> Explain how some plants are adapted to their environments <input type="checkbox"/> Explain what fossils are and how they were formed <input type="checkbox"/> Explain the job of a palaeontologist
Links to other learning:	Prior Learning: <ul style="list-style-type: none"> • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats) • Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants) 	Future Learning: <ul style="list-style-type: none"> • Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3) • A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3) • The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3) • Changes in the environment may leave individuals within a species, and some entire species, less well 	High Quality Text: One Smart Fish – by Christopher Wormald Moth: An Evolution Story – By Isabel Thomas Scientist to study: Mary Anning - (Fossil hunter who developed the theory that dinosaurs had become extinct a long time ago) Charles Darwin - (Natural Historian who developed the theory of evolution by natural selection) Nettie Stevens - (Geneticist who concluded that sex is inherited as a chromosomal factor and that males determine the gender of offspring)	Risk Assessment:	Teacher CPD: Reach Out CPD - https://www.reachoutcpd.com/ sign up for free. ASE Plan Muharem work.

	<ul style="list-style-type: none"> Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks) Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats) Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5) 	adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)	Emma Dunne (Palaeobiologist who investigates how ancient climate change affected the evolution of different species)			
<u>Learning Intention</u>	<u>Lesson Outline</u> <u>(Key Questions in colour)</u>			<u>Resources</u>	<u>Vocabulary</u>	<u>Lowest 20% Adaptations</u>
1 L.I. I can collect and observe a range of specimens and identify how organisms are adapted to their environment. 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and asking questions.</p> <p>Pre topic assessment – What do the children already know about evolution and inheritance? Children complete a thought shower of what they already know. Prompt questions:</p> <p>Why do animals live in different habitats? – think about to your work in Year 2 about how animals are suited to certain environments.</p> <p>What does evolution mean? – has anyone heard of Charles Darwin or his work?</p> <p>What are fossils and how are they formed?</p> <p>Complete vocabulary assessment on cover page for the unit and repeat in last lesson to show progression. Thought shower will also be added to in final lesson.</p> <p>Big Question: How are plants and insects adapted to their microhabitat?</p> <p>Word of the week – Adaptation.</p> <p>Who was Charles Darwin? Why was he so important? Gather ideas of what the children already know then watch - https://www.youtube.com/watch?v=42l53DagWnU</p> <p>Take the children into forest school and explain we will be collecting specimens just like Darwin. Encourage the children to collect a range of natural items including plants and mini beasts. Allow children time to examine their specimens and group them in different way. Then encourage the children to identify the adaptations and organise them into cross sectional boxes. – photograph</p> <p>Note: As a boy, Darwin was known for filling his pockets with stones, bits of plants and even live bugs, while he was exploring the countryside. He continued collecting on his HMS <i>Beagle</i> voyages, filling the ship with thousands of specimens. Encourage children to be discerning about what they collect, ensuring that their specimens are good quality. Talk about the ethics of collecting specimens and devise a class policy that makes clear what they should and shouldn't collect.</p>			Time in Forest School, tweezers, specimen cross sectional box such as ice cube tray, specimen tubes, magnifying glasses, iPad.	Adaptation, microhabitat, specimen, cross sectional.	

Together as a class choose a specimen to discuss e.g. woodlice. Ask the children what adaptations the woodlice has to help it live in its micro habitat – take feedback and ideas. Suggestions might include:

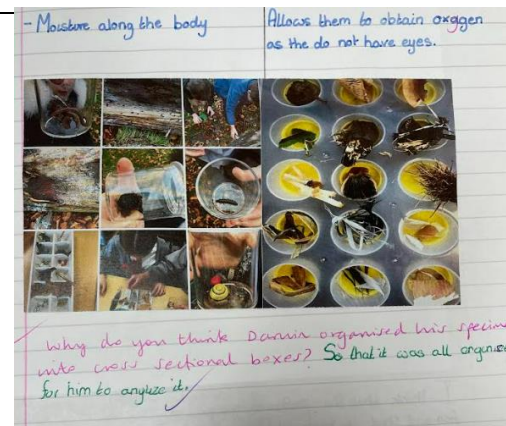
- Multiple legs, exoskeleton, rolling into a ball, two antennae. Now encourage the children to discuss why a woodlice has these features, **what is the reason?** E.g. multiple legs – to allow it to move quickly and escape predators.

Task: Ask the children to choose a specific plant or animal from their specimens and identify its adaptations like the class model. Encourage the children to explain how its features help it to survive in its microhabitat. Children might need Ipad to research some reasons for adaptations.

Challenge: **Why do you think Darwin organised his specimens into cross sectional boxes?**

Health and Safety note: Ensure children wash their hands after touching specimens and avoid touching their face until they have cleaned their hands thoroughly. Ensure children know not to pick mushrooms.

Outcome example:



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2 L.I. I can research how animals adapt to their environment over time.



This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and asking questions.

Prior learning:

What does adaptation mean?

Explain an adaptation example in a mini-beast from last week.

How do animals change over time? Do they always look like their parent at birth? – Yr2

Big Question: How have animals adapted to live on the Galapagos Islands?

Word of the week: Evolution

Explorify – odd one out – amazing adaptations. Show the three images above and ask everyone to come up with as many similarities and differences as they can. If they get stuck, prompt them to think about: appearance, what they do, where they might be found. Then, everyone needs to decide which one is the odd one out and why. Encourage a reason for every answer and there is no wrong answer!

Ipads.

Adaptation, evolution, Charles Darwin, Galapagos islands, environment.

As a class, **can you think of other animals which use camouflage to survive? Can you think of other strategies animals use to escape predators? What would make some better at surviving than others?**

<https://www.youtube.com/watch?v=8SYyHiot-IE> / https://www.youtube.com/watch?v=Dk5_JoPqPFk

Task 1: Watch the above videos about the amazing creatures in the Galapagos Island. Ask the children to choose an animal found on the islands, such as the Marine Iguana, Blue-Footed Booby, Giant Tortoise, Galapagos Penguin, Frigate Bird or Lava Lizard. Research and discuss what features show that the animal has adapted and evolved to suit its environment. Record your information using expanded noun phrases to describe your chosen animal's features and then explain how it has adapted to suit the environment.


At this stage teacher could model an example for the children if needed.

Think about one of the animals from the islands and discuss four key adaptations the animal has. In turn think about the impact on the animal if it didn't have this adaptation. E.g.: Booby blue feet for attracting females. Impact wouldn't mate and lead to extinction.

Task 2: ask the children to choose one of the animals in small groups. Ask them to think about some adaptations that means this animal is suited to its environment and then consider what the impact would be of not having this characteristic. Use the key template to support the children.

Example outcome:

Starter-Odd one out.
Discuss with your partner which you think is the odd one out and why.




Task
Watch the short clip about the amazing creatures found in the Galapagos Islands.
Choose an animal found on the islands, such as the marine iguana, blue-footed booby, giant tortoise, Galapagos penguin, frigatebird or lava lizard. Research and discuss what features show that the animal has adapted and evolved to suit its environment. Record your information using expanded noun phrases to describe your chosen animal then explain how it has adapted to suit its environment.

Challenge: Think about an unusual environment and then consider what adaptations an animal would need to survive here, giving reasons why.
For example: Unusual environment: Volcano
Adaptation: fire proof feet
Reason: won't burn on the hot volcano


Memory flash cards

Dark brown, feathered wings.
Long, slim body.
Small, tiny, beady eyes.
When their prey is in sight, these seabirds utilize the physical adaptations that make them exceptional divers. They fold their long wings around their streamlined bodies and plunge into the water as high as 80 ft.

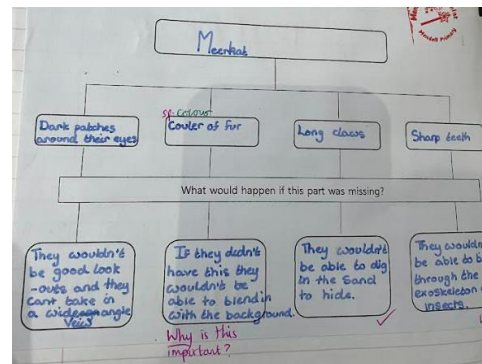


Vaned blue webbed feet.
Thin, pointy beak.
Red along the muddy floor.
They have a slender body to dive.

Strong, yellow claws.
Baby blue face.



Molli-covered body.
Long, red legs.
Small, pink.



Challenge:

Environment - Ice

- Adaptation - Night vision
Reason - To see broken ice in the dark.
- Adaptation - Warm blood
Reason - To balance the heat. *What colour would your animal be? White to camouflage in snow.*
- Adaptation - Strong swimmer
Reason - In case it falls into water.

* When Sally lightfoot crabs hatch they are black with small red spots. Each time they change their shell the spots get bigger until the crab is eventually all red.

Extension challenge: think of an unusual or extreme environment and then consider what adaptations an animal would need to survive there giving reasons. For example:
 Unusual environment: Volcano
 Adaptation: Heat resistant feet
 Reason: feet won't burn when standing on hot rocks

carriers
 I predict that the ~~peg~~ ^{carrier} will be best for picking up larger seeds because it is blunt and square tip that will help grip the seed. *
 has a

I think that the scissors will not be best for picking up larger seeds as it is thin and sharp for cutting through meat. If it was to try it may cut through the seed and will not have any food to eat. ✓

* A bird with this type of beak would be able to crush insects and survive.

Beaks	Sunflower seeds	Peas	Raisins	Beans
T	12	10	10	17

3 L.I. I can investigate how bird's beaks are adapted to eat specific food.



This is a Science lesson. In Science, we s lesson is setting up a simple test and re

Prior learning:
How is a marine Iguana adapted to its
What is a useful adaptation for avoidin
Are all young the same as their parent?

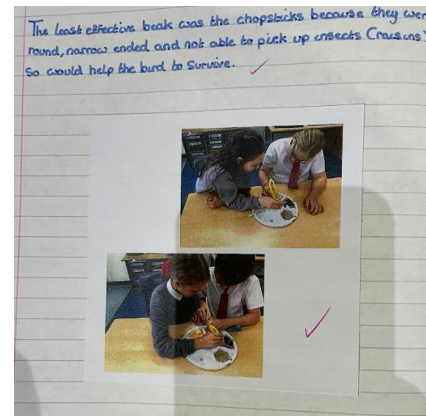
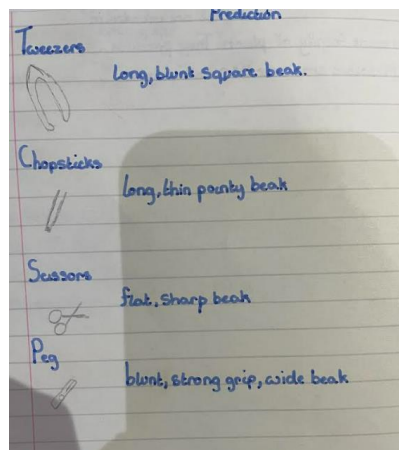
Starter: Explorify – Perfect Pinchers. – u puffin, a lapwing and a macaw's beak.
 Share the video about Darwin's discoveries al

Big Question: Which beak is best for ea

Explain to the children that today they will be setting up a simple test to see how a bird's beak is adapted to eat specific foods. Ask the children to first explore the different 'beaks' and predict which beak will be most suitable for collecting different seeds. Also encourage the children to record and description of each beak e.g. long, blunt square beak.

Fill a tray for each table with a range of seeds varying in shape and size such as: sunflower seeds, dried peas, pumpkin seeds, lentils, sesame seeds and poppy seeds or alternatives such as raisins and beans. Use pegs, chopsticks, tweezers and scissors to act as bird's beaks. Ask the children to record how many of each seed each beak collects in a set amount of time and display results. Ask the children to conclude which beak was best for eating seeds and why. **Can they find any patterns within their results?** E.g. birds who eat worms need x type of beak because...

Example outcome:



4 L.I. I can explore how environmental changes can affect animals.

This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations and asking questions.

Prior learning:

What did Charles Darwin discover about Finches?

What does the word evolution mean?

Ipads, Explorify, book: Moth: An Evolution Story by Isobel Thomas

Variation, camouflage, species, evolution, adaptation, environmental change,



What can the lack of adaptation cause? – Extinction.

Big Question: How can environmental change affect animals?

Word of the week: Environmental change

Starter: Explorify – What if we could bring back woolly mammoths? Encourage children to discuss the question with a partner and think about the following questions:

Why did mammoths become extinct?

Where did woolly mammoths live and what did they eat?

Would woolly mammoths be able to live on earth today?

If woolly mammoths were brought back from extinction where would they live?

Discuss how the climate changed meaning the mammoths were no longer well adapted to their environment.

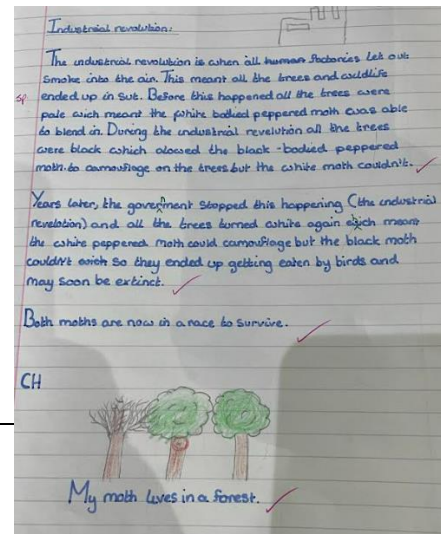
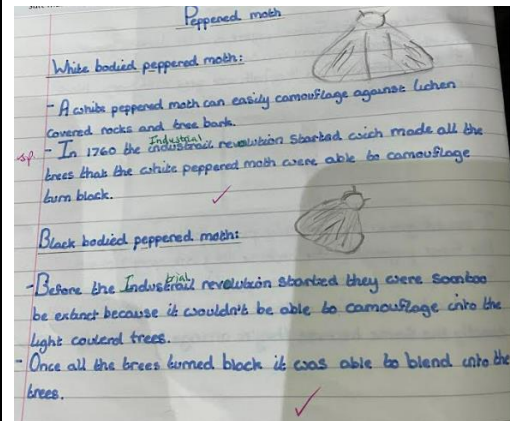
Share the following video which explores the two varieties of peppered moth in the UK and the affect the Industrial Revolution had on these two insects: <https://www.youtube.com/watch?v=Pop-xetGaBM>

Task 1: Ask the children to research how the industrial revolution affected the two varieties of peppered moths.



Task 2: design a moth that would be camouflaged in a specified environment e.g. forest, sand dunes, mangroves, salt marches, grasslands etc...


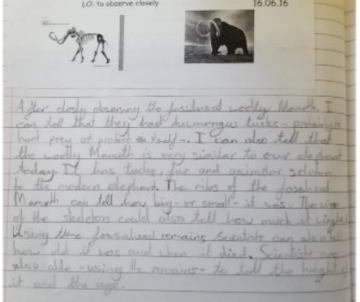
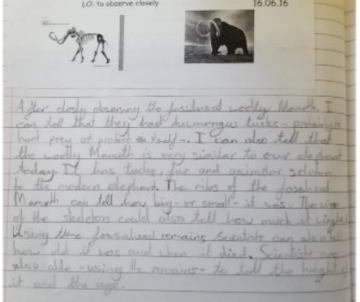
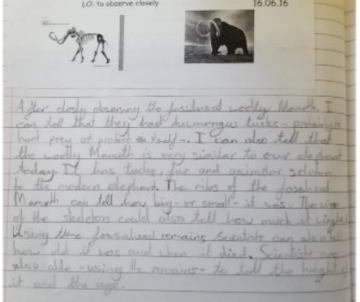
Exit Pass: read the book Moth: An Evolution Story by Isobel Thomas. Discuss what it teaches us about evolution.

Example outcome:



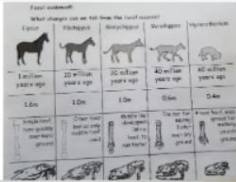
industrial revolution.

		Exit Pass: ask the children to bring in photographs of their parents and grandparents for next lesson.		
5	Part 1: 1hr L.I. I can recognise that living things have offspring that are not normally identical to their parents. 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations.</p> <p>Prior learning: offspring – Year 2 recap. Orally give a definition, think of synonyms, antonyms and apply it in a sentence orally.</p> <p>Word of the week: inheritance. Discuss the children's understanding before comparing Charles Darwin's theory with Gregory Mendel's.</p> <p>Big Question: What do children inherit from their parents?</p> <p>Task 1: Ask the children to consider their family photos and look for any similarities between themselves and their parents and grandparents. Allow the children to discuss this using the word of the week. Can the children explain what genetic features they have inherited?</p> <p>Task 2: show the children a collection of pictures of the Beckham family. Ask the children to explain which features they think the children have inherited from their parents. Are any of the children identical? Do the children look more like David? Victoria? A mixture? What features do they think they have from each parent? e.g. Nose shape, eye colour etc...</p>	Children's photographs, pictures of Beckham family.	Genetic features, inheritance, offspring.
5	Part 2: 1hr L.I. I can describe how plants and animals can be bred to produce offspring with desired characteristics. 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations.</p> <p>What does adaptation mean?</p> <p>What does evolution mean?</p> <p>Who famously explored the Galapagos islands? – What did he discover?</p> <p>Explorify: Odd One Out – Half and Half – allow the children to discuss the hybrid species and identify which they think is the odd one out explaining their reasons why. Encourage the children to think about their appearance and behavioural characteristics.</p> <p>Big Question: what are the advantages and disadvantages of artificial evolution?</p> <p>Show the children a picture of a cocker spaniel a poodle and their offspring a cockerpoo, include key characteristics for each parent dog. Ask the children to examine each parent and their characteristics and ask what could their offspring inherit? Ask the children to write a description in groups and then compare. Explore the idea that the offspring could inherit different aspects.</p> <p>Task 1: ask the children to consider whether creating artificial evolution is the right thing to do and express their opinion on this. Encourage the children to reflect on advantages and disadvantages.</p>	Ipads. Odd one out.	Characteristic s, artificial evolution, offspring.

		<p>Task 2: imagine a new species of dog. Provide children with iPads to research different breed's characteristics. What breeds would you mix and what would it create? Explain what advantages your hybrid species would have.</p>							
6	<p>L.I. I recognise that animals change over time and that fossils provide information about this.</p> 	<p>This is a Science lesson. In Science, we study nature and the behaviour of natural things. The skill we will be using this lesson is making observations.</p> <p>Prior learning: what do you already know about fossils and how they are formed? – Year 3 Rocks.</p> <p>Big Question: what can fossils tell us about the process of evolution?</p> <p>Show the children a picture of a woolly mammoth and its fossil and a modern elephant and its skeleton. Ask the children to consider similarities and differences between the two and provide reasons for this in a written explanation. Children can work in pairs or groups.</p> <table border="1" data-bbox="268 494 878 861"> <thead> <tr> <th data-bbox="268 494 687 539">EVIDENCE OF LEARNING Examples of work</th> <th data-bbox="687 494 878 539">ASSESSMENT Knowledge</th> </tr> </thead> <tbody> <tr> <td data-bbox="268 539 687 861">  </td> <td data-bbox="687 539 878 861"> <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> <p>Working scientifically</p> </td> </tr> </tbody> </table> <p>Show the children fossil records of horse's evolution over time. Encourage them to study the information and then consider and answer the question: what can we learn from fossil records?</p>	EVIDENCE OF LEARNING Examples of work	ASSESSMENT 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> <p>Working scientifically</p>	<p>Mammoth fossil and elephant skeleton. Picture of mammoth and elephant also.</p> <p>Evolution of the horse resources.</p>	<p>Evolution, fossils.</p>	
EVIDENCE OF LEARNING Examples of work	ASSESSMENT Knowledge								
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EVIDENCE OF LEARNING

Examples of work



What can we tell from the fossil records?
We can tell over millions of years - that the horse has evolved to have a single tooth and a larger skull. It also has grown 12 ribs, which is a sign of growth. I can also tell that the horse's legs and its body evolved to have hair on its back, that the horse also evolved its legs from a 4-toed hoof to a single hoof because of the environment and food that it changed over millions of years. The horse was also changed through natural selection to be able to eat and run.

ASSESSMENT

Knowledge

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

Working scientifically

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