Science

Evolution and Inheritance Year 6

Remember when

Identifying animals (e.g. amphibians, reptiles, birds, fish, mammals) and plants using classification keys. (Y4)
Animals that are carnivores, herbivores and omnivores. (Y1/Y2/Y4/Y5)
Animals have offspring which grow into adults. (Y2/Y5)
The basic needs of animals for survival (water, food, air). (Y2/Y3/Y4)
Some animals have skeletons for support, protection and movement. (Y3)
Food chains, food webs and the role of predators and prey. (Y2/Y4)
Features of habitats and the animals and plants that exist there (biodiversity) (Y2/Y4)
The life cycle of some animals and plants. (Y2/Y5)
Environments can change and this has an effect on the plants and animals that exist there (Y2/Y4)
Living things breed to produce offspring which grow into adults. This is called reproduction. (Y5)
The features of some rocks and the role they play in the formation of fossils. (Y3)

Sticky knowledge

- Children will know that all living things have offspring of the same kind as their features are inherited from their parents
- Children will know that offspring are not identical to their parents and vary from each other because of sexual reproduction
- Children will know that plants and animals have characteristics which make them suited to their environment (adaptation)
- Children will know that if the environment changes rapidly, some species will die out
- Children will know that if the environment changes slowly, animals and plants which are best suited survive in greater numbers to pass their characteristics on to their young.
- Children will know that over a long time new species can be created. This is called evolution
- Children will know that fossils give us evidence of what lived on Earth millions of years ago and provide evidence to support evolution
- Children will know that Darwin and Wallace observed how living things adapt to different environments

Charles Darwin, an evolutionary scientist, studied different animal and plant **species**, which allowed him to see how **adaptations** could come about. His work on the finches was some of his most famous.

Key vocabulary

Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

National Curriculum

- 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

Common Misconceptions

- 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

LO	Knowledge and Skills	Lesson outline
Lesson 1 **LO:** To understand that living things produce offspring and that they are not normally identical to their parents. **Enquiry Type:** Grouping and classifying	**Sticky Knowledge:** All living things have offspring of the same kind as their features are inherited from their parents Offspring are not identical to their parents and vary from each other because of sexual reproduction **Skill**: Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	Recap year 5 learning- sexual and asexual reproduction Discuss how humans inherit characteristics from their parents. Children build two parents from pink and white marshmallows (one pink, one white) - they can then build children using mini marshmallows, deciding which "features" each child will get from the parents. Children should understand that although the children will rarely be identical, they will still only get characteristics from their families. Could purchase Science day in a box (Curiosity box): Inheritance STEM experiment kit • Curiosity Box (curiosity-box.com)
Lesson 2	**Sticky Knowledge:** Children will know that plants and animals have characteristics which make them	Adaptations that make an animal suited to one environment can make it very difficult for it to live somewhere else. Imagine a fish that is adapted to living

LO: To understand how animals adapt to their environment. **Enquiry Type:** Grouping and classifying	suited to their environment (adaptation) Children will know that Darwin and Wallace observed how living things adapt to different environments **Skill:** Identify scientific evidence that has been used to support or refute ideas or arguments	underwater left on dry land. The gills it uses to breathe cannot work in the air and it has no lungs – it would quickly die. Children will have a series of animals to sort into the correct environment. All children will identify how they have adapted to its environment. Ensure that these are different animals to those looked at in Year 2. GDS- independent research SEN- supported with pictures and word banks Research Darwin and Wallace and how their theories of natural selection and survival of the fittest link to what children have found out. Beaks activity (Creative Teaching p. 69) - Children to explore why birds have different types of beaks. Use a range of utensils (chopsticks, tweezers, tongs, pegs) to represent beaks and investigate how easy/difficult it is to collect different "food types" (string/pipe cleaner worms, seeds, rice to represent small insects, raisins/berries, marshmallows to represent meat/flesh) Which food is best suited to each beak shape? How do you know?
Lesson 3 **LO:** To understand how adaptation makes plants more or less able to survive in different habitats. **Enquiry Type:** Observation	**Sticky Knowledge:** Children will know that plants and animals have characteristics which make them suited to their environment (adaptation) Children will know that Darwin and Wallace observed how living things adapt to different environments **Skill**: Record data and results of increasing complexity using tables and bar charts	The children will discuss and research different climates from around the world with a focus on different types of plant life. They will then match photos of plants in their environment with the correct climate/biome. Which plants have had to adapt most? Why have they had to adapt to their environment. Link to what Darwin and Wallace theorised about natural selection.
Lesson 4 **LO:** To know the theory of survival of the fittest **Enquiry Type:** Observation	**Sticky Knowledge:** If the environment changes rapidly, some species will die out If the environment changes slowly, animals and plants which are best suited survive in greater numbers to pass their characteristics on to their young. **Skill:** Record data and results of increasing complexity using tables and bar charts	Starter - Why do giraffes have a long neck? Video link: https://www.youtube.com/watch?v=WNUE2-htZZ0 Moths in Manchester (Creative Teaching p. 69-70) Discuss how peppered moths used to camouflage themselves against trees around the city of Manchester. This meant the lighter grey moths were more likely to survive and reproduce as they were hidden against the light grey bark of the birch trees. After 1845 when the city became more industrialised, pollution turns the bark of the trees darker, so the darker grey moths could hide from their predators and were more liklely to survive. Scatter different shades of string (moths) over white fabric or tree bark. Children then act as birds to hunt for the string moths. Why are some moths easier to spot than others? Repeat activity with black/dark fabric. Address any misconceptions with their findings. GDS/SEN- mixed ability groups
Lesson 5 **LO:** To understand how adaptation may lead to evolution **Enquiry Type:** Research	**Sticky Knowledge:** Children will know that over a long time new species can be created. This is called evolution **Skill:** Identify scientific evidence that has been used to support or refute ideas or arguments	Adaptation: Children discuss statements on the lesson presentation with their talk partner relating to adaptation of living things. Ask children to feedback by voting on each statement and then reveal if the statement is true or false. Address misconceptions and errors if they arise. Adaptation and Evolution: Explain the conditions for adaptation by natural selection leading to evolution. Task 1: Living Fossils: Read through the information about what constitutes a living fossil and how some living things have remained virtually unchanged. Does this mean these living things have never developed mutations or does it mean those that did have become extinct? Which is a more plausible explanation? Task 2: Advantages and Disadvantages of Adaptation: Show examples of how an adaptation can have both advantages and disadvantages. Children write the advantages and disadvantages of specific adaptations in living things using the differentiated sheets. Selective Breeding: Explain the process of selective breeding. Cross Breeding: Explain the difference between cross and selective breeding. Selective and Cross Breeding: In mixed ability groups, children examine and sort the Selective and Cross Evolution and Human Intervention: Explain how humans have affected the evolutionary process through selective breeding of plants and animals. Task 3: Breeding Cards into parent(s) and selectively bred offspring. Children or adult takes a picture of the sorted cards as evidence. Genetic Modifications: Show a range of ways that humans are intervening in the evolution process. Task 4: Should humans intervene in this way? Why? Why not? What effect will this have on living things in the future? Discuss with class

Lesson 6 **LO:** To understand how fossils provide information about the past. **Enquiry Type:** Observation/Research	**Sticky Knowledge:** Children will know that fossils give us evidence of what lived on Earth millions of years ago and provide evidence to support evolution **Skill:** Record data and results of increasing complexity using scientific diagrams and labels	Recap year 3 learning from rocks and soils about how fossils are formed and then move on to what fossils tell us about evolution. Gather different types of fossils. Allow children to explore and investigate them. What do they think each was was? How was it preserved? How old might it be? What can we learn about diet, habitat, size and features of things in the past from these fossils? GDS- more detail answer- word banks given to extend answers.

	End of unit assessment	
Working towards	Working at Age related expectations	Working at a greater depth