YEAR 6 EVOLUTION AND INHERITANCE PLANNING

Class: **Term:** **Subject: Science** **Unit: Evolution and Inheritance**

Differentiation and support (Detailed differentiation in weekly plans.) SEN: write up investigations on writing frames. Support from more able partners in mixed ability work. Additional adult support. GT: provide headings for experiment sections. Encourage predictions conclusions that draw on scientific knowledge. Provide extension activities to apply their own knowledge and to research information independently	English: using technical language, using dictionaries and listening for information in video clips, reading comprehension skills, presenting information, biography writing, referencing, Maths: sorting dates for evolution, writing billions and millions in numbers ICT: learning from videos, researching information online, online activities, copyright and online content History: geology and palaeontology, geological time periods, how ideas and 'science' developed and the 'Enlightenment', making inferences from limited evidence, famous historical figures Geography: evidence of plate tectonics and climate change, adaptations RE and PSHCE: creation stories, changes in accepted ideas, traits of successful historical figures

W	Learning objective	Teaching activities	Resources	Assessment: Success Criteria
1	To understand how people explained what they could not understand before they used science To think and discuss like scientists (40 mins)	Intro: Explain to the children that we will be learning about a number of ideas that had an enormous impact on science, particularly biology (the study of living organisms) in the coming weeks Explain that we do this, we are going to: • look at how people explained the natural world before they used 'science' • try and come up with our own theories and explanations in the same way that scientists did in the 18th and 19th centuries Go through PowerPoint which: • explains how people have always been curious and tried to explain the natural world • explains how in the past, people used religion and / or myths to explain what they could not understand came up with • explains how people in Europe used to believe all of the Bible literally, and use its stories to answer some of the 'big questions' • explains the enlightenment, the development of the scientific process, and what this process involves • explains some of the beliefs of people in Europe pre-enlightenment Main: Children to be shown the following observations and / or evidence that scientists came up with in the 18th and 19th centuries: • the fossil record and how it changes at different depths within rock • dog breeding • Mendel's pea plants • Darwin's finches • Galapagos Tortoises • peppered moths • excess offspring Each of the above has a slide in the PowerPoint For each of the slides, children need to discuss in small groups: 1) think of what the observation or experiment tells us 2) come up with a theory to explain what it tells us 3) decide if it helps to prove that any of the five religious beliefs from the 18th century are incorrect: which belief/s does it help disprove and why? After each slide, ask the children to share some of their answers to these questions with the whole class Plenary: Discuss what as a class: • what we can agree on as a class for the 3 key questions • what conclusions we can agree on overall Explain that people today still debate whether evolution is a better explanation for the diversity of life on Earth than creationism is	PowerPoint Slide with religious beliefs in Britain in the 18th century printed out and enlarged Slide with instructions printed out and enlarged	MUST: understand how people came up with explanations before 'science' SHOULD: suggest ideas for what the evidence and observations tell us, and suggest theories to explain these comments COULD: provide sound reasons for their arguments and listen and respond to the arguments of others critically and maturely

2a	To understand how fossils can teach us about the past To have a better understanding of how scientific progress is made (30 mins)	Intro: Explain that scientific facts and information have to be discovered. A scientist will either: • suggest a theory for how or why something happens, and then try to prove or disprove the theory • find some evidence and suggest a theory to explain it Ask the children to think, pair, share what a fossil is and how they are formed (they should have covered this in Year 3) Watch the videos on fossil formation at: https://www.bbc.co.uk/bitesize/topics/z9bbkqt/articles/z2ym2p3 (if the link does not work, Google 'BBC bitesize video How are fossils made?') http://www.youtube.com/watch?v=TVwPLWOo9TE http://www.youtube.com/watch?v=3rkGu0BItKM https://www.bbc.co.uk/programmes/p00ckj8s (if the link does not work, Google 'BBC two video lost worlds vanished lives how amber forms') Explain that we are going to be acting as scientists by using fossils to suggest theories and thinking about what we can learn from fossils Main: Go through PowerPoint with the following: • Tropical fern fossils found in Antarctica (tells us that Antarctica was warmer in the past than it is now. Perhaps the temperature at the south pole used to be much higher or perhaps the land used to be closer to the equator) • Sea-life fossils found on Mount Snowdon (tells us that Mount Snowdon used to be under water. Perhaps sea-levels used to be much higher, Mount Snowdon has moved or Mount Snowdon used to be less high) • Dinosaur footprints (tells us that it walked on two feet and that each of its feet had 3 talons. Can also estimate how large the dinosaur would have been and how long one of its strides would have been) • Comparing dinosaur fossils (can tell T-Rex was a carnivore from its teeth and claws, whereas can tell Triceratops was a herbivore from the shape of its mouth and its teeth) • Coprolites (fossilised animal dung) (can tell us what the creature ate and help us to estimate how large it would have been) • Fossilised eggs (can tell us how many young a creature had at a time and how they developed) • Fossils on different continents (because Mesosaurus could not swim across the Atlantic and the exact same species is very unlikely to have developed in two separate areas, this is evidence that South America and South Africa were once joined together i.e. of plate tectonics) • Fossils in different layers of rock (can help us to know how long ago creatures existed, when they became extinct how old they are and how old the rock is) For each slide, in pairs or small groups the children need to discuss what they think the fossil (and its context) tell us Plenary: Discuss the limitations of fossils: what can they not tell us? (skin type, colour of organism, how its organs and muscles worked, species of soft-bodied organisms e.g. jellyfish etc)	Videos (open and ready to play, with ads skipped and / or closed) PowerPoint	MUST: know what fossils are and understand that fossils can teach us about the past SHOULD: come up with suggestions for what we can learn from fossils COULD: critically evaluate different ideas in a logical and reasoned way

2b	To appreciate how long periods of 'geological time' are To know how and why scientists split the history of life into such periods (30 mins)	Intro: Revise how with dates, the higher a number is before BC (before Christ) / BCE (before common era), the further back in time it was Watch the video about the geological time scale at https://www.youtube.com/watch?v=r10oh1NHKv4 (if the link does not work, Google 'YouTube The Geological Timescale Cambrian Science') Explain that during each period of time, the conditions on Earth were different, so different animals thrived Explain and emphasise how the times on the worksheet are in millions of years Tell children to stick the boxes without any gaps, so that they fit on the page Main: Children to given the periods and eras of the geological time scale (Cambrian Period, Ordovician Period etc) jumbled up Children need to cut out the eras and periods and sort them correctly Give lower ability children / children who will struggle with keeping the work neat the worksheet with the table to stick their answers on Extension: Children to find out in books and / or on internet the names of some creatures that lived in each period and / or some information about each period and add this to their work Plenary: In pairs / small groups, have a quiz: give children the worksheet from the independent work and see how many eras and periods they can remember	Worksheets Scissors Glue Books on the history of life and / or computers, laptops or tablets	MUST: appreciate just how long periods of 'geological time' are SHOULD: know the names and order of some of the eras and periods of the geological timescale COULD: find out about the Earth and / or its organisms during some of the periods of geological time