

Subject	Geography	Year Group	8	Sequence No.	4	Topic	Fragile environments
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Retrieval	Core Knowledge	Student Thinking
What do teachers need retrieve from students before they start teaching new content ?	What specific ambitious knowledge do teachers need teach students in this sequence of learning?	What real life examples can be applied to this sequence of learning to development of our students thinking, encouraging them to see the inequalities around them and 'do something about them!'
<p>L1-2 – What are fragile environments? Links to other topics e.g. Y7 topic 'what issues is our world facing' and links to sustainability throughout schemes of learning</p> <p>L3 – Where are fragile environments? This links to Y7 topic 2 'how can we use maps?'. Students need to retrieve how to use maps, names of countries and continents as well as being able to describe the distribution of something, which is also covered in other lessons e.g. L2 Getting to Know Asia, whereby the describe population distribution.</p> <p>L4 – What is a cold environment? Students recall what a fragile environment is from lesson 1. Link back to Y7 topic of Sherwood Forest and how that is an important ecosystem too.</p> <p>L5 – How do animals survive in Antarctica? Students recall from L4 why Antarctica is a hostile environment and why animals need to adapt to survive.</p> <p>L6- How are people using Antarctica? Link back to L4 and the importance of Antarctica for research, tourism etc.</p>	<p>L1-2 – What are fragile environments?</p> <ul style="list-style-type: none"> Fragile environments is a term used to described those natural environments that are sensitive to, and easily abused by human activities. The demise of Easter Island can be blamed on the population that did not consider the impact of their actions on the environment. For example, deforestation meant a reduction in habitats which further impacted the island. This is linked to sustainability which means, 'meeting the needs of the current population without compromising the ability of future generations to meet their own needs. <p>L3 – ability to describe the distribution of a fragile environment. In a top answer we would include:</p> <ul style="list-style-type: none"> ✓ Is there a pattern? – are they evenly/unevenly spread? ✓ Where are the most? ✓ Where are the least? <p>For example, 'Tropical rainforests are mainly located between the latitudes of 23.5°N (the Tropic of Cancer) and 23.5°S (the Tropic of Capricorn)—the tropics. Tropical rainforests are found in Central and South America, western and central Africa, western India, Southeast Asia, the island of New Guinea, and Australia'.</p> <ul style="list-style-type: none"> Explanation of why the environments are fragile, 'Rainforests are very fragile ecosystems. They are not good at recovering from disturbance. A mature or primary forest takes hundreds or even thousands of years to be formed and is built up of a set of layers, each with its own combination of plant and tree species' <p>L4 – The importance of Antarctica</p> <ul style="list-style-type: none"> Antarctica is a remarkable continent – remote, hostile and uninhabited. This frozen continent is key to understanding how our world works, and our impact upon it. Antarctica is important for science because of its profound effect on the Earth's climate and 	<p>With the knowledge gained from this topic students will develop their understanding of how important the natural environments in the world are and how our actions as people can have detrimental impacts. They will explore ways to reduce our impact and how to solve some of the problems we are facing and protect places they learn about. They will do this through the following activities:</p> <ul style="list-style-type: none"> Students think about the lessons we can learn from the failures made by the Easter Islanders and what could have been done to prevent disaster and what can be done in the future to be more sustainable to ensure that this doesn't happen to other populations. Students consider why environments are fragile, therefore understanding their importance will enable students to think about the human actions that threaten them and understand the importance of protecting them. Students learn about a named example of a cold environment – Antarctica. They learn about the many reasons why Antarctica is globally important. They learn that it is a global common and therefore needs to be protected. Students can make links between the hostility of the Antarctica environment with characteristics and adaptations of animals in Antarctica, with reference to an emperor penguin. Students use this knowledge to design their own animal capable of surviving.

<p>L7 – How is Antarctica being damaged? Link back to L4 and L6 about uses of Antarctica and how these can cause negative impacts.</p> <p>L8 – What is happening to Antarctic glaciers? Link to the geological timescale seen at the start of Y7 as well as throughout other topics.</p> <p>L9-10 – How can we manage Antarctica?</p>	<p>ocean systems. Locked in its four kilometre-thick ice sheet is a unique record of what our planet's climate was like over the past one million years.</p> <ul style="list-style-type: none"> Antarctica is a continent 5.3 million square miles in size or 58 x bigger than the UK! Antarctica has 70% of all the world's freshwater frozen as ice. No one permanently lives on Antarctica and no one owns it. The first time anyone set foot on Antarctica was in 1821. The South Pole was first reached in 1911. Antarctica recorded the Lowest temperature ever on earth -89.0°C. People are attracted to Antarctica due to a growing interest in ecotourism and Adventure tourism. Antarctica is the last and largest unspoiled wilderness area on Earth and people want to see what it looks like. Today around 40,000 people visit Antarctica. Antarctica supports a large variety of animals. Animals live in the sea around Antarctica and on the Land itself. Antarctica is home to many endangered species, including, 5 species of whale, 2 species of penguin, 10 species of Albatross. About 4,000 scientists live on Antarctica in the summer and 1,000 visit over winter. Antarctica supports so many animal species and scientists come to Antarctica to understand how they survive in such as harsh environment. <p>L5 Animals in Antarctica</p> <ul style="list-style-type: none"> Adaptations are any behavioural or physical characteristics of an animal that help it to survive in its environment. These characteristics fall into three main categories: body parts, body coverings, and behaviours. Any or all of these types of adaptations play a critical role in the survival of an animal. <p>The emperor penguin -</p> <ul style="list-style-type: none"> Chicks have soft fur for insulation, this is a more effective insulator on land than the parents feathers, but of little use in the sea, they must moult before they can swim Large size. Emperors are twice the size of the next biggest penguin This allows them to retain heat meaning that they are able to survive the winter fast and the extreme cold temperatures endured at this time Short stiff tail helps balance on land, forms a tripod with heels on ice to give the least contact area to prevent heat loss 	<ul style="list-style-type: none"> Students make an informed decision using evidence whether or not Antarctica should be used by humans or not. Students use evidence to judge whether humans are guilty of destroying Antarctica or not. Students make a decision about whether or not actions should be taken to protect Antarctic glaciers. Students evaluate the strategies to protect Antarctica and then reach a decision about the best way to protect it.
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- **Powerful claws on the feet** help to gain a grip on snow, ice or rock when emerging from the ocean or when tobogganing

L6 – see scavenger hunt resources in shared file as there is lots of knowledge about the different uses of Antarctica.

L7 – How is Antarctica being damaged?

- Whaling - When whales and other large animals flourish in the ocean, they carry a substantial amount of carbon to the sea floor upon dying. Whales and other large marine vertebrates could effectively function as carbon credits.
- Mining - Mining in Antarctica would be **very difficult, dangerous and expensive** as the climate is so harsh, the ice is very thick and Antarctica is very remote from major centres of population. This would make the transportation of minerals and equipment in and out of Antarctica hazardous.
- Tourism - The ecosystem is very fragile, and too many people will disrupt the delicate balance it has. It can take many years to recover, if at all. If larger ships come, tourist numbers will increase. Tourists, along with research scientists, may unknowingly bring seeds and spores of plants from other areas. There is the threat of pollution, e.g. oil spills from the cruise ships and other methods of transport. This happened in 2007.

L8 Antarctic glaciers –

- A glacier is a large, **perennial accumulation of crystalline ice**, snow, rock, sediment, and often liquid water that originates on land and moves down slope under the influence of its own weight and gravity.

Antarctica is a massive block of ice today, but it used to more simply be a range of glacier-topped mountains like those found in Alaska and the Alps.

- The strange continent's thick ice sheets formed tens of millions of years ago against an Alpine-style backbone of mountains during a period of significant climate change, a new study finds.
- The Antarctic continent now is covered almost entirely by ice that averages about a mile (1.6 kilometers) thick.

- Scientists have known for some time that the Antarctic Ice Sheet formed around 14 million years ago

Causes of glacial melting

- The amounts of CO₂ and other greenhouse gases produced by human business, transportation, deforestation, and fossil fuel usage, rise into the air where they stop the heat from the sun from bouncing back out to space. As a result, temperatures rise, and glaciers melt.
- In some areas, wind and ocean circulation patterns have helped to push naturally occurring warm water closer to the edge of the ice, some scientists say this has led to the melting of ice.
- Effects of glacial melting
- Rise in sea level and flooding of coastal areas the world's glaciers still contain enough to raise the ocean by another half a meter, which could directly threaten many cities in coastal regions. As a result of these rising sea levels, coastal erosion has also increased.
- Species are also at risk. Many land and sea animals rely on glaciers as their natural habitats and as they disappear so does the rich ecological life they shelter.
- As a result of sea-level rise, storm surges become more prevalent, with warm air and ocean temperatures combining to increase the frequency of coastal storms.

L9-10 Antarctica management

- The Antarctic Treaty was signed in Washington on 1 December 1959 by twelve nations (Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, United Kingdom, United States and USSR). Through this agreement, the countries active in Antarctica consult on the uses of a whole continent, with a commitment that it should not become the scene or object of international conflict. In its fourteen articles the Treaty:
- specifies that Antarctica should be used exclusively for peaceful purposes, military activities, such as the establishment of military bases or weapons testing, are specifically banned;
- guarantees continued freedom to conduct scientific research;
- promotes international scientific cooperation including the exchange of research plans and workers, and requires that results of research be made freely available;
- sets aside the potential for power disputes between Treaty parties by providing that no activities will improve or reduce previously stated

	<p>positions with respect to territorial claims, provides that no new or enlarged claims can be made, and makes rules relating to power;</p> <ul style="list-style-type: none"> • forbids nuclear explosions and the disposal of radioactive waste; • provides for inspection by observers, chosen by any party, of ships, stations and equipment in Antarctica to ensure the observance of, and agreement with, the Treaty; • requires parties to give advance notice of their expeditions; provides for the parties to meet every so often to discuss measures to further the objectives of the Treaty; and • puts in place a disagreement settlement procedure <p>The Treaty also provides that any member of the United Nations can agree to it. The Treaty now has 52 parties. Membership continues to grow.</p> <p>Since entering into force on 23 June 1961, the Treaty has been recognised as one of the most successful international agreements.</p>	
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