**Nature: Chapter 6**

***Learning to work with and for the natural world***

**Chapter Overview**:

In this chapter, students will be introduced to climate diversity around our planet, and how it dictates the lifestyles of people and the habitats of animals. An emphasis will be made on how the fine balance of conditions on Earth shape the lives of plants and animals (including humans!). Students will think about the possible changes to climate and weather, why these variations matter, and what we are doing to protect the natural environment. Students are encouraged to form ideas about how we can live in harmony with nature. [*Leading into Inventions: Chapter 7*].

**Topics:**

**Geography, Biology, English**

**Essential Questions:**

* What are the different climates on Earth?
* How do plants and animals interact with the climate in their habitats?
* How do we live within and respect nature?
* How can new ideas help us protect nature?

**Enduring Understandings:**

* Humans and animals adapt to live in different climates
* Animals and plants form ecosystems which rely on their climate
* Nature can teach us how to live sustainably
* Life on Earth is better if we respect nature
* We can work together to protect nature

**Vocabulary:**

climate, weather, nature, ecosystem, adapt, climate change, conservation, protect

**Chapter 6a – Learning from nature**

**00 min - 20 min**

**Activity: Climate islands**

Groups of 4. Provide students with a blank A3/A2 sheet of paper and coloured pens/pencils. Ask them to draw 4 big islands that have different climates (see slides).

What are the **weather conditions** that define these climates? *If students need a full introduction to climate zones, see below*

Ask the students what **humans** have done to be able to live, eat, work, travel in these different climates? Draw these human factors on each island.

*Think about housing, growing food, different transport methods*

Which island best represents the climate they live in?

**Explanation: Climate:** “*The weather conditions prevailing in an area or over a long period of time*”.

**How is this different from weather?** “*Weather changes on the timescale of minutes and hours - think about how long a rain shower lasts. Climate is the description of conditions over many years, centuries and beyond.”*

**Climate zones**: For classes who have not been introduced to climate zones, this 5-minute BBC Bitesize video provides a great summary: <https://www.bbc.co.uk/bitesize/clips/zr7hyrd>

**1. Tropical -** Around the Equator we have tropical climates which are hot and humid, this is where you’ll find the world’s rainforests.

**2. Arid -** Then there are arid or dry climates – like you’d find in deserts.

**3. Mediterranean -** Next is Mediterranean with hot dry summers, and cooler wetter winters.

**4. Temperate -** Then there are temperate climates. That’s what we have in the UK, where summers are mild and winters aren’t too cold.

**5. Continental -** In areas that are a very long way from the sea, the climate is continental with long, cold winters and short, hot summers.

**6. Polar -** Finally, there’s polar climates which experience long periods of extreme cold.

How would we need to change our lives if the climate on our island changed to a different type… (*e.g. hotter + drier, colder + wetter*)

Would we need to build different houses, grow different food and find new ways to move around?

**20 min - 45 min (Discussion & activity)**

**Interactive:** Humans and animals have **adapted** to live in each climate. They form their own **ecosystems**. This is how living things interact with the environment around them (*land, soil, vegetation, climate, sun, air*).

In the arctic marine ecosystem, there are multiple animals and plants which live in harsh conditions because they are adapted to be supported by the climate and each other. Each member of the ecosystem uses the surroundings as its habitat and source of food.

*Can the students call out or draw the food web for the arctic marine ecosystem?*

**Activity: Mix n’ match ecosystems** - students are given a small group exercise to collect animals, plants, soil and climates into their ecosystems.

**Animals -** Roadrunner bird (*hunts in open spaces such as dried up riverbeds*), white wolf (*thick fur coats that are white for camouflage, hunt arctic hare),* sloth (*hangs upside down in trees and has a diet of insects*), harvest mouse (*lives in fields, tall grass or hedges eating seeds, berries and insects*)

**Plants -** Agave plant (*prefers hot temperatures, needs very little water, popular with butterflies*), black bearberry (*prefers cold conditions, often found in the Northerly regions, berries appreciated by birds*), water lily (*rooted in soil and floating in water*), poppies (*prefer sunny conditions but moderate temperature, popular with bees*)

**Soil -** Dry and open to sun, dry and often snow covered, wet and densely covered by trees, moist and flat with seasonal temperatures

**Climate -** Rocky desert, arctic tundra, tropical rainforest, temperate grasslands

[Cards are provided and are fully editable]

**Interactive: Adaptation**

*How do the students think plants and animals would cope if an* ***ecosystem changes****?*

Many animals are having to adapt the way they live due to changes in their ecosystems.

The migration patterns of **monarch butterflies** are shifting to later in the year since winters are becoming less cold.

The **American pika** are moving to higher mountainous regions to escape the heat and drought in their ecosystem. Highlight that they are in danger of running out of cooler terrain to escape to (reaching the top of the mountain)!

**Coral** is showing incredible adaptation which is allowing them to survive in warmer ocean water which could be very important to them surviving the changes to their ecosystem.

*Humans are also adapting to live safely in our changing environment*

* It is important to protect and plant new **mangrove forests** around coastlines vulnerable to storm surges and tidal waves. These can protect low-lying habitats and also absorb carbon dioxide from the air, and purify nearby seawater.
* We also **changing how we farm**: [Rice farmers in Bangladesh](https://www.nytimes.com/2018/09/21/climate/climate-change-adaptation.html) (a low-lying country on the Bay of Bengal) are using rice crops which grow in saltier water, in preparation for their fields containing more sea water. Farmers all over the world are taking action to produce food sustainably, using crops which save on water, planting trees to create healthier ecosystems, and not over-working the land.

*So, we now know that understanding nature can help us make the world a safer place to live. Next time, we will explore how we can live alongside nature and help it thrive.*

**Chapter 6b – Protecting nature**

**00 min - 20 min (Activity)**

Last time we played with **ecosystems** and learned how humans and animals can adapt when their environment changes. But if we let the environment change too much then nature will be badly affected! Today we will learn about the amazing ways that people are **protecting nature**.

**Activity: Nature survey**

To protect nature, we need to know our surroundings. Let’s head outside and investigate (bring your eco-diary)…

* In your diary, write down the different animals you see (if you don’t know what it is called, ask your teacher or classmates, and if no one knows we can find out later)
* Collect as many different kinds of leaves as you can – this will help us work out how many different plants and bushes are around your school (Use this [leaf identifier](https://www.imperial.ac.uk/media/imperial-college/research-centres-and-groups/opal/Tree-Identification-guide-8pp-chart_corrected.pdf) to help)

Are you in an urban region? Plants and insects play an important role everywhere. If the previous activities aren’t suitable, try these:

* Hunt for insects and write down every different type you see
* Is there any soil or grass around? Identify sunny spots that would be good for planting new flowers. Mark out a patch that could become the new school flower bed.

**20 min - 40 min (Interactive)**

**Interactive:** **Working for nature**

Link to previous lessons: We’ve seen that energy is important to modern life, but we need to use it in a way that doesn’t damage our **climate** and **ecosystems**. We can work as a society to achieve this! *Remember saving energy, using efficient appliances etc…*

We can

1. Stop or minimize use of fossil fuels (*switch to clean renewable energy,* *switch to electric vehicles, cycle, walk, fly less…*)
2. Save energy (*use less electricity, make things efficient [Chapter 4], insulate homes…*)
3. Protect nature (*plant trees, protect the rainforest and our local environment*

**What technologies are humans in this city using to live sustainably (not harming nature)?**

*Wind turbines and solar panels to generate electricity*

*Electric cars and trains to travel without burning fuel*

*Buildings are tall to provide housing without covering too much land*

*Different kinds of trees are planted all around and throughout the city to provide green spaces for animals and humans (Biodiversity)*

**Protecting forests and planting trees is not only good for plants and animals, but also important to protect the air and the climate.**

**Videos: Inspiring conservationists**

Inspirational examples of protecting nature come from our next two Sustain/Ed Changemakers: **Doorae** and **Awapy**

**Doorae** lives in Hawaii and discovered that polystyrene or “Styrofoam” was being used and thrown away too often around the islands. Plastic waste was appearing in the ocean or on beaches where it posed a danger for animals. She campaigned around to end the use of packaging that can’t be recycled and persuaded local businesses to use paper or other biodegradable materials. Watch her story here: <https://www.youtube.com/watch?v=ZOzHhkRSz1U>

**Awapy** is a member of the Eru Eu Wau Wau tribe in the Amazon rainforest. His tribe are working with the World Wildlife Foundation to end destruction of the rainforest, protecting important plants and habitats for animals and humans. Awapy is one of many people in indigenous people communities using drone technology to detect deforestation approaching their land and to prepare for fighting forest fires. Watch his story here: <https://www.youtube.com/watch?v=KG8ixzoIOMg>

*Read more here:* [*https://www.wwf.org.uk/updates/protectors-amazon*](https://www.wwf.org.uk/updates/protectors-amazon)

**40 min - 60 min (Activity)**

**Activity: “Tiny changes” poster**

Work in groups to make a **conservation** poster for the local area – *how can we all help nature thrive in our neighbourhood?*

Encourage the students to think about their **nature survey** – did they notice anything that could be helped by making tiny changes?

Ideas: *Create a bug hotel to support insects, plant bee-friendly flowers, stop using plastic to reduce plastic waste around the neighbourhood, switch off lights in rooms that aren’t being used, cycle to school, walk to school, start a school vegetable patch, place bird feeders in nearby trees, …*

Other primary schools are already doing great things – pupils in Ullapool had all plastic straws removed from shops in the town, to protect local marine life:

<https://scottishwildlifetrust.org.uk/news/ullapool-going-plastic-straw-free/>

**Extra activity:** Task the groups with writing a short letter to their **local councillor** (or any other community group), with an **action plan** to protect nature in their neighbourhood (*e.g. make it easier for kids/people to travel on public transport, making cycle lanes, protect parks and forests, building bee houses and planting bee-friendly flowers, building hedge-hog tunnels, reducing littering, save energy at home…*)

Ask the students to write one or two sentences about **the nature they have surveyed** **earlier**.

Good luck making tiny changes!

**Teacher survey chapter 6:** [FORM HERE](https://forms.office.com/r/weLJL91zi9)

**Resources:**

* Slides
* BBC Bitesize video on climate zones: <https://www.bbc.co.uk/bitesize/clips/zr7hyrd>
* Blog post about talking to young children about the scary subject of climate change: <https://blog.usejournal.com/how-to-talk-to-kids-about-climate-change-3465079793f1>
* Doorae’s story: <https://www.youtube.com/watch?v=ZOzHhkRSz1U>
* Awapy’s story: <https://www.youtube.com/watch?v=KG8ixzoIOMg> and

<https://www.wwf.org.uk/updates/protectors-amazon>

* Plastic straw ban in Ullapool: <https://scottishwildlifetrust.org.uk/news/ullapool-going-plastic-straw-free/>