



Adapting to Climate Change

Time needed for activity 45 minutes plus

Location Indoors or Outdoors

Context

This activity plan highlights how the impacts of climate change are forcing the natural environment to adapt.

Natural Resources Wales' purpose is to pursue the sustainable management of natural resources in all of its work. This means looking after air, land, water, wildlife, plants and soil to improve Wales' well-being, and provide a better future for everyone.

Curriculum for Wales

Science and Technology

• **What matters**
Being curious and searching for answers is essential to understanding and predicting phenomena.

Health and Well-being

• **What matters**
How we process and respond to our experiences affects our mental health and emotional well-being.

Humanities

• **What matters**
Our natural world is diverse and dynamic, influenced by processes and human actions.

Mathematics and Numeracy

• **What matters**
The number system is used to represent and compare relationships between numbers and quantities.

Languages, Literacy and Communication

• **What matters**
Expressing ourselves through languages is key to communication.

Expressive Arts

• **What matters**
Creative work combines knowledge and skills using the senses, inspiration and imagination.

• **What matters**
The world around us is full of living things which depend on each other for survival.

• **What matters**
Our decision-making impacts on the quality of our lives and the lives of others.

• **What matters**
Informed, self-aware citizens engage with the challenges and opportunities that face humanity, and are able to take considered and ethical action.

• **What matters**
Statistics represent data, probability models chance, and both support informed inferences and decisions.



Digital Competency Framework

Completing this activity provides opportunities to meet the following strands of the Digital Competency Framework.

Citizenship	Interacting and collaborating	Producing	Data and computational thinking
<ul style="list-style-type: none"> Identity, image and reputation. 	<ul style="list-style-type: none"> Communication. Collaboration. 	<ul style="list-style-type: none"> Sourcing, searching and planning digital content. Creating digital content. 	<ul style="list-style-type: none"> Data and information literacy

Objectives

- Learners will gain an understanding of natural processes and ecosystem services.
- Learners will use their mathematical skills to help visualise the local impacts of climate change.
- Learners will have a basic understanding of how climate change will drive environmental adaptations that will affect their day to day lives.
- Learners will collaborate to express their thoughts and findings whilst developing their communication and technology skills.

Resources and equipment

- Worksheet - Adapting to climate change**
- Access to research materials e.g. internet search engines
- Creative materials

Background information

Climate change impacts are already being widely felt and are set to increase, further changing our weather and increasing the frequency of high temperatures, storms, floods, droughts, and other extreme climate events. These impacts directly affect people, the economy and the natural world.

Climate change damages the ecosystems we benefit from and that underpin our way of life.

Ecosystem services allow human life to exist by providing food and filtering water, regulating disease and climate, supporting soil formation, and providing recreational and cultural benefits. Adversely affected ecosystem services, caused by the impacts of climate change, will have major consequences at global and local level, increasing risk to lives, assets and infrastructure.

The 2015 Paris Agreement saw 195 countries agree to limit global average temperature rise to well below 2°C, with the aim to limit the change to 1.5°C.

Wales has strengthened its legislative framework to reduce greenhouse gas emissions through The Environment (Wales) Act 2016. The Act sets a legal target of reducing emissions by a minimum of 80% by 2050.

What to do

Activity 1 - Calculating changes

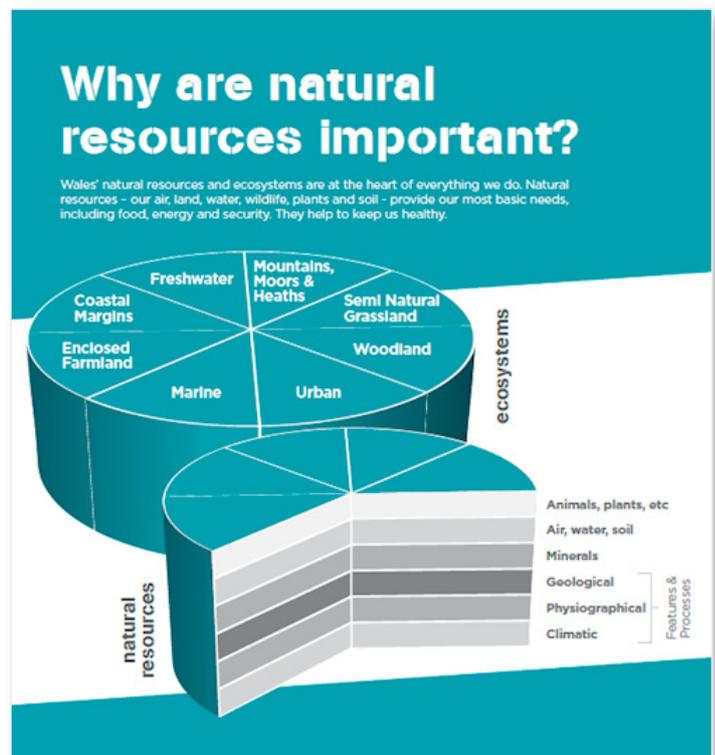
- Begin by asking your learners to work in pairs or small groups to explain what they think the impacts of climate change might be on the natural environment in Wales. Can they create a list of these and what effects they will have? For example, warmer summers, more wildfires, wetter winters, more floods, more drought, less insects to pollinate plants, etc.



2. Ask you learners, to research to find out what the average summer and winter temperatures, rainfall and sea levels were in Wales or the UK, during 2018. Discuss which websites or apps might be useful for finding out this kind of information. Provide each pair with the **Worksheet - adapting to climate change** and allow sufficient time to investigate and access the data.
3. Ask your learners to consider if the information they have found comes from trusted websites or apps, e.g. the Met Office.
4. Ask your learners to use the information they have found to fill in the 2018 column on the worksheet.
5. Use the UK Climate Predictions 2018. These are the currently projected impacts of climate change from a high emissions scenario, used to appreciate the urgency of the climate emergency. Ask your learners to complete the rest of the worksheet to find out how these elements of the natural environment will need to adapt.
6. Using the data they have found for 2018, ask your learners to work out the increases or decreases to the data to show the predicted readings for 2050 and then 2100. As the predictions of the impacts of climate change are often adjusted, you may want your learners to check for the the most up to date figures and adapt their data accordingly.
7. When the worksheet is complete, discuss the findings. What do they tell us about how the local natural environment will adapt?

Activity 2 - Environmental adaptation

1. Following on from the first activity, explain to your learners that they are going to consider how climate change is forcing the natural environment to adapt. These environmental adaptations are the alterations, adjustments and modifications to natural systems and processes that we are starting to see. For example, seasons shifting resulting in plants flowering earlier due to warmer temperatures.
2. Can your learners hazard a guess at what ecosystem services are? Ecosystem services are the many benefits to humans provided by the natural environment. They are broadly grouped into four categories:
 - Provisioning services including food and water.
 - Regulating services including weather and disease control.
 - Supporting services including nutrient cycling and oxygen production.
 - Cultural services including leisure time and occupational benefits.
3. Ask them to think carefully about the phrase ecosystem services, and work in pairs or small groups to see if they can come up with a simple definition. Discuss their definitions. Is there a group favourite?
4. Ecosystem services allow human life and society to exist. For example, bees and other organisms pollinating our food crops, providing the water cycle, supporting healthy soil formation, and providing recreational and cultural benefits. Ask your learners to make a list of as many ecosystems services as they can think of and discuss their outputs.





5. Look again at the worksheet findings and ask your learners what these changes might mean to daily life within their local community. As an example, could hotter summers result in people being more active in the cooler parts of the day, leading to a more Mediterranean lifestyle? Are these changes thought to be good or bad? For instance, as UK infrastructure isn't fully heat-adapted, heat waves can cause acute health problems and result in an oppressive atmosphere, without proper thermal regulation. Some changes might at first appear positive such as warmer summer days to enjoy but what might this mean to food production? Would different food crops need to be planted and how do we ensure enough water for them to grow? Others may immediately be seen as negative, such as higher chance of flooding from local rivers causing homes and businesses to be affected.
6. As the natural environment adapts to climate change what might this look like where your learners live? Ask them to think about the landscape that their community sits within. What types of habitats can they identify? For example, are their hillsides, rivers, beaches, grassland, woodlands, etc? As temperatures, rainfall and sea-levels rise or fall, how will these habitats change by 2050 or 2100? Will grassed areas dry out and become prone to wildfires? Will some sites become boggy no go areas? Will the different species of urban trees that provide shade and help improve local air quality survive and thrive or not? Could any areas of the local landscape disappear under water from local streams, rivers or the sea? How could local wildlife be affected? Will conditions be suitable for local pollinators such as butterflies, moths, flies, wasps and bees to survive? Will local food crops be affected?
7. Individually, in pairs or small groups create a sketch, picture, model, stop motion film, PowerPoint presentation or enviro-vlog, to show how the community's surrounding landscape may change by 2050 or 2100. Peer assess the completed creations.
8. How do your learners feel after thinking about these impacts and changes? Discuss their concerns and think about ways to share them with the wider community. What actions can your learners take to lead more sustainable lives? It is important that they do not develop climate anxiety but understand how they can take control of their own actions, advocate for change and contribute to climate change mitigation.

Suggested key questions

- What natural processes govern our natural environment?
- What ecosystem services do humans rely on?
- What impacts are humans having on the natural world?
- What are your biggest concerns about the climate emergency, locally, nationally and globally?
- What do we need to change to sustainably use and manage our natural resources?
- What can I, my school, my community do to help?

Adapting for different needs or abilities

More support

- Only look at average temperature or rainfall.
- Provide your learners with the average 2018 data.
- Complete the activities in larger, adult led groups.
- Only complete activity 1 or 2.

More challenge

- Research the climate and nature emergencies.
- Complete both activities.
- Look at the different scenarios, e.g. best case scenario of a 1.5°C temperature increase, or worst case scenario of a 10°C increase.



Follow up activity/extension

Try out our:

- Activity Plan – 3C’s of climate change activity plan
- Activity Plan – Climate emergency activity plan
- Activity Plan – Creating an enviro-vlog
- Activity Plan – Nature champions
- Activity Plan – Animating nature through stop motion animation
- Advocate for climate change action
- Ask your learners to write about their personal perspective on any of the issues you have considered during this activity

Additional Information

Find out more about Natural Resources Wales’ work to address climate change at www.naturalresourceswales.gov.uk

State of Natural Resources Report (SoNaRR) for Wales 2020

Looking for more learning resources, information and data?

Please contact: education@naturalresourceswales.gov.uk or go to <https://naturalresources.wales/learning>

Alternative format; large print or another language, please contact: enquiries@naturalresourceswales.gov.uk 0300 065 3000