Green Futures

Transition Year Module

September 2026

LESSON 1

GreenFutures

Understanding Our Changing Planet: Climate, Environment and Data

How scientists study a changing climate and why good data is at the heart of it.

UNESCO Greening Curriculum concepts: Climate Science · Resilience Building

What you'll learn today

1. Explain the difference between weather and climate
2. Describe the major causes and impacts of climate change, in Ireland and globally
3. Understand how scientists collect and interpret climate data and where AI fits in
4. Read evidence for yourself in graphs, maps and datasets
5. Recognise why reliable data matters for good decisions

GETTING OUR TERMS RIGHT

Weather vs. Climate

Weather

- What is happening in the atmosphere right now or over the next few days
- Changes hour to hour - rain, sun, wind, temperature
- ‘It's cold and wet in Galway today’

Climate

- The average pattern of weather in a place over decades
- Changes slowly, over years and generations
- ‘Ireland has a mild, wet, temperate climate’

Quick check

Is this weather, or climate? 'It rained almost every day in Dublin last October.'

Discuss as a class, then reveal: it depends - one wet October is weather. A trend of wetter Octobers over 30 years is climate.

WHY IS THE CLIMATE CHANGING?

Causes of Climate Change

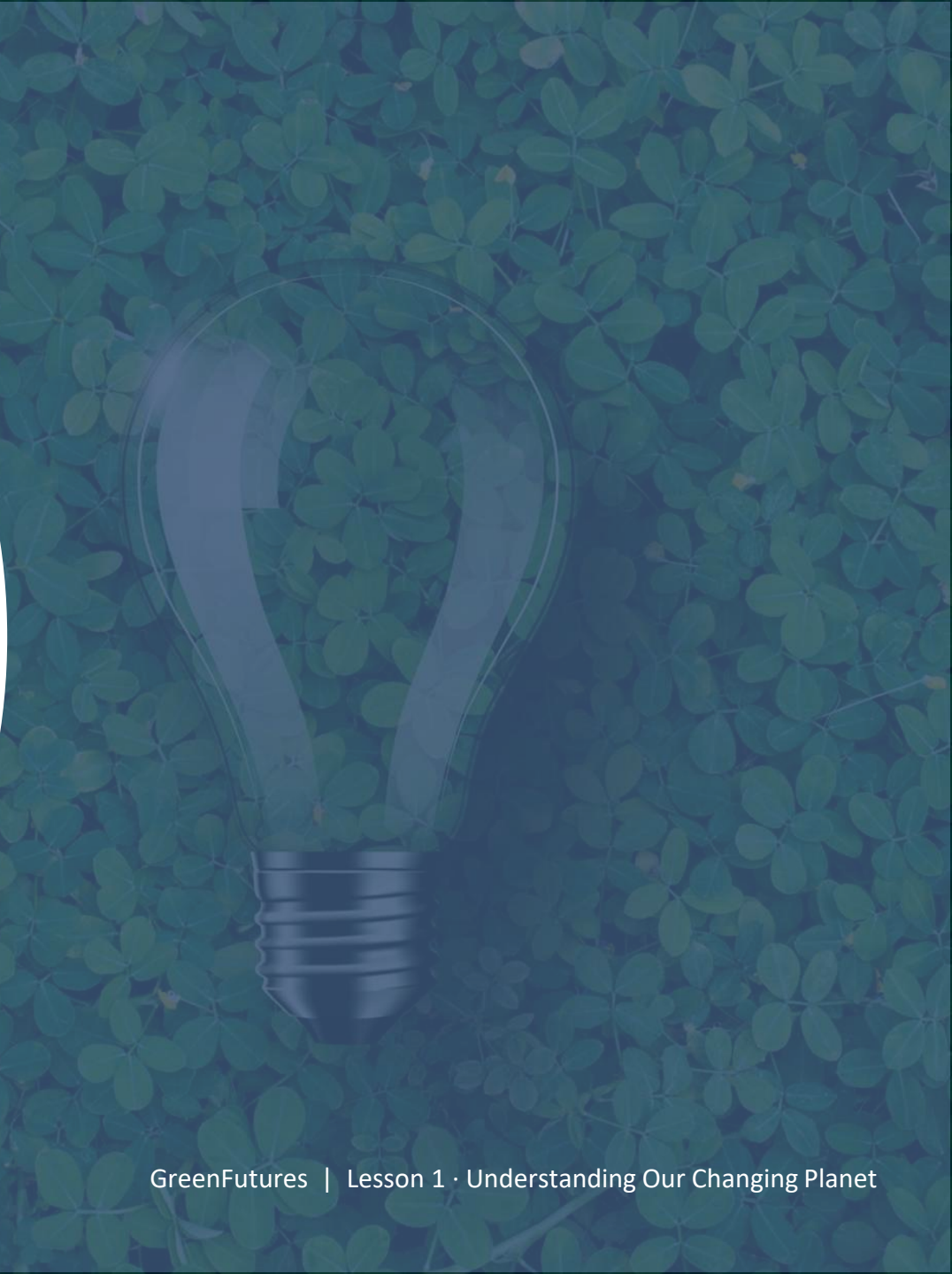
- The greenhouse effect: certain gases trap heat in the atmosphere - this is natural and keeps Earth livable
- Burning fossil fuels (coal, oil, gas) releases extra carbon emissions, thickening that blanket of gas
- More trapped heat = a warmer planet, changing rainfall, storms, seasons and sea levels
- The scientific evidence for this link is very strong - but scientists still debate the exact pace and local detail, which is a normal part of how science works

IE Irish Example

Climate Change, Closer to Home

- Shannon flooding: repeated severe flooding along the River Shannon has damaged homes, farms and roads in recent years
- The 2018 drought and fodder crisis: an extreme dry summer left many Irish farmers without enough feed for livestock
- More frequent heatwaves are being recorded across Ireland, alongside wetter winters

Sources: Met Éireann; OPW flood risk data



THE BIG PICTURE

Climate Systems Work Together

- Atmosphere - the air around Earth, where weather happens
- Oceans - absorb huge amounts of heat and carbon; currents move that heat around the planet
- Biosphere - all living things, from forests to plankton, which absorb and release carbon
- These systems are deeply connected: change one, and the effects ripple through the others

SEEING THE EVIDENCE

How is Climate Data Collected?

- Satellites - track temperature, ice cover, sea level and more from space
- Ground sensors and weather stations - measure temperature, rainfall and wind in real time
- Historical records - decades (sometimes centuries) of measurements reveal long-term trends
- **AI and machine learning models** increasingly help scientists combine millions of these data points into weather and climate forecasts, from short-term flood warnings to long-range climate projections
- How AI/ML models turn raw data into a usable forecast: Advancing flood forecasting technologies to prevent damage and mitigate risk | Success Stories | Research Ireland

ACTIVITY

⏱ ~8 minutes

Explore Real Irish Climate Data

1. In pairs, open one of these dashboards on a phone, tablet or laptop: Met Éireann's climate pages, Climate Ireland, or the Copernicus Climate Change Service
2. Find one piece of data about Ireland, a temperature trend, a rainfall record, or a recent extreme event
3. Note down: what does the data show, and over what time period?
4. Be ready to share one interesting finding with the class

Low-bandwidth option: teacher displays one dashboard on the class screen and talks through it together.

WHERE AI COMES IN?

Why Climate Science Need AI and Digital Tools

- Climate science depends on huge datasets. This is sometimes described using data's ‘5 Vs’: Volume, Velocity, Variety, Veracity and Value
- No human could read millions of satellite images or sensor readings by hand. AI models are trained to spot patterns in this data far faster
- Digital technologies such as sensors, communication networks, cloud computing are what make continuous environmental monitoring possible
- Data accuracy matters: a model is only as reliable as the data that feeds it

Reflection

Why might scientists sometimes agree and sometimes disagree?

Prompt: disagreement about detail (exact timing, local impact) is normal in science. Near-total agreement exists on the core cause of climate change.

WHY THIS MATTERS

Reliable Data, Better Decisions

- Good climate data helps governments plan flood defences, farmers plan for drought, and communities prepare for extreme weather
- Poor or biased data can lead to poor decisions. We'll explore this risk directly in Lesson 2, when we look at AI and its limitations
- Everyone has a role: individuals, communities, businesses and governments all act on the evidence in different ways

ACTIVITY

⏱ ~7 minutes

Spot the Climate Signal Where You Live

Think about your own town, county or family stories. Has anyone you know mentioned a change in weather patterns - wetter winters, hotter summers, more flooding, changed growing seasons? Note down one local change and, if you can, one piece of evidence or data that might support it.

How they show their work: Students write 3–4 sentences in their journal/worksheet, which they'll revisit at the end of the module.

What have we learned?

- ✓ We can explain the difference between weather and climate
- ✓ We understand the main causes and impacts of climate change, including examples close to home
- ✓ We know how scientists collect and use climate data and where AI fits in
- ✓ We‘ve started our own climate journal, spotting change where we live

See you in Lesson 2: Artificial Intelligence, Ethics and Climate Solutions

Developed by the ADAPT Research Centre in partnership with Huawei and UNESCO.