

GREENFUTURES

Lesson 2: Artificial Intelligence, Ethics and Climate Solutions

Teacher Guide

This is the second of four GreenFutures lessons. It builds directly on Lesson 1's introduction to climate data by asking: what actually is the AI behind these tools, how is it used in climate work, and what are its limits and risks?

Time	~55 minutes (flex to a 40-minute class by trimming discussion time and one activity, as noted in the walkthrough below)
Background	Builds on Lesson 1 (climate data and the introduction of AI's role in it). No technical AI background is assumed. The lesson deliberately keeps explanations grounded in everyday, non-technical examples.
Materials Needed	PowerPoint presentation, laptop, screen, internet access, timer, students' climate journals from Lesson 1, a small pre-vetted bank of real AI/climate headlines or social posts for the two evaluation activities (teacher to prepare in advance).

Curriculum Links

GreenFutures is designed as an NCCA-compliant, cross-curricular Transition Year module (Science, Geography, CSPE, Digital Media). Its interactive and reflective activities build the five key skills central to Transition Year:

- Information processing
- Critical and creative thinking
- Communicating
- Working with others
- Being personally effective

Leaving Certificate subject links: Geography, Politics and Society, Technology, Computer Science, Business, Economics.

Learning Intentions

By the end of this lesson, students will be able to:

- Explain basic AI concepts and terminology in plain language
- Identify real ways AI is used in climate and environmental work
- Evaluate the benefits and risks of AI systems, including bias
- Reflect on ethical questions around technology and sustainability

Module Overview

Recap and Warm-Up (~6 mins)

Recap Lesson 1 and open with a quick, energising discussion.

What AI Is and How It Works (~8 mins)

Demystify AI in accessible, everyday terms.

AI in Climate Science and Its Limits (~16 mins)

See real applications, then interrogate bias directly through an activity.

Ethics and the Environmental Cost of AI (~17 mins)

Cover responsible AI principles, misinformation, and AI's own environmental footprint.

Apply, Recap and Close (~11 mins)

Students judge a real claim, then the class consolidates and previews Lesson 3.



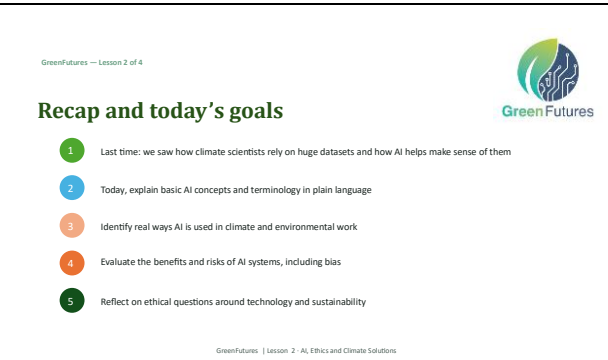
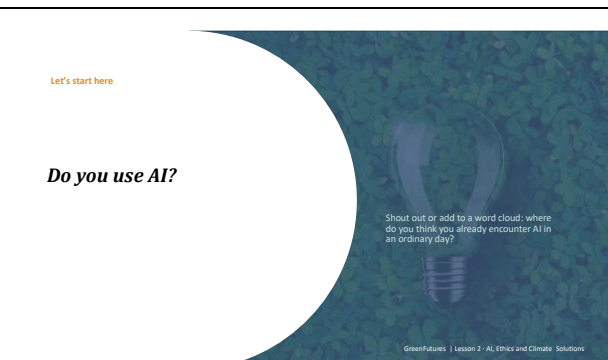
With the support of:



This project is funded within the framework of the UNESCO and Huawei collaboration, 'Digital Futures for a Smart Europe: A Feasibility Study on Digital Transformation and Green Innovation'

Lesson 2 Module Walkthrough

Each row below shows the slide alongside facilitation notes. Timings are approximate and add up to the total above; trim discussion prompts first if running short on time.

Recap and Warm-Up (~6 mins)	
 LESSON 2 Artificial Intelligence, Ethics and Climate Solutions <i>What AI actually is, how it's used in climate science and the questions we must ask about it.</i> UNESCO Greening Curriculum concepts: Climate Science · Resilience Building · Climate Justice · AI Ethics GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~1 min) Briefly recap Lesson 1's key idea: climate science depends on huge datasets and AI helps make sense of them.
 GreenFutures — Lesson 2 of 4 Recap and today's goals 1 Last time, we saw how climate scientists rely on huge datasets and how AI helps make sense of them 2 Today, explain basic AI concepts and terminology in plain language 3 Identify real ways AI is used in climate and environmental work 4 Evaluate the benefits and risks of AI systems, including bias 5 Reflect on ethical questions around technology and sustainability GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~2 mins) Walk through today's learning outcomes.
 Let's start here Do you use AI? Shout out or add to a word cloud: where do you think you already encounter AI in an ordinary day? GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	DISCUSSION (~3 mins) 'Do you use AI?' - take open answers or use a word-cloud tool. Works well as a low-stakes opener. 'Do you use AI and where do you see AI used in every day life?'



DEMYSIFYING THE TERM

What AI Is and Is Not



- AI refers to technologies designed to carry out tasks that would otherwise need a human mind such as recognising images, understanding language, spotting patterns, making predictions
- We already use it: the algorithm choosing your social media feed, autocomplete and predictive text, streaming recommendations and voice assistants
- AI is not magic and it doesn't 'think' or 'understand' the way people do. It finds statistical patterns in the data it was trained on
- AI is also not one single thing. It is a broad family of different tools and techniques

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LECTURE (~4 mins)

Define AI in plain terms and immediately ground it in everyday examples - social media algorithms, autocomplete/predictive text, streaming recommendations, voice assistants.

Be explicit that AI finds statistical patterns, it doesn't 'understand'. This distinction matters for the ethics discussion later.

We **strongly** encourage to take a free, 90-minutes course on AI, specifically designed by ADAPT Research Centre for secondary school teachers: <https://ailiteracyintheclassroom.ie/course/>



HOW DOES IT WORK?

Machine Learning and Pattern Recognition



- Machine learning is the most common form of AI in use today: a model is shown many examples and learns to spot patterns in them
- An accessible way in: think of the line of best fit you draw in maths (slope, x/y-intercept). Machine learning is, at its simplest, a much more powerful version of finding the pattern that fits the data
- The more (and better) the data, the more reliable the pattern the model learns

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LECTURE (~4 mins)

Introduce machine learning as pattern-finding, using the line-of-best-fit/coordinate geometry analogy so it connects to students' maths course.

Machine Learning: Learning a Model from Data

Example: use study hours to predict an exam score

1 Start with examples

Past observations tell us what happened for students who studied different amounts.

Sample training data

Study hours	Exam score
1	52
2	57
3	63
4	68
5	72
6	79

Input (x): study hours

Output (y): exam score

The algorithm does not memorise the table, it learns a pattern.

2 Choose a model family: "equation of the line"



3 Training learns the parameters

ML = choose a model family + find the parameter values that best fit the data

A line is a simple model. More expressive models can be learned: decision trees or neural networks.

A short, worked example or visual that makes this concrete, lands better than the analogy alone.

Here we demonstrate that Machine Learning comprises of two aspects. 1) Samples of data from previous examples 2) A "Model" where parameters need to be tuned based on the examples.

We illustrate this using the Equation of the line [$Y = \text{Slope} * X + \text{Intercept}$]. Here the parameters are Slope and Intercept.

Machine Learning algorithms try to find the best Slope and Intercept parameter values so that the model can make the best prediction for new data.

We ask the model to predict the results a student will get (Y value) if they study for 6 hours (X value).

Classification: Learning a Decision Boundary

Simplified weather example: classify a day as Rain or No rain

1 Label past examples

For each past day we record simple weather measurements and whether rain occurred.

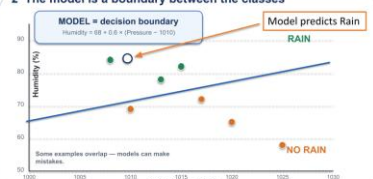
Illustrative teaching data

Pressure (hPa)	Humidity (%)	Class
1005	58	No rain
1008	65	No rain
1017	72	No rain
1013	78	Rain
1008	84	Rain
1004	91	Rain
1015	82	Rain
1002	60	No rain

Inputs: pressure + humidity
Output: Rain / No rain

Real forecasts use many more variables.

2 The model is a boundary between the classes



3 Training finds boundary parameters

Here: slope = 0.6; baseline = 68% humidity at 1010 hPa

Teaching simplification only. Real rain forecasts combine pressure trends, temperature, wind, radar, satellite data and numerical weather prediction.

There are many “Model” types. Using the line is a very trivial approach where there are 2 parameters. Modern AI / ML models may have hundreds, thousands, or even billions of parameters.

Here we provide another example where historical data was collected, about pressure and humidity, and whether it rained. Here we can see if we can “Classify” the prediction or new data into Rain or No Rain depending on where the new point lies in reference to the learned model.

Research in Action

AI at Work in Climate Science

- **Climate modelling** - combining huge datasets to project how the climate may change
- **Weather forecasting** - from short-range warnings to longer seasonal outlooks, including flooding, frost and heat-event predictions
- **Flood- and heat-risk mapping** - identifying which areas are most exposed
- **Early warning systems** - giving communities more time to prepare for extreme events
- Watch a video [here](#) (AIMSIR Centre, UCD)
- Watch a video [here](#) (AI for the Planet, Google)

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LECTURE (~4 mins)

Cover the four real applications of AI in climate science: modelling, forecasting, risk mapping, early warning systems.

[How will AI transform how we forecast the weather in Ireland?](#) (AIMSIR Centre at UCD)

[AI for the Planet | Google Research](#)

ACTIVITY

~8 minutes

Spot the Bias

1. Look at the two example scenarios shown by your teacher: (1) An Garda Síochána (Recording Devices) (Amendment) Bill 2025; and (2) Area Monitoring Systems
2. In pairs, discuss: what could go wrong when each system is used on people or places it wasn't well trained on?
3. Write one sentence: "AI can be biased or can create errors because..."
4. Share back to the class

This connects directly to Lesson 4, where we look at climate justice and fairness in more depth.

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ACTIVITY (~8 mins)

Present the two scenarios (An Garda Síochána (Recording Devices) (Amendment) Bill 2025; Area Monitoring Systems).

Pairs discuss what could go wrong, then write one 'AI can be biased because...' sentence.

Flag explicitly that this connects to Lesson 4's deeper look at climate justice and fairness.

Ensure most up-to-date information. (Links below from August 2026)

----Discussion links for An Garda Síochána (Recording Devices) (Amendment) Bill 2025:

<https://president.ie/en/media-library/news-releases/connolly-signs-the-garda-siochana-recording-devices-amendment-bill-2025>

<https://www.iccl.ie/news/garda-ai-bill-iccl-trinity/>

<https://www.rte.ie/news/primetime/2023/0614/1389207-how-would-facial-recognition-technology-work-in-ireland/>

---- Discussion links for Area Monitoring Systems:



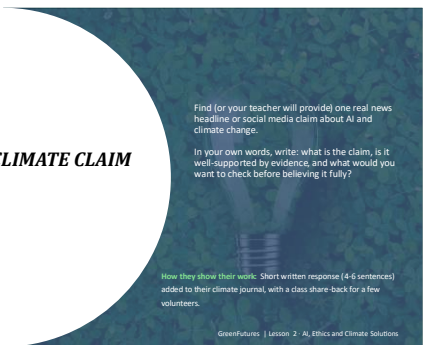
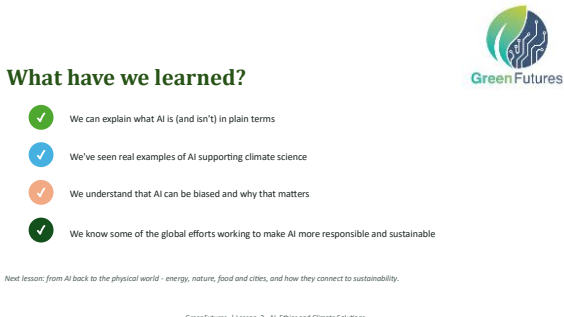
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	https://www.irishtimes.com/news/technology/ai-41506511.html https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/area-monitoring-system-ams/ https://www.agriland.ie/farming-news/dafm-additional-acres-actions-to-be-satellite-monitored/
 GETTING IT RIGHT Responsible and Ethical AI • UNESCO's Recommendation on the Ethics of Artificial Intelligence sets out global principles: transparency, fairness, human oversight, and environmental sustainability • The EU AI Act is a recent example of governments turning these principles into law • Ethical AI means asking: who built this system, what data trained it, who checks its decisions, and who is affected if it gets something wrong? • These are live, unresolved debates - there often isn't one single 'correct' answer, which is exactly why they're worth discussing Read more: "No More Hidden Costs": UN Chief Launches AI Environmental Transparency Initiative EU Statement – UN Global Dialogue on Artificial Intelligence Governance EEAS AI's environmental costs threaten water, land and climate UN News GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~4 mins) Introduce UNESCO's Recommendation on the Ethics of Artificial Intelligence (transparency, fairness, human oversight, environmental sustainability) and the EU AI Act as a real-world example of these principles becoming law. Keep this as an open question – 'who checks these systems, and who is affected if they get it wrong?' - rather than a settled answer.
 ACTIVITY ⌚ ~6 minutes Fact, Myth or It is Complicated? 1. Your teacher will show a short series of social media-style posts making claims about climate change or AI 2. For each one, decide: is this well-supported, false, or somewhere in between? 3. Discuss: what made a claim easy or hard to evaluate? This builds the digital literacy skill of evaluating credibility – a skill for life, not just for climate topics. GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	ACTIVITY (~6 mins) Show a short series of pre-vetted social-media-style posts making claims about climate or AI. Students judge: well-supported, false, or somewhere in between. Prepare this bank of examples in advance rather than searching live. Examples: (Ireland) "Data centres now use almost a quarter of ALL the electricity in Ireland." (https://www.rte.ie/news/business/2026/0707/1582175-cso-data-centre-energy-figures/) "That cold, frosty week we just had? Kind of hard to believe in 'global warming' now, isn't it?" (https://www.thejournal.ie/factcheck-debunked-graph-hottest-springs-climate-change-global-warming-chart-met-eireann-hottest-springs-7064300-Jun2026/) "Video going around of a well-known Irish businessman telling people to invest in a new trading platform, is it really him?" https://www.thejournal.ie/debunked-michael-oleary-financial-software-ai-deepfake-6644169-Mar2025/) (International)

	"Volcanoes pump out more CO2 every year than all of humanity combined, so why blame cars and factories?" (https://www.climate.gov/news-features/climate-qa/which-emits-more-carbon-dioxide-volcanoes-or-human-activities) "Every time you ask ChatGPT a question, it uses a full bottle of drinking water." (https://findskill.ai/blog/does-chatgpt-use-water/)
 THE OTHER SIDE OF THE COIN The Environmental Cost of Digital Technology  - AI and digital technology don't just help the climate - they also have a real environmental footprint - Data centers use significant amounts of energy and, in many cases, water for cooling. - Irish data centers consumed 23% of all metered electricity in Ireland in 2025. In 2015, the consumption was 5%. - Ireland is one of the most data-center-dense countries in Europe relative to its size, which has made data centers a live national debate about energy demand and the electricity grid - Wider issues: digital inclusion and access, and the environmental footprint of the devices we all use GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~4 mins) Cover the environmental footprint of digital technology: data-centre energy and water use, and Ireland's position as one of Europe's most data-centre-dense countries relative to its size. https://www.cso.ie/en/releasesandpublications/ep/p-dcmec/datacentresmeteredelectricityconsumption2025/ https://www.rte.ie/news/business/2026/0707/1582175-cso-data-centre-energy-figures/
 IT'S NOT ALL BAD NEWS Working Towards Balance  - International efforts are underway to make AI more sustainable and more fairly governed - The UN Global Dialogue on AI Governance (July 2026) and the AI for Good Global Summit bring governments and researchers together on these questions - The Coalition for Sustainable AI includes over 100 universities and companies working on more sustainable AI - The EU also regulates the energy and emissions performance of data centers - Watch here UN Global Dialogue on AI Governance No Country Can Govern AI Alone Inside the UN's Global Dialogue on AI Governance United Nations GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~3 mins) Present the balancing international efforts, so the lesson doesn't end on a purely negative note about AI's footprint. Note the Irish Presidency (July-Dec 2026) and a number of events organised on AI across Ireland. Further reading: https://knowledgegov.org/reflections-on-the-ai-for-good-global-summit-2026/ https://www.europarl.europa.eu/RegData/etudes/BRIE/2025/775859/EPRS_BRI(2025)775859_EN.pdf

 APPLY IT ~2 minutes JUDGE A REAL AI-CLIMATE CLAIM Find (or your teacher will provide) one real news headline or social media claim about AI and climate change. In your own words, write: what is the claim, is it well-supported by evidence, and what would you want to check before believing it fully? How they show their work: Short written response (4-6 sentences) added to their climate journal, with a class share-back for a few volunteers. GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	APPLY (INDIVIDUAL, CAPTURED) (~8 mins) Students evaluate one real AI/climate headline or claim (teacher-supplied) and write 4–6 sentences: what's the claim, is it supported, what would they check? A few volunteers share back. Add to the climate journal. Teacher note: keep a small bank of pre-vetted real headlines ready, so students aren't searching open-ended and encountering unsuitable content. Examples: Why AI is the biggest threat to sustainability — and what you can do about it by Raz Godelnik HumanAI Medium Golf Drinks More Than Every Data Center Combined
 What have we learned? ✓ We can explain what AI is (and isn't) in plain terms ✓ We've seen real examples of AI supporting climate science ✓ We understand that AI can be biased and why that matters ✓ We know some of the global efforts working to make AI more responsible and sustainable Next lesson: from AI back to the physical world - energy, nature, food and cities, and how they connect to sustainability. GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~2 mins) Revisit the four learning outcomes.
 GreenFutures See you in Lesson 3: Sustainable Systems - Energy, Nature, Food and Cities Developed by the ADAPT Research Centre in partnership with Huawei and UNESCO. GreenFutures Lesson 2 - AI, Ethics and Climate Solutions	LECTURE (~1 min) Preview Lesson 3: Sustainable Systems - Energy, Nature, Food and Cities.