EdSutra

Teaching guide

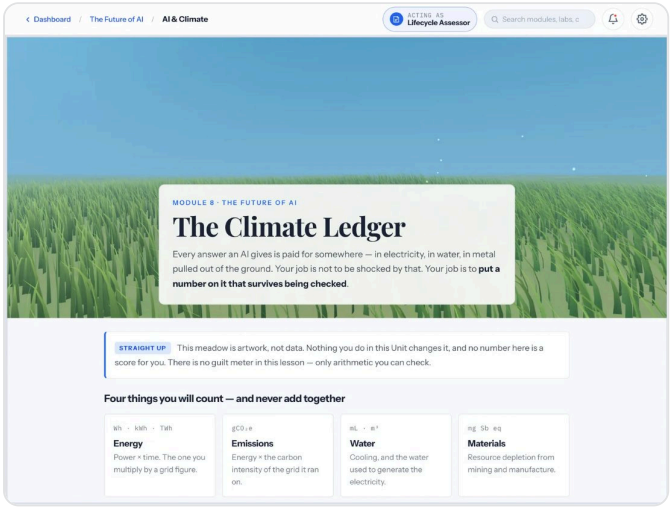
Module 08 · The Future of AI · Unit 02 · Stage 3, Responsibility

AI & Climate

The Climate Ledger

Grades 7–12 | 30 minutes | Role: **Lifecycle Assessor**

Grade 7: About age 12–13 · Year 8 in the UK · Class 7 in India



The big idea

A climate figure for AI means little until you know what it counted: which model, where, when and inside which boundary. Two careful 2025 studies put the water for one AI response 173 times apart, and neither is wrong. Learners do the arithmetic, find where efficiency backfires, and judge a use against a non-AI option.

The learner's job

Learners are the **Lifecycle Assessor** at Meridian Foresight Office · Environmental Accounts. Three teams want a climate number from you. All three will quote it. Only you will know what it counted. Their task: put a number on it. Then show what the number left out.

By the end, learners can say

- I can distinguish power, energy, emissions, water, and materials, and read each with its correct unit
- I can explain how a system boundary, a grid, and the definition of “one prompt” change an estimate
- I can calculate and compare two deployment scenarios from visible assumptions, carrying ranges
- I can trace how rebound, utilization, or a boundary change reverses an apparent advantage
- I can decide whether an AI use is climate-justified against a bounded non-AI baseline, and specify a lower-impact plan

Before class

- One computer or tablet for each learner or pair, with EdSutra open (this Module is part of the full EdSutra studio).
- Open the studio once on each device before class, so the Unit still runs if the internet drops.
- Play Remember and Understand yourself, so you know where learners will click and which figures they will meet.
- Have calculators or scrap paper ready. The Apply ledgers show every step, and learners can check them by hand.
- Best after How Machines Learn and Reinforcement Learning.
- Units open in order, and Module 1 comes first. To start a class here, switch on Open every Unit in Settings → Teachers & parents.

Words to introduce

Power and energy: Power is a rate in watts; energy is power times time, in watt-hours.

Grid carbon intensity: Grams of CO_2e made per kWh of electricity; it differs by country and hour.

System boundary: What an estimate counts, and what it leaves out.

Life cycle: Every stage of impact, from mining and training to your device and disposal.

Embodied impact: Impact from making the hardware, paid before any request is served.

Utilization: How busy hardware is. A fixed making cost is split over its uses.

Rebound effect: Something gets more efficient, so it is used more and the total rises.

Running the lesson 40 minutes

Open 4 min

"You may have heard that an AI chat "drinks a bottle of water". Who counted that, what did they count, and when?"

Before anyone clicks, ask: about how much water does one AI answer use, a drop, a spoonful or a glass? Write the votes on the board. Come back to them in Understand, where two studies disagree 173 times over.

Step	What learners do	Ask the class	Listen for
1. Remember 6 min	Learners tag nine real published figures as power, energy, emissions, water or materials, then build the six stages of an AI system's life cycle in order.	• Why is 700 W a power but 0.24 Wh an energy? • Which life-cycle stage do published figures most often leave out?	The unit tells you what a number measures. Impacts happen in stages, not just inside the app.
2. Understand 7 min	Three predict-then-reveal cases: the same job in France and in India, the same job with a wider boundary, and two 2025 studies 173 times apart on water.	• Why did emissions change when the energy stayed the same? • Look at our water votes. Is one of the two studies lying?	Emissions depend on the grid. The studies measured different models, boundaries and meanings of "one prompt".
3. Apply 9 min	For a cloud assistant and an on-device helper, learners set power, seconds per request, requests per day and the electricity's country. Then they compare the two ledgers, tables showing every step.	• Which single assumption moved your emissions the most? • If the two ranges overlap, which one is lower?	Every figure can be checked by hand. When ranges overlap, the honest answer is "we can't tell from these numbers".
4. Analyze 6 min	Three cases where the option that looks lower loses: a 10 times efficiency gain, a quiet private server and a small model's training. Learners name the lever and the ledger line that proves it.	• Each request got 10 times cheaper. Why did the daily total go up? • Why does a quiet server cost more per request?	Use grew 40 times, so total energy rose. A fixed making cost split over few requests is large.
5. Evaluate 8 min	Three real decisions: a poster image, wind forecasting and an always-on app feature. Learners take a position, pick only evidence that supports it, name who bears the impact and complete a six-line lower-impact plan.	• Which evidence argued for your call, and which against it? • Who bears the impact of your choice, and do they get a say?	Any position can pass. What counts is evidence that supports it, a named bearer and a plan someone can check.

Steps follow Bloom's revised taxonomy, in the order the Unit presents them.

Deepen the thinking

Critical thinking	A headline says AI uses "X liters per question". What three questions would you ask before repeating it?
AI thinking	Running a model where and when the grid is cleanest cuts emissions. Which AI jobs could wait for that, and which could not?
Ethics and fairness	A data center draws water and power from one local area, but its users live everywhere. Who should have a say in it?
Connect to life	Think of something that became cheaper or easier, so you used it more. Did your total use go up or down?

Misconceptions to listen for

"Every AI prompt has one true cost."

Understand shows Google and Mistral 173 times apart on water, because they counted different things. Always ask what was counted.

"Making AI more efficient solves the problem."

In Analyze, each request gets 10 times cheaper, but use grows 40 times, so daily energy rises 4 times.

"Emissions belong to the model."

The same job in France and India uses the same energy, yet India's grid makes about 16 times the emissions.

In real life the card learners see at the end of the Unit

- "A bottle of water per chat" headlines trace back to a 2023 estimate for a whole conversation.
- Tech companies publish per-prompt energy and water figures that differ hugely, mostly because they count different things.
- An app can get more efficient per use yet use more energy overall if far more people use it.

Try it this week. Find one claim about AI's energy or water use. With an adult, ask: what was counted, for which system, and when?

Watch out for. A climate figure means little without its units, boundary and date, and energy, carbon and water can't be added into one score.

Talk about it. When is an AI task worth its energy, compared with doing it another way?

Exit ticket

1. What is the difference between power and energy?

   _____

2. Give one reason two honest studies can disagree about AI's water use.

   _____

3. What is the rebound effect? Give one example.

   _____

Going further

For a class project, each learner finds one published claim about AI's energy or water use and checks it: the units, the system boundary, the date and the source. The class then sorts the claims by what they counted.