

Carbon vs Nature

When do carbon and wildlife agree, and when do they clash?

KS2 (Years 3 to 6) and KS3 · About 60 minutes · Indoors



Facilitator notes

Pupils now know how much carbon their grounds hold. This session asks two harder questions. First, how big is that store compared with what the school releases every year? Second, is more carbon always better? Pupils discover that carbon and wildlife often go together, but not always, and that good decisions about land weigh both, along with the needs of the people who use it.

At a glance

Big question	Is the best thing for carbon always the best thing for nature?
Learning outcomes	<p>All pupils: sort land changes by their effect on carbon and on wildlife, and give a reason for each.</p> <p>Most pupils: compare the carbon stored in the school's trees with the school's yearly emissions and explain what that comparison shows.</p> <p>KS3 and some upper KS2: explain the difference between a carbon store and a yearly flow, and weigh carbon, wildlife and people against each other.</p>
Curriculum links	<p>KS2 Science: living things and their habitats, working scientifically. KS2 Maths: multiplication, division, comparing quantities. PSHE and citizenship: discussion and debate.</p> <p>KS3 Biology: ecosystems, the carbon cycle. KS3 Geography: human and physical interactions. KS3 Maths: ratio and proportion.</p>
Time	About 60 minutes, indoors.
You will need	Class tree carbon total and carbon map from Session 2, your school's gas and electricity use for one year (or the example figures in this pack), Carbon and Nature Grid (one per group, A3 if possible), dilemma cards (one set per group), pupil sheets, calculators for KS3.

National Education Nature Park link

The Nature Park is all about increasing biodiversity on school sites. This session adds the carbon question to that picture. Pupils will finish by shortlisting changes that are good for both, which leads straight into the Nature Park's stage of planning and making improvements to your site. Keep the shortlist for Session 4.

Before the session: find your school's energy use

Ask your business manager or site manager for the school's gas and electricity use for one recent year, in kilowatt hours (kWh). It is on the energy bills or in your Display Energy Certificate data. If you cannot get it in time, use the example school figures on Sheet A. They are invented, but they are in the right range for a primary school.

The conversion factors on Sheet A are the UK government's 2026 figures, rounded: about 0.18 kg of carbon dioxide for every kWh of gas, and about 0.14 kg for every kWh of electricity. The electricity

figure gets smaller most years as more of the grid runs on wind and solar. That is worth pointing out to pupils.

Background for you

Stores and flows. The carbon in a tree is a store. It built up slowly over the tree's whole life, often decades. A school's emissions are a flow: they happen every single year. Comparing a lifetime's store with one year's flow is a fair challenge, and it shows how hard it is for grounds to balance out a school's emissions. Each year a tree adds only a little to its store.

Carbon and nature. Many changes help both: hedges, leaving dead wood, mowing less, replacing hard surfaces with planting. But some do not. Species-rich grassland and wildflower meadows are rare and precious habitats, and planting trees on them can destroy the wildlife they support even though the trees store more carbon in time. Fast-growing non-native trees can lock up carbon quickly but support far fewer native insects. And every change affects people too: play space, sports pitches and safety all matter.

Session plan

Part 1. Remember our trees (5 minutes)

Put the class tree carbon total from Session 2 on the board.

Say: *Our trees have been quietly collecting carbon from the air for years. That is a lot of carbon. But how does it compare with the carbon our school gives out?*

Part 2. The reality check (15 minutes)

Pupils work through Sheet A in pairs. First they turn the tree carbon into carbon dioxide. Then they work out the carbon dioxide from one year of the school's heating and electricity. Finally they compare the two.

In the example school, all the carbon stored in the trees equals about a third of one year of heating and electricity. That is roughly four months. And that is before counting travel, food or anything else.

Say: *So does that mean our trees do not matter? Not at all. They store carbon, they cool the playground in summer, and they are home to wildlife. But it does tell us something important. If we want to cut our school's carbon, using less energy matters most. Our grounds are the bonus, not the answer.*

Give pupils a moment to react. Some may feel deflated. Bring them back to the point that they now understand the real size of things, which is exactly what helps people make good decisions.

Part 3. Carbon vs nature (25 minutes)

In groups of three or four, pupils place the dilemma cards on the Carbon and Nature Grid. They must agree on a position and a reason for each card. There are no fixed right answers. What matters is the reasoning.

Then compare groups. Where did everyone agree? Where did groups disagree, and why? Common placements are below, but accept any well-argued position.

Card	Usual placement	Discussion point
1	Good for carbon, not so good for nature	Precious meadows should not be planted with trees. Could the trees go somewhere else, like the edge of the field?

2	Win-win	Easy and free. Why do so many places tidy leaves away?
3	Win-win	Takes a few years to grow. Is it worth the wait?
4	Lose-lose	Why do some schools still choose it? (Can be used all year, less mud.) What could they do instead?
5	Good for carbon, not so good for nature	Native trees grow more slowly but support many more species.
6	Good for nature, not so good for carbon	Not every good change has to be about carbon. Safety needs thinking about.
7	Win-win	Can sports and long grass share a field?
8	Win-win, but a trade-off for people	Who uses that space now? How could you ask them?

Extension: add a third question for each card: is it good for people? This turns a 2D grid into a three-way decision, which is how real land decisions work.

Part 4. Back to our map (10 minutes)

Bring out the class carbon map from Session 2. Pupils use their carbon and wildlife scores to find two things: an area that is low for both, and an idea that could make it a win-win. They record these on Sheet C.

Collect the ideas into a class shortlist of three to five changes. This is the starting point for Session 4.

Part 5. Exit question (5 minutes)

Pupils finish the sentence: The most useful thing our grounds can do for the planet is...

Common misconceptions

- **Planting trees can cancel out a school's emissions.** The reality check shows why that is very unlikely. Cutting energy use matters far more.
- **More carbon is always better for nature.** Usually the two go together, but meadows, ponds and non-native plantations show they can pull apart.
- **If something does not help carbon, it is not worth doing.** Wildlife, shade, play and wellbeing all matter in their own right.

Adapting the session

- **Lower KS2:** skip the calculation and do the reality check as a demonstration: pour one jar of rice for the trees and several jars for one year of the school. Use the first four cards only.
- **Upper KS2:** complete Sheet A with calculators and all eight cards.
- **KS3:** work out emissions per pupil, and tackle the store and flow challenge on Sheet A. Add the people question to every card.

Coming next: Session 4, The Design Challenge

Pupils choose one idea from the shortlist, plan it properly, and pitch it to the headteacher or governors.

Sheet A: The reality check

How does the carbon in our trees compare with what our school gives out?

Name: _____ Class: _____

Step 1. Our trees

Carbon stored in our trees (from Session 2)	_____ kg
× 3.7 to turn carbon into carbon dioxide	_____ kg CO ₂

Step 2. Our school in one year

Gas used in one year: _____ kWh × 0.18	_____ kg CO ₂
Electricity used in one year: _____ kWh × 0.14	_____ kg CO ₂
Total for one year	_____ kg CO ₂

Step 3. Compare

Trees (Step 1) ÷ one year (Step 2) = _____

So all the carbon our trees have stored in their whole lives equals about _____ of one year of our school's heating and electricity.

Example school (invented figures)

12 trees storing 3,000 kg of carbon × 3.7 = 11,100 kg CO₂

Gas: 150,000 kWh × 0.18 = 27,000 kg CO₂. Electricity: 60,000 kWh × 0.14 = 8,400 kg CO₂. Total: 35,400 kg CO₂

11,100 ÷ 35,400 = about 0.3, so the trees equal about a third of one year, or roughly four months.

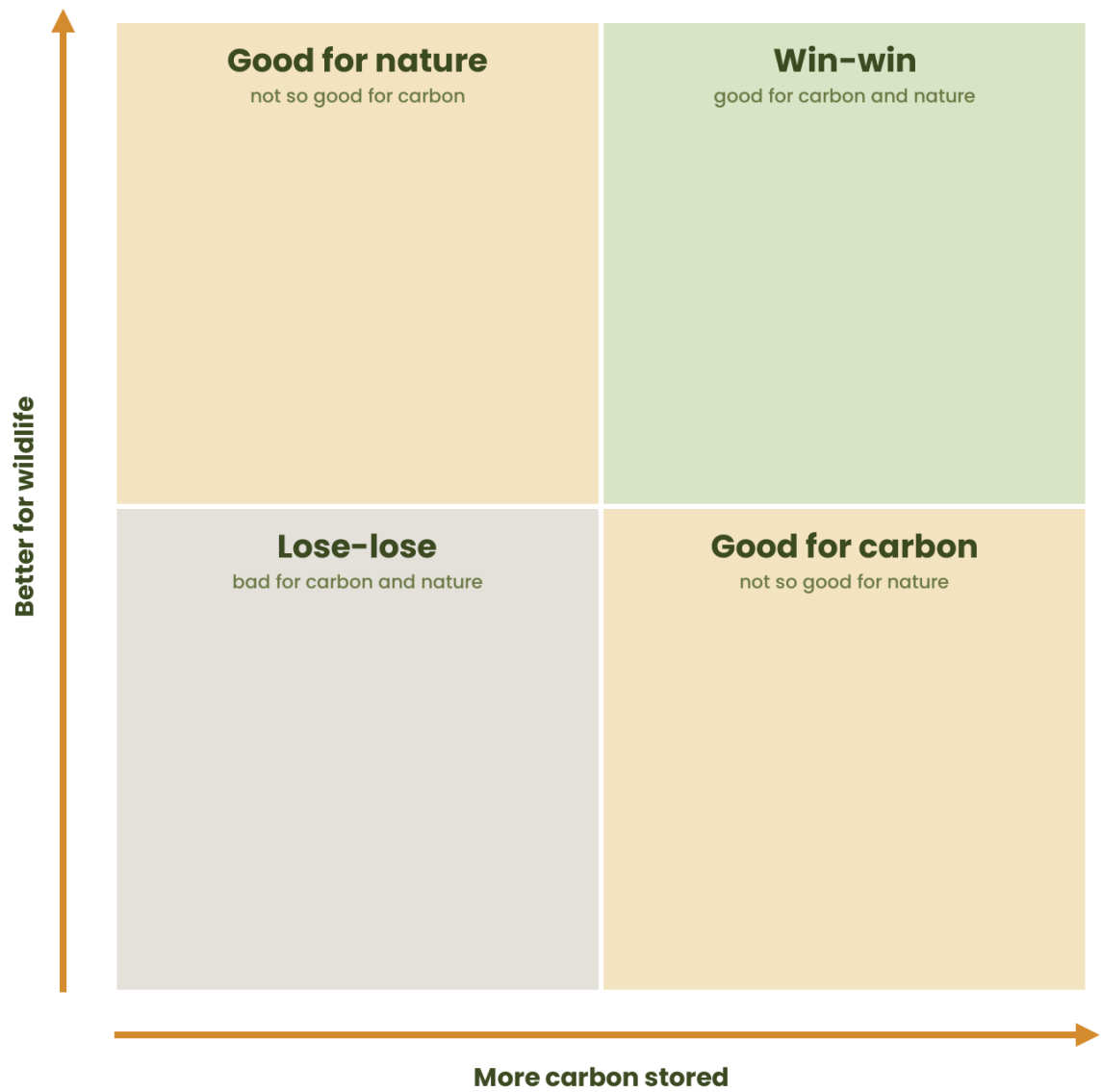
What do you think about this result?

KS3 challenge: stores and flows

The trees' carbon built up over many years. The school's emissions happen every year. Why does that make the comparison even harder for the trees? What would a school need to do to really cut its carbon?

Carbon and Nature Grid

Place each card where you think it belongs. Be ready to explain why.



Ground Level · Where's Our Carbon? · Session 3
Print on A3 if you can. One per group.

Dilemma cards

Cut along the dashed lines. One set per group.

<p>1</p> <p>Plant trees on the wildflower meadow</p> <p>Trees will store more carbon in time, but the meadow flowers and the insects that need them will be lost.</p>	<p>2</p> <p>Leave fallen leaves and dead wood where they fall</p> <p>Feeds the soil, adds carbon, and gives minibeasts and fungi a home.</p>
<p>3</p> <p>Swap a wooden fence for a native hedge</p> <p>A hedge stores carbon in wood and roots and gives birds food and shelter.</p>	<p>4</p> <p>Lay artificial grass on the field</p> <p>No living plants, no soil life, and it is made of plastic.</p>
<p>5</p> <p>Plant a row of fast-growing conifers from another country</p> <p>Stores carbon quickly, but few native insects and birds can use them.</p>	<p>6</p> <p>Dig a wildlife pond</p> <p>Brilliant for frogs, dragonflies and birds. Some carbon is stored in the mud.</p>
<p>7</p> <p>Stop mowing one corner of the field</p> <p>Longer grass, more flowers and insects, and the soil is left alone to build up carbon.</p>	<p>8</p> <p>Turn a strip of tarmac into a planting bed</p> <p>More carbon and more wildlife, but less space to play. Who should decide?</p>

Sheet B: Carbon vs nature

Record where your group placed each card, and why.

Name: _____ Class: _____

Card	Where we placed it	Our reason
1		
2		
3		
4		
5		
6		
7		
8		

The card our group argued about most was number _____ because

Sheet C: Back to our map

Use your carbon map from Session 2 to find a win-win.

Name: _____ Class: _____

An area of our grounds that is low for carbon and low for wildlife:

An idea that could make it a win-win:

Would this be good for people too? Who would we need to ask?

Could this idea cause a problem? How could we solve it?

Exit question

The most useful thing our grounds can do for the planet is
