

Carbon goes round and round and round Make your own carbon cycle

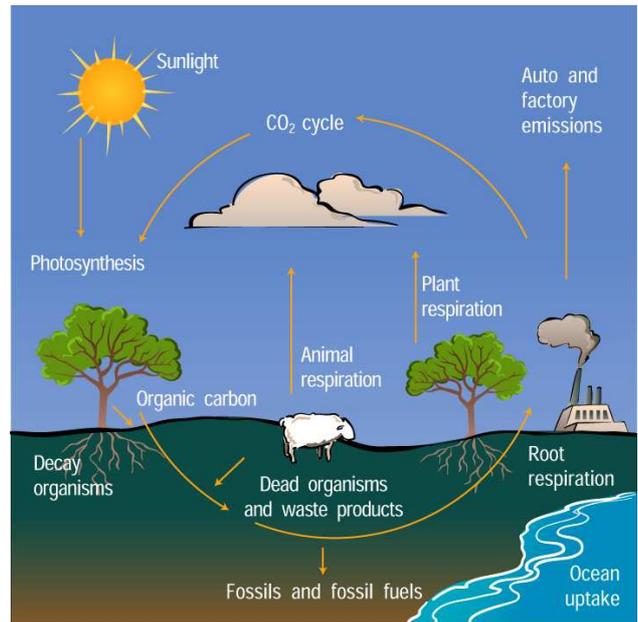
Give your pupils specimens, drawings or photos of the various stages of the carbon cycle and ask them to put the specimens/drawings/photos into the correct sequence and explain what has happened to the carbon at each stage.

The photos on pages 2, 3 and 4 may be used, or the teacher and/or the pupils can draw the stages themselves, either on paper or on the ground.

If possible, collect specimens of all the various stages and add these to the cycle too - good examples are suggested in the 'specimen' list below.

Ask the pupils:-

- to arrange the specimens, drawings or photos in the correct order to complete the carbon cycle.
- at which stages is the carbon 'fixed'?
- at which stages is the carbon 'released'?



The back up

Title: Carbon goes round and round and round.

Subtitle: Make your own carbon cycle.

Topic: The carbon cycle can be introduced when teaching many topics including the atmosphere, photosynthesis, respiration, decomposition, combustion and fossil fuels, climate change . . .

Age range of pupils: 10 - 14 years

Time needed to complete activity: 30 minutes

Pupil learning outcomes: Pupils can:

- list the processes involved in the carbon cycle;
- list the main carbon products involved in the cycle;
- know that the carbon cycle is happening all the time everywhere;
- say where carbon is fixed;
- say where carbon is released.

Context:

Arrange the photos and/or specimens in the correct order to complete the carbon cycle. A fairly simple version of the cycle is shown in the diagram.

Suggested specimens:

- the atmosphere - air in a glass jar or plastic pot, labelled atmosphere;
- plants and photosynthesis - a plant with leaves;
- animals, including people eat the plants - some grass or fruit/vegetables;
- animals, including people, eat the animals - some

food, cooked meat or fish;

- decaying organisms, waste products - something which is decaying in a glass jar or plastic pot, labelled 'decaying organisms and waste';
- fossil;
- 'fossil' fuel e.g. piece of coal/some oil in a container;
- animal respiration - breathe into a glass jar or plastic pot, labelled 'animal respiration';
- plant respiration - a plant with leaves;
- factory emissions - some soot if possible;
- vehicle exhausts - if it is safe to do so, collect some air near a busy road or just label a container 'vehicle exhaust fumes';
- oceans - water in a glass jar or plastic pot, labelled seawater.

At which stages is the carbon 'fixed'?

Carbon is fixed by plants during photosynthesis, i.e. carbon dioxide, water and sunlight are used by plants to make sugar and oxygen.

The plants are eaten by animals on land and in water and so they take in carbon.

Decaying organisms and vegetation and waste products from animals put carbon into the soil.

The carbon from dead organisms and waste products may eventually become fossils (and rocks formed of fossil remains, like limestone/chalk) and fossil fuels (like coal, crude oil and natural gas).

Phytoplankton (plants) in the oceans take up carbon dioxide from the atmosphere. The oceans also take carbon dioxide into solution from the atmosphere. It is more soluble in cold water than in warm water.

At which stages is the carbon 'released'?

Animal breathing puts carbon dioxide back into the atmosphere.

Plant respiration puts carbon dioxide back into the atmosphere.

Decaying organisms and vegetation release carbon into the atmosphere.

Factories and vehicles burning fossil fuels emit carbon dioxide and soot into the atmosphere.

Weathering of limestone releases carbon dioxide into the atmosphere.

Volcanic eruption releases carbon dioxide into the atmosphere.

Following up the activity:

The topic could be followed by a discussion about climate change and increasing quantities of carbon dioxide in the atmosphere.

Underlying principles:

- The carbon cycle is happening everywhere all the time.
- Carbon is 'fixed' by certain processes.
- Carbon is 'released' by certain processes.

Thinking skill development:

- understanding the pattern (construction);
- different pieces of evidence (cognitive conflict);
- explanation of thinking (metacognition);
- relevance of the cycle to everyone (bridging).

Resource list:

- photos (not essential)
- 5 glass jars or plastic pots with lids and labels
- 2 plants with leaves
- something decaying
- food - grass/fruit/vegetable and meat/fish
- fossil
- 'fossil' fuel, e.g. a piece of coal/oil in a container
- soot, if possible.

Useful links:

Earthlearningidea 'The carbon cycle through the window'.

http://epa.gov/climatechange/kids/carbon_cycle_version2.html

<http://users.rcn.com/jkimball.ma.ultranet/BiologyPages/C/CarbonCycle.html>

<http://www.cet.edu/ete/modules/carbon/efcarbon.html>

Source: Developed by Chris King and Elizabeth Devon from the Earth Science Education Unit, 'Life, atmosphere and everything' workshop, E-carbon cycle activity by Paul Grant and Chris King.

Photos by Peter Kennett unless stated otherwise



Atmosphere



Plants using CO₂ in photosynthesis



Animals eating plants



People eating

Photo with permission - Scottish Love in Action www.sla-india.org



Coal - fossil fuel



Decaying leaves (Photo Elizabeth Devon)



Ocean uptake of CO₂



Fossil



Plant respiration



Animal respiration



Vehicle exhaust

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