

## What makes physical geography accessible?

Activities to help remove misconceptions and improve understanding.

**Title of Activity** Moving round the Carbon cycle

**Presenter** Physical Geography SIG  
- based on an activity devised by **Dr Tim Favier, University of Utrecht, Netherlands.**

**Topic or Theme** Carbon Cycle.

### What is frequently misunderstood or not grasped?

Appreciation of differences in residence time of carbon. The flux (rates, rapidity of flow) between different stores. Complexity of processes and why some part of the cycle are considered sources and others sinks. Carbon exchange between geosphere and other spheres.

### Activity Description

Students role-play a carbon atom using cards to explain carbon 'stops' and throws of dice to determine how carbon is distributed and exchanged across the Earth. They record processes, flows, flux and residence time to discover key sources and sinks.

### Materials

- Visual representation of the location of carbon stores in geosphere, atmosphere, biosphere and hydrosphere.
- A 6-sided dice and a 20-sided dice for each student (or pair).
- 16 carbon store cards (one for each 'stop'), each with the store process and probability dice scores to reflect residence time.
- Carbon map

### Set-Up and Procedure

1. Set out the cards around the classroom corresponding to the carbon map (i.e. a similar distribution to that found in the Earth).
2. Tell students they are a carbon atom that will move around the earth between the geosphere, atmosphere, biosphere and hydrosphere. The aim of the activity is to discover how this happens and how carbon is distributed within and across the earth.
3. Give each students one of each dice (pair students if you have a limited number of dice) and a carbon map.
4. Students choose a store to start. Every location on the map is a stop in the carbon cycle.
5. Students read the card to discover how carbon is present in the stop and throw the dice to determine if stored or transferred.
6. If they remain stored and need another dice throw they record with x. If they move they draw a line to the new store on the map, recording direction of movement and noting the process along the line.
7. Students continue until they have visited all stops.

### Follow Up

- Ask students where they got frustrated and what 'frustration' equates to in the C cycle.
- Discuss the maps produced to highlight the pattern and magnitude of flows and processes that create sinks or sources. Ask students to consider how human activity is likely to change the balance of natural flows in the C cycle.

