

A Carbon Journey

The following activity has been adapted from: <http://www.fnesc.ca/sciencetrg/> (pg. 206-208).

In this activity, your students will each **take on the role of a carbon atom and experience how carbon is constantly changing states**. Each station in this activity represents somewhere that carbon can be found and stored (i.e., the atmosphere, humans, soil, plants, animals, the ocean, and coal, oil, and gas). The journey that your students take during this activity will depend on the number that they roll at each station.

Before starting this activity, encourage your students to create a “travel log” where they can keep track of all the stations they go to. You may also encourage students to take a moment when they reach each new destination and imagine what they would see and feel in that location. This information can also be recorded in their travel logs. By the end of this activity, students will have a written record that reflects how carbon changes states and how increasing amounts of carbon are being released into the atmosphere as a result of human activities.

Things to consider before beginning this activity:

- There are two different cards for Station 7: coal, oil, and gas- one of which is pre-industrial and the other is post-industrial. With this, the activity may be done twice, once using the pre-industrial card and then again using the post-industrial card.
- Depending on the size of your class, you may choose to run two different sections of this activity at the same time to lessen the number of students at each station at a given time
- This activity is well-suited to be done outside, as stations can be more spread out and students can engage with the natural environment

For this activity, you will need:

- Dice at each station
- Printed Carbon Transformation Station cards
- Paper/devices for students to record their transformations (travel log)

Starting the Activity:

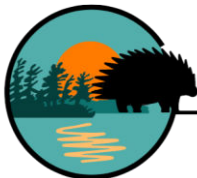
To begin, disperse the carbon transformation stations around your learning area, with a variety of dice at each station. Explain to students that they will be acting as a carbon atom during this activity and they will be recording their journey and transformations in a travel log. You may choose to have all your students start at the same station, or evenly divide your class amongst the seven stations to begin the activity. From there, students will write in their travel logs, roll the dice at their station, and follow the directions on the sheet to move to their next location



(see attached Carbon Transformation Stations). Students will continue with this process for the rest of the exercise.

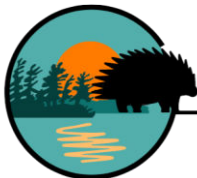
Consolidation Questions:

- Were there stations where many carbon atoms (students) stayed at for extended periods of time? What does that tell you about that station? (i.e., carbon sinks)
- Were there stations where carbon atoms were only at for a short period of time?
- After running through both the pre-industrial and post-industrial version, what differences did you noticed in how carbon atoms moved and changed states?
 - Why did the post-industrial version send more carbon atoms into the atmosphere than the pre-industrial version?



Blackline Master 7-4 Carbon Transformation Stations

<p>Station 1 ATMOSPHERE</p> <ol style="list-style-type: none">1. You follow wind currents to the other side of the world. Stay in Atmosphere2. You stay in the air. Stay in Atmosphere3. You are taken in by a Devil's Club through photosynthesis. Go to Plants4. You are dissolved in the Ocean. Go to Ocean5. You are breathed in by a moose. Go to Animal6. You remain in the air. Stay in Atmosphere	<p>Station 2 HUMANS</p> <ol style="list-style-type: none">1. The human respire and breathes you out as CO₂. Go to Atmosphere.2. Through digestion the human eliminates you into its waste water system. Go to Ocean.3. The human sneezes and you are expelled into the air. Go to Atmosphere.4. You are absorbed into the human's bone. Stay in Humans.5. You are eliminated and processed in a waste treatment plant. Go to Soil.6. You are consumed by a bacteria in the human's gut. Stay in Humans.
<p>Station 3 SOIL</p> <ol style="list-style-type: none">1. You stay in the soil as dead plant matter.2. You stay in the soil as dead animal matter.3. You are burned for fuel and released into the atmosphere. Go to Atmosphere.4. You remain buried deep in the earth for millions of years, eventually becoming Coal Oil or Gas. Go to Coal, Oil and Gas.5. You are taken up through a plant's roots. Go to Plants.6. You erode into a river and eventually end up in the Ocean. Go to Ocean.	<p>Station 4 PLANTS</p> <ol style="list-style-type: none">1. You become part of the plant's structure. Stay in Plant.2. You are burned for fuel and released into the atmosphere. Go to Atmosphere.3. The plant you are part of is eaten by an animal. Go to Animal.4. The plant you are part of dies and falls to the ground. Go to Soil.5. You are eaten in a salad for lunch. Go to Humans.6. You die and are compressed over millions of years. Go to Oil and Gas.



Blackline Master 7-4 page 2

<p>Station 5 OCEAN</p> <ol style="list-style-type: none">1 You are carried by the ocean currents. Stay in Ocean2. You are absorbed by plankton in the process of photosynthesis. You are eaten by a fish. Go to Animals.3. You follow currents through the ocean, stay in Ocean.4. You are released into the atmosphere. Go to Atmosphere.5. You are absorbed by phytoplankton in the process of photosynthesis. You are eaten by clam, which is then eaten by a human. Go to Humans6. You are absorbed by a salmon who is caught by a bear when it is spawning. The bear drops the carcass in the forest by some trees. Go to Plants.	<p>Station 6 ANIMAL</p> <ol style="list-style-type: none">1. You become part of the animal's body. Stay in Animal.2. You are released as waste through respiration when the animal breathes out. Go to Atmosphere.3. The animal you are part of is eaten by another animal. Stay in Animal.4. The animal you are part of dies and falls to the ground. Go to Soil.5. The animal you are part of dies and decomposes, you are released into the atmosphere by the microbes decomposing the animal. Go to Atmosphere.6. The animal you are part of is dinner for a Human. Go to Human.
<p>Station 7 COAL, OIL, AND GAS - Pre-Industrial</p> <ol style="list-style-type: none">1. You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.2. You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.3. You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.4. You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.5. You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas6. You are burned for fuel and released into the atmosphere. Go to Atmosphere.	<p>Station 7 COAL, OIL, AND GAS - Post-Industrial</p> <ol style="list-style-type: none">1 You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.2 You remain buried deep in the earth for millions of years. Stay in Coal, Oil and Gas.3. You are burned for fuel and released into the atmosphere. Go to Atmosphere.4. You are burned for fuel and released into the atmosphere. Go to Atmosphere.5. You are burned for fuel and released into the atmosphere. Go to Atmosphere.6. You are in an oil spill and leak into the ocean. Go to Ocean.