



## Forests as Carbon Sinks

### Organization:

**Title:** Forests as Carbon Sinks

**Summary:** Students learn about the role carbon plays in climate change and about local carbon sinks and sources. Students also learn how human relationality with the local land base impacts carbon and its subsequent impact on the changing climate.

**Inquiry Question:** Inquiry Question 1: Forest Harvesting: How does observing the land teach us that an ecosystem is comprised of interdependent beings (including humans) which all have important roles and responsibilities that must be fulfilled in order for an ecosystem to thrive?

**Duration:** 1-2 class periods

**Learning Environment:** Classroom, outdoor

**Season:** Summer, Spring, Fall

### Materials:

- Computer
- Projector
- Video: <https://www.youtube.com/watch?v=2Jp1D1dzxi8>
- Carbon and Climate Change Teacher Backgrounder.pdf
- A Carbon Journey.pdf
- Sources and Sinks.pdf
- Sources and Sinks Assignment Sheet.pdf

### Part One- *Forest as Carbon Sinks:*

- Dice for each station
- Printed carbon transformation station cards
- Paper for students to record transformations (travel log)
- Large outdoor space to facilitate activity
- Ten-minute video accompanying this Learning Bundle that discusses from both Indigenous and Western Scientific perspective the capacity of different types of soil to sequester carbon.

### Part Two- *Carbon Sources and Sinks:*

- Blank Climate Factors handout
- Blank Local Maps from your school neighborhood
- Matching the number of groups
- Tape or sticky tack
- Colouring pens, pencils, or markers
- A place to display finalized maps and factor sheets

### Curriculum Links:

Grade 9 Destreamed: A2.4, B2.2, B2.4, B2.5

Grade 10 Academic: D3, D2.1, D2.9, D3.3, D3.5, D3.8

Grade 10 Applied: D2, D1.2, D2.1, D2.7, D3.2, D3.3

**Meta Data:****Content Type:** Activity**Bundle:** Food**Theme:** Global Climate Change**Subject Area:** Biology, Environmental Education, Geography, Outdoor Education, Science, Social Studies**Curriculum Focus:** 9, 10*Part One: Forests as Carbon Sinks*

Carbon is an essential building block of life. It is linked to all biotic and abiotic substances on earth. Through multiple diverse carbon cycles within and among organisms and their environment, carbon is constantly being transformed into different molecules. Although carbon is incredibly important to the health and functioning of our ecosystems, an imbalance of carbon between terrestrial (or aquatic) ecosystems and the atmosphere can have terrible consequences. Students will look at the carbon cycle from an Indigenous perspective using the themes of interdependence which shows another gift that forests provides. (eg: long-term carbon storage-sequestration)

- Teachers ask students to try to identify an object that does not contain carbon. The teacher then asks students how carbon relates to climate change. For more background information students can watch the following video:  
<https://www.youtube.com/watch?v=2Jp1D1dzxj8>
- Teachers introduce students to the vocabulary word “anthropogenic” to talk about how anthropogenic emissions caused by industrialization are increasing the amount of carbon in the atmosphere. These changes are contributing to climate change.
- Teacher leads a discussion with students regarding the role carbon plays in climate change using the **Carbon and Climate Change Teacher Backgrounder.pdf** for reference.
- To better understand how forests and soil can act as a carbon sink students can watch the ten-minute video accompanying this Learning Bundle that discusses from both an Indigenous and Western Scientific perspective the capacity of different types of soil to sequester carbon.
- Teachers run an interactive game with the students called *Becoming a carbon atom (The Carbon Journey)* adapted from:  
<http://www.fnesc.ca/sciencetrg/> (pg. 206)  
Instructions regarding how to facilitate this activity will be included in **A Carbon Journey.pdf**. In this activity students go to different stations that represent the different transformed states of carbon. Through this activity students learn how carbon is constantly changing state and how increasing amounts are being released from forests and other ecosystems into the atmosphere due to human activities.



- The class runs through the exercise twice ie: once pre-industrial conditions and second time using post-industrial conditions.
- Based on the exercise, teachers ask students if there were places where a large number of carbon atoms were collected and stored for a long time (ie: carbon sinks) and if there were locations where carbon atoms remained for a short period of time? To learn more about this check out:  
<https://www.peelregion.ca/planning/teaching-planning/pdfs/Grade9forWeb.pdf>

### *Part Two: Carbon Sources and Sinks*

- Teachers can run through the **Sources and Sinks Lesson Plan.pdf** and associated **Sources and Sinks Assignment Sheet.pdf**. In this lesson, students will learn to summarize major sources of greenhouse gas emissions, as well as potential greenhouse gas sinks, like wetlands and forests. Students should begin to see the carbon cycle, and how humans changed this. Secondly, this activity introduces them to local avenues of change. The lesson takes the larger picture of climate change and shows students how it is changed by the land around them. By the end of the lesson, students should have a much better understanding of how the land in their community – and its role as a sink or source -can be changed by our relationship with it.