

## Climate Change Lesson 7 - The Carbon Cycle

### Objectives

- Students will gain a basic understanding of the biological processes and human activity in the Carbon cycle
- Students will differentiate between biological and geochemical processes
- Students will describe biological processes: photosynthesis, respiration, and decomposition
- Students will discuss how these processes fit together to create the carbon cycle
- Students will discuss how human activity impacts the carbon cycle

### Vocabulary

- Atmosphere
- Carbon Dioxide (CO<sub>2</sub>)
- CO<sub>2</sub> Emission
- Combustion
- Consumers
- Decomposition
- Fossil fuels
- Ozone
- Photosynthesis
- Respiration

### Materials

Computer with Internet access, glue, scissors, recycling materials, markers, tape

### Warm Up

Discussion Questions:

- *What is Carbon?*
- *Where can carbon be found in this room? On our planet? In space?*
- *How does photosynthesis work?*
- *How does decomposition work?*
- *How does respiration work?*

### Lesson

Provide an introduction to the carbon cycle and the different components. Use NOAA's guide and modify depending on grade level and time for unit:

<http://www.noaa.gov/resource-collections/carbon-cycle>



## Assignment

Have students divide into three groups: photosynthesis, decomposition, and respiration. Over the course of a week, students will conduct research and participate in an activity on one of the carbon cycle processes. Provide students with the resources listed below.

Have students create a presentation with a poster board and present to the rest of the class using repurposed or recycled materials.

## Wrap Up

Have students calculate their carbon footprint (best completed as homework with family):

<https://www3.epa.gov/carbon-footprint-calculator/>

## Resources

General:

<http://www.noaa.gov/resource-collections/carbon-cycle>

<https://www.netl.doe.gov/research/coal/carbon-storage/carbon-storage-faqs/what-are-the-primary-sources-of-co2>

<https://whatsyourimpact.org/greenhouse-gases/carbon-dioxide-emissions>

<https://www3.epa.gov/carbon-footprint-calculator/>

Photosynthesis:

Video: <http://www.pbs.org/wgbh/nova/nature/photosynthesis.html>

Text materials:

[http://www.wctech.org/wcts/Staff/Michele%20Beneducci/Book%20Pages/te\\_ch09\\_unlocked.pdf](http://www.wctech.org/wcts/Staff/Michele%20Beneducci/Book%20Pages/te_ch09_unlocked.pdf) (pg 202-207)

Work sheets: [https://www.nps.gov/cave/learn/education/upload/biology\\_middle\\_school.pdf](https://www.nps.gov/cave/learn/education/upload/biology_middle_school.pdf) (Pgs 6-9)

Reading comprehension:

[http://www.softschools.com/language\\_arts/reading\\_comprehension/science/2/photosynthesis/](http://www.softschools.com/language_arts/reading_comprehension/science/2/photosynthesis/)

Experiment: [https://www.nps.gov/cave/learn/education/upload/biology\\_middle\\_school.pdf](https://www.nps.gov/cave/learn/education/upload/biology_middle_school.pdf) (pg 35-37)

Respiration:

Video: [https://www.youtube.com/watch?v=Py4R\\_Up2uBc](https://www.youtube.com/watch?v=Py4R_Up2uBc)

Text materials:

[http://www.wctech.org/wcts/Staff/Michele%20Beneducci/Book%20Pages/te\\_ch09\\_unlocked.pdf](http://www.wctech.org/wcts/Staff/Michele%20Beneducci/Book%20Pages/te_ch09_unlocked.pdf) (pg 208-215)



Worksheets:

<http://home-school.lovetoknow.com/worksheets-printables/cellular-respiration-worksheets-middle-school>

Experiment:

[http://www.cfep.uci.edu/cspi/docs/lessons\\_secondary/Cell%20Respiration%20Fermentation.pdf](http://www.cfep.uci.edu/cspi/docs/lessons_secondary/Cell%20Respiration%20Fermentation.pdf)

Decomposition:

Video: <https://www.youtube.com/watch?v=uB61rfeeAsM>

Text Material & experiment:

[https://www.esa.org/tiee/vol/v6/experiment/soil\\_respiration/description.html](https://www.esa.org/tiee/vol/v6/experiment/soil_respiration/description.html)

