

# Carbon Cycle Part 1 - What IS Carbon?

## Summary

This inquiry and discussion based lesson is a brief introduction to the carbon cycle, focusing on a description of carbon and its importance to life on Earth.

## Main Core Tie

Science - Biology

[Standard 1 Objective 2](#)

## Time Frame

1 class periods of 45 minutes each

## Materials

- powerpoint (what is carbon)
- log, truck, or large branch of tree
- diamond ring, or an object to represent a diamond
- coal, oil shale and other carbon-based rocks
- car oil
- pencil or graphite
- carbon-fiber products, like trekking poles or bicycle parts

## Background for Teachers

From wiseGEEK: Carbon is a naturally abundant, nonmetallic element which forms the basis of most living organisms. It is the fourth most abundant element in the universe, and it plays a crucial role in the health and stability of the planet through the carbon cycle. This cycle is extremely complex, and it illustrates the interconnection between organisms on Earth. Most consumers are familiar with the element, along with numerous forms in which it appears.

The atomic number of this element is six, and it is identified by the symbol "C" on the periodic table. The structure of carbon molecules is such that the molecules bond readily with a wide range of other elements, forming thousands of compounds. The molecules also bond with each other in different ways, creating forms of carbon such as diamonds, the hardest substance on Earth, and graphite, one of the softest materials on the planet. Its changing personality, depending on what it bonds with and how, makes it a very unique element.

All living organisms contain carbon, and as they decay or change, they will continue to contain the element. Coal, limestone, and petroleum, for example, are all fossilized forms of living organisms containing abundant amounts of carbon. Plants and animal life which died millions of years ago were slowly compressed into these substances, and their integral carbon was preserved. These remains are used in everything from jet fuel to children's dolls.

For this lesson, you will need a variety of items that contain carbon (listed in Materials) to demonstrate the commonality of carbon. Lead a discussion about carbon, and end with an emphasis on the carbon cycle.

## Student Prior Knowledge

Students should be familiar with concepts like photosynthesis, respiration and fossil fuel combustion. A complete understanding of these processes is NOT necessary, and will be covered in later lessons. Students should also be familiar with the periodic table, have knowledge of atomic numbers, and have knowledge of the states of matter (solid, liquid, gas).

## Intended Learning Outcomes

### 1. Use Science Process and Thinking Skills

- a. Observe objects, events and patterns and record both qualitative and quantitative information.
3. Demonstrate Understanding of Science Concepts, Principles and Systems
  - a. Know and explain science information specified for the subject being studied.

## Instructional Procedures

Begin lesson by telling students you have a bag of items that are all somehow related to each other. You will pull two items out at a time. Students will write in their notebooks what the items are, and predict how the items are related. Allow several minutes per pair of items for students to make predictions individually, and then share their predictions as a class. Ask probing questions were appropriate to facilitate discussions.

Once carbon has been mentioned, or after most of your items have been revealed, share with the classroom that all of the items in the bag are made of carbon. Ask students what comes to mind when you mention the word "carbon."

Begin the "what is carbon" powerpoint to continue the discussion about carbon. Below are main points for each slide. If time allows, you can discuss all the main points.

First slide -- emphasize that carbon is an ELEMENT and makes up a variety of MOLECULES.

When scientists talk about carbon, they are referring to a very small scale of atoms.

Second slide -- carbon flows through Earth's ecosystem. Highlight key parts of the carbon cycle.

Third slide -- depending on student's background, you can discuss more about carbon in the periodic table of elements (i.e., how many bonds carbon makes).

Fourth slide -- carbon as an important player in the green house gas effect.

Fifth slide -- how scientists study carbon (if there is time)

Conclude the lesson by making a list of important qualities of carbon together as a classroom:

- Carbon is a solid, liquid and gas
- Carbon is an element (atomic number 6)
- Carbon is a building block of life
- Carbon flows through Earth's ecosystem

## Strategies for Diverse Learners

This lesson plan will allow for students to see and handle items that all contain carbon. Observations and notes will be written, and discussions can be conducted in pairs as well as a whole class.

## Assessment Plan

Students will take notes in their science notebooks throughout the class period. Notebooks will be collected once a week and assessed based on a rubric.

## Rubrics

[Science Notebook](#)

## Bibliography

- [What is Carbon from wiseGEEK](#)
- [Climate Change terms from EPA](#)
- [What is the Carbon Cycle?](#)

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