

# Carbon Dioxide: Can't Live With it, Can We Live Without it?

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<b>Grade Level</b>	7-9
<b>Duration</b>	2 class periods

## National Geography Standards

15. How Physical Systems Affect Human Systems

## Arizona Geography Concept

Concept 5: Environment and Society  
PO 4. Describe the positive and negative outcomes of human modification of the environment

## Arizona Science Standards

Grade 7  
Strand 3: Physical Systems  
Concept 1: Analyze environmental benefits and risks of human interactions.

## Overview

Carbon dioxide is often seen from only one vantage point, that of being harmful. But Carbon dioxide is also an important part of our habitat and the environment in general. This lesson will help students to understand the impact of too much CO<sub>2</sub> in the environment, sometimes due to human impacts. But this lesson will also show CO<sub>2</sub> to be important to human, plant life and the environment as well.

## Purpose

In this lesson, students will learn the effects CO<sub>2</sub> has on the environment, in both positive and negative ways.

## Materials

- Paragraphs about CO<sub>2</sub> for up to seven groups of 4 to 5 students.
- Overheads of each article.
- Overhead 1 & 2
- Carbon Dioxide Worksheet
- Assessment

## Objectives

The student will be able to

- Define global warming, carbon dioxide, greenhouse gasses, temperature, photosynthesis.
- Describe the dangers and benefits of carbon dioxide in the environment.

## Procedures

Class Period One

1. Using Overhead 1 introduce the key terms: global warming, carbon dioxide, greenhouse gasses, temperature, and photosynthesis.
2. Give each group of students (6-7 groups 4 to 5 per group) a different paragraph to read and discuss.
3. Using the carbon dioxide Worksheet have the students read the paragraph together and collaborate on one or two sentences which summarize the paragraph. They should also finish the rest of the worksheet individually, expressing their own opinions.



## Carbon Dioxide: Can't Live With It, Can We Live Without It?

4. Have each group of students present their summarizations to the class while the teacher writes them on an overhead.
5. Using Overhead 2 have the class fill in a T-Graph with the teacher about the positive and negative qualities of CO<sub>2</sub>.

Class Period Two

Complete the assessment with the class.

### Assessment

Give each student a new T-Graph. Have each student fill in the T-Graph using the facts presented in the lesson. The student should list as many positive and negative facts about CO<sub>2</sub> as they can. Mastery will be considered 5 out of 7 facts presented. For ELL students drawings would be acceptable.

### Extensions

Have the students do research on their own about global warming and the greenhouse effect.

### Sources

<http://tree.ltrr.arizona.edu/hal/ancient.pdf>

Mammoth Lakes Visitor's Guide

<http://earthobservatory.nasa.gov/Library/GlobalWarming/>

[http://www.nasa.gov/worldbook/global\\_warming\\_worldbook.html](http://www.nasa.gov/worldbook/global_warming_worldbook.html)

## Overhead 1: Vocabulary

**Global Warming** - a slow increase in the Earth's temperature due to the increasing amounts of carbon dioxide and other greenhouse gases in the atmosphere; if there is too much carbon dioxide (and other greenhouse gases) in the atmosphere, more heat than normal is trapped and temperatures around the world increase.

**Fossil Fuel** - any one of several nonrenewable resources such as coal, oil, or natural gas, created from the remains of organisms

**Temperature** - the degree of hotness or coldness of something, such as water or air, usually measured with a thermometer.

**Greenhouse Gasses** - gas released into the air through the burning of fossil fuels. Examples include carbon dioxide, methane, carbon monoxide, nitrous oxide, and other by-products of our civilization.

**Photosynthesis** - The process plants use to make food, it requires carbon dioxide, water, light and the green tissue called chlorophyll. The plant then releases oxygen.

## Paragraphs for Groups

Paragraph #1: Some scientists believe that the release of greenhouse gasses such as carbon dioxide from the burning of fossil fuels in factories and automobiles may be causing global temperatures to rise. This is known as global warming. Industrial countries, such as the United States, produce more than 75% of these gasses. These fuels produce most of the world's electricity and run the world's more than 550 million cars, busses and trucks. Developing countries burn forests to clear land and use wood for heating and cooking. This also releases greenhouse gasses into the atmosphere.

Paragraph #2: At Horseshoe Lake, California, many of the trees are dead or dying. In 1994 the U.S. Geological Survey scientists detected naturally occurring carbon dioxide gas in the vicinity of Horseshoe Lake and other areas of Mammoth Lake. Since then they have been monitoring and measuring the concentration and rate of gas discharge from the ground. The higher than normal concentrations of CO<sub>2</sub> are responsible for killing approximately 120 acres of trees next to Horseshoe Lake and elsewhere on Mammoth Mountain. It is believed that earthquake and magma activity beneath the area in 1989 may have opened channels for the gas to reach the surface.

Paragraph #3: The human body is made up of many elements, the largest percentage being water. But did you know your body was also made up of carbon dioxide? Well, it is. That is why when you respirate (breathe out), there is carbon dioxide given off. When breathing, oxygen goes into your lungs to be used by your body from your lungs and through your heart, when you inhale. When you exhale your lungs send out carbon dioxide as a by-product which it no longer needs.

Paragraph #4: We have been taught in our science classes about the importance of the rain forest and it's production of oxygen which we all need to breathe and live. But carbon dioxide is important to the rain forest, and to us, as well. When plants perform photosynthesis, which is how a plant produces its food, it takes in carbon dioxide and releases oxygen into the air. If it weren't for carbon dioxide plants could not survive and neither could we. You and I and other animals must have plants for food and energy as well.

Paragraph #5: High altitude trees are often non-existent or stunted in growth. They tend to be smaller and gnarled. This is because they are at the limit of their growing season. A growing season is how many days freezing temperatures do not occur. At these high altitudes, the low temperatures simply do not give enough time for trees to grow. However, at times in the past when Earth was warmer, trees could grow higher up on

mountains. You can sometimes see these dead trees above the limits of tree growth today.

Paragraph #6: Some scientists disagree with the theory of global warming. They argue that sea-levels are not rising as expected. They also state that while carbon dioxide levels are rising dramatically the temperatures world-wide are not (less than a degree in the last ten years). These scientists say that the graphs of increasing temperatures are made from weather stations in cities that experience warming as a city grows, not because the climate is getting warmer. They also say that carbon dioxide levels have been higher in the past without the effects of global warming, and that perhaps cooling may be what we should be concerned about.

Paragraph #7: If it weren't for the limestone on the planet Earth our atmosphere would be totally different. In fact, it would be much more like the planet Venus. The limestone of our earth "locks up" a massive amount of carbon dioxide in it's formula which would otherwise make our world totally uninhabitable. For this reason we should always be thankful for the large amounts of limestone around us. Kiss a piece of limestone today!  $\text{CaCO}_3$  is limestone rock (carbon dioxide, or  $\text{CO}_2$ , is part of this rock!)

## Worksheet

Paragraph # \_\_\_\_\_ Two sentences which summarize this paragraph are:

1. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. \_\_\_\_\_  
\_\_\_\_\_

What does the paragraph tell about CO<sub>2</sub>?

Can't Live With It because:

\_\_\_\_\_  
\_\_\_\_\_

Can't Live Without It because:

\_\_\_\_\_  
\_\_\_\_\_

Do you agree with this paragraph? Why or Why not?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

What else do you know about CO<sub>2</sub>?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**T-Graph**  
**Carbon Dioxide Can't Live With It, Can We Live Without It?**

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Can't Live With It

Can't Live Without It

1.

1.

2.

2.

3.

3.

Neither Category

1.

2.

C02 Overhead & Assessment

**T-Graph /Answer Key**  
**Carbon Dioxide Can't Live With It, Can We Live Without It?**

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Can't Live With It

1. CO<sub>2</sub> kills trees at high altitude.
2. CO<sub>2</sub> is thought to cause global warming, and too much CO<sub>2</sub> in an atmosphere like Venus makes life impossible.
3. Trees at Horseshoe Lake in California died because CO<sub>2</sub> levels were too high.

Can't Live Without It

1. Our bodies are made up of CO<sub>2</sub> and need CO<sub>2</sub>.
2. Trees depend on CO<sub>2</sub> for photosynthesis which gives us oxygen to breathe.
3. Without enough CO<sub>2</sub> Earth's atmosphere would get way too cold and an ice age would occur.

Neither Category

1. Limestone "locks up" CO<sub>2</sub> so that our atmosphere is a place we can live unlike Venus where it would be impossible.
2. Some scientists don't believe that CO<sub>2</sub> causes global warming, because CO<sub>2</sub> levels used to be higher and temperatures haven't risen as much as CO<sub>2</sub> levels have.

C0<sub>2</sub> Overhead & Assessment Answer Key

Carbon Dioxide Can't Live With it Can We Live Without it?  
Worksheet/Answer Key

Paragraph # 2 Two sentences which summarize this paragraph are:

1. High levels of naturally occurring Carbon Dioxide gas killed trees at Horseshoe Lake California.

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2 Scientists think earthquakes and magma may have caused the gas to come to the surface.\_\_\_\_

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What does the paragraph tell about CO<sub>2</sub>:

Can't Live With It because:

High levels of carbon dioxide kills trees.

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Can't Live Without It because:

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Do you agree with this paragraph? Why or Why not?

I agree with the paragraph. It seems to be based on fact and scientists have studied the cause for

the death of these trees.

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What else do you know about CO<sub>2</sub>?

I know that CO<sub>2</sub> is given off in the exhaust from cars.