

Climate Science in a Nutshell

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HELP!



TEACHER RESOURCE GUIDE

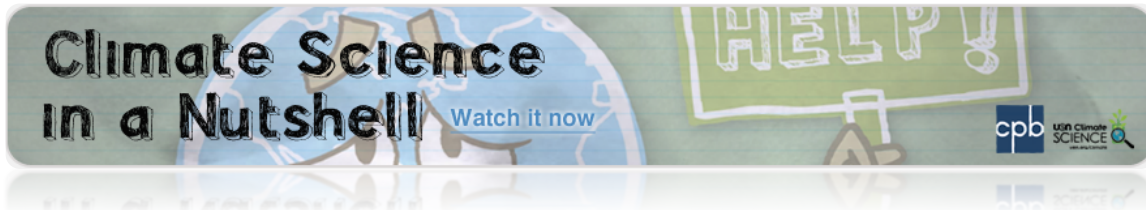
EPISODE 4: TOO MUCH CARBON DIOXIDE

Brief Description

One thing that makes life on Earth possible is a thin layer of gases called the atmosphere. It holds in the air we breathe and protects us from the cold of outer space. When energy in the form of light reaches us from the Sun, it streams through the atmosphere, making plants grow and lighting up our days. In addition to light, the Sun also delivers heat, which warms the planet. But much of that heat is reflected back towards space.

Keywords/Key Concepts

Atmosphere	The air that surrounds the Earth.
Carbon Dioxide	A gas that is produced by all animals and plants during respiration and used by plants during photosynthesis. Carbon dioxide is also the by-product of burning fossil fuels.
Gas	An airlike, fluid substance which expands freely to fill any space available.
Greenhouse Effect	Excess carbon dioxide and other gases in smaller amounts that are preventing heat from escaping the Earth's atmosphere thereby warming up the planet.
Heat	The quality of being hot; high temperature.
Oxygen	A colorless, odorless gas. Oxygen forms about 20 percent of the earth's atmosphere.



TEACHING IDEAS WHEN USING VIDEO IN THE CLASSROOM

While watching television is often seen as a passive viewing experience, there are ways to turn it into a springboard for student interaction. Here are some general teaching strategies that enhance the use of video materials in your classroom by targeting specific skill sets.

- **Predicting**
- **Viewing Comprehension**
- **Listening Practice**
- **Speaking Practice**
- **Discussion**

PREDICTING

With picture and audio on:

- Use the pause control to stop a scene and have students predict what will happen next.
- Use the pause control to stop after a particular line of dialogue and have students predict the next line.

With audio off:

- Have students predict the situation and characterizations based on viewing an entire scene without the sound.
- Have students predict lines of dialogue after viewing an entire scene without the sound.
- Have students predict individual lines of dialogue by using the pause button to stop the scene.

With picture off:

- Have students predict the situation and characterizations by listening to the soundtrack without watching the picture.

VIEWING COMPREHENSION. You can check students' understanding of the situation in the following ways:

Before watching:

- Give students specific things to look and listen for before they watch a scene.

While watching:

- Freeze-frame the scene by using the pause button and check students' understanding

While watching or after watching:

- Have students answer comprehension questions you devise.

After watching:

- Give students cloze scripts and have them fill in missing words in dialog lines.

LISTENING PRACTICE. Have students focus on the dialogue contained in a scene by listening for particular vocabulary words, structures, or functional expressions:

TV Dictation:

- Have students write dialogue lines as they view them, using the pause control to stop the scene after each line.

Cloze Scripts:

- As students view a scene, have them fill in missing words in a cloze script you have created.

SPEAKING PRACTICE

Role Plays:

- Have students role play a scene, practicing the lines of dialogue for correct intonation and emphasis.

On-Location Interviews:

- Have students circulate around the classroom and interview each other using questions contained in the video segment. Students can then report to the class about their interviews.

Information Gap:

- Have half the class see a segment without audio and the other half hear it without the picture. Students from each half of the class then pair up, talk about the situation and characters, and act out the scene.

Strip Dialogue Scenes:

- Write dialogue lines on separate strips of paper, distribute them randomly, and have students recreate the scene by putting the lines together.

DISCUSSION

- Have students discuss the scene, plot and characters' actions, thoughts, and feelings.
- Have students think about what the characters in the scene are thinking but not saying. Students can create these interior monologues, present them to the class, and discuss any varying opinions about characters' inner thoughts during the scene.
- Have students tell which characters they identify with and explain why.

Adapted from *Side by Side TV Reference Guide*.



Episode 4: Too Much Carbon Dioxide

One thing that makes life on Earth possible is a thin layer of gases called the atmosphere. It holds in the air we breathe and protects us from the cold of outer space.

When energy in the form of light reaches us from the Sun, it streams through the atmosphere, making plants grow and lighting up our days.

In addition to light, the Sun also delivers heat, which warms the planet. But much of that heat is reflected back towards space.

Fortunately, though, the Earth's atmosphere works like a blanket, preventing a lot of heat from escaping. In fact, if the Earth didn't have its atmospheric blanket its average temperature would be about -18 Celsius, or 0 Fahrenheit. Brrr! Thanks to the atmosphere, the Earth's average temperature is a much more livable 15 Celsius – about 59 degrees Fahrenheit.

One of the gases in Earth's blanket is called carbon dioxide, or CO₂. Carbon dioxide is everywhere on Earth, actually, and it's an important part of Earth's delicate balance of life. It's what animals, including us, exhale after they breathe in oxygen. Plants then use carbon dioxide, along with sunlight, to grow and make more oxygen for us to breathe. A lot of carbon dioxide is also absorbed by the oceans.

The carbon dioxide that's left over floats up into the atmosphere and helps form our planet-warming blanket.

But there's a problem. Scientists have observed that the amount of carbon dioxide in the atmosphere has been steadily rising over the last 100 years – soaring high above anything the Earth has seen for hundreds of thousands of years. All the plants in the world, as well as the oceans, can't absorb all the extra carbon dioxide in the air.

So consider this: Have you ever put on too many blankets at night? If you've woken up hot and clammy, then you know how the earth feels when it has more carbon dioxide than it can handle.

Scientists now know that excess carbon dioxide and some other gases in smaller amounts are preventing heat from escaping, and this is warming up the planet. They call it the Greenhouse Effect.

Remember that graph of average temperature rise since 1880? Check out this graph of carbon dioxide levels in the atmosphere since 1880. Now let's look at them both. See how they're rising together? That's because as carbon dioxide goes up, the temperature does, too. They're directly connected.

In the next video, we'll take a closer look at where all this extra carbon dioxide is coming from.



EPISODE 4: TOO MUCH CARBON DIOXIDE

