The Greenhouse Effect

Name: Date:

What do you know about the greenhouse effect?

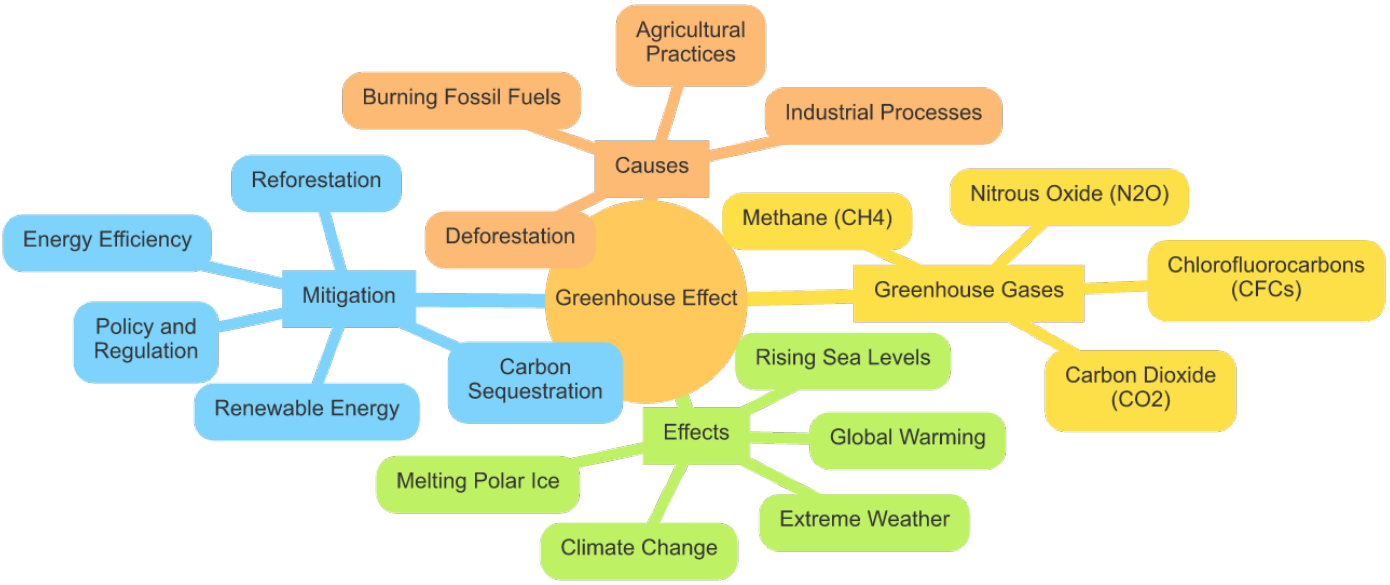
What do you associate with the greenhouse effect, what do you already know about it? Make some notes. Then, gather your information together in a mind map.

Make some notes about the greenhouse effect.

The Greenhouse Effect

Name: Date:

Additional information for teachers



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Youtube: What Is the Greenhouse Effect?

To watch the youtube video just scan the QR code.

https://www.youtube.com/watch?v=SN5-DnOHQmE

Watch the YouTube video, then fill in the blanks with the correct information.

The greenhouse effect is a natural process that warms the Earth's **surface**. It occurs when the Sun's energy reaches the Earth and is absorbed, then radiated back as heat. Greenhouse gases in the atmosphere, such as carbon dioxide, water vapor, and **methane**, trap some of this heat, preventing it from escaping into space. This trapped heat helps to maintain the Earth's temperature at a level suitable for life. Human activities, such as burning fossil **fuels**, have increased the concentration of greenhouse gases in the atmosphere. This increase has led to more heat being trapped, contributing to global **warming**. NASA uses satellites to monitor the levels of these gases and to study their effects on the climate. Understanding the greenhouse effect is crucial for addressing issues related to climate **change**.

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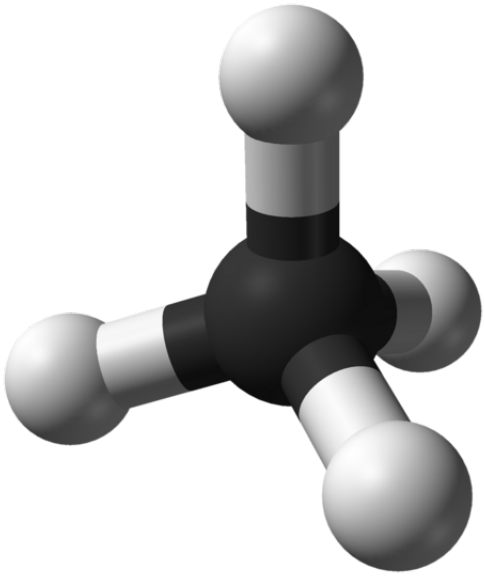
Greenhouse gases in detail

Now have a look at one greenhouse gas and its contribution to the greenhouse effect. After reading the text, fill out the profile.

Methane (CH_4)



Source: Ben Mills, via Wikimedia Commons (Public domain)

Methane is a simple gas with a big impact. Its chemical formula is CH_4: one carbon atom surrounded by four hydrogen atoms. It is colorless, odorless, and lighter than air. In the Earth's atmosphere, methane is present only in tiny amounts – about 1.9 parts per million, less than 0.0002%. Yet this small share is very powerful.

Methane forms naturally when microorganisms break down organic material without oxygen, for example in wetlands, rice paddies, or in the stomachs of cows and sheep. It also escapes from natural gas and oil production, coal mines, landfills, and from thawing permafrost in the Arctic. Methane is even found as frozen "ice" bubbles at the bottom of cold lakes and oceans.

One special property of methane is its strong ability to trap heat. Over 20 years, one molecule of methane warms the planet more than 80 times as much as one molecule of carbon dioxide. This makes methane one of the most important greenhouse gases after CO_2. Since the Industrial Revolution, its concentration in the atmosphere has risen sharply, mostly due to human activities.

Although methane stays in the atmosphere for only about 10–12 years (much less than CO_2), its intense warming effect in the short term means that reducing methane emissions is a fast and effective way to slow climate change. Cutting leaks from fossil fuel infrastructure, changing agricultural practices, and better waste management can quickly lower methane levels and help limit global warming.

The Greenhouse Effect

Name: Date:

Name

Chemical formula

Percentage in the Earth's atmosphere

Properties

Origin

Occurrence

Contribution to the greenhouse effect

The Greenhouse Effect

Name: Date:

Additional information for teachers

Name

Methane

Chemical formula

CH_4 (one carbon atom and four hydrogen atoms)

Percentage in the Earth's atmosphere

About 1.9 parts per million, which is less than 0.0002% of the...

Properties

Methane is a colorless, odorless gas that is lighter than air and very strong at trapping heat.

Origin

Methane forms when tiny living things break down dead plants and animals without oxygen, such as in wetlands, rice fields, or in the stomachs of cows and sheep.

Occurrence

Methane escapes from natural gas and oil production, coal mines, landfills, thawing Arctic permafrost, and also exists as frozen “ice” bubbles at the bottom of cold lakes and oceans.

Contribution to the greenhouse effect

One methane molecule warms the planet more than 80 times as much as one carbon dioxide molecule over 20 years, so cutting methane leaks and emissions can quickly help slow climate change.

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Greenhouse gas crossword puzzle

Now solve the crossword puzzle with words related to the greenhouse gas presented above.

										2 g					
										r			6 w		
										e			a		
						1 m				e			r		
					3 w	e	t	l	a	n	d		m		
						t				h			i		
			5 a	n	t	h	r	o	p	o	g	e	n	i	c
						a				u			g		
						n				s					
4 h	y	d	r	a	t	e	s			e					

Across

3 Natural area such as a bog or marsh where methane is produced without oxygen (7)

4 Frozen methane bubbles found at the bottom of cold lakes and oceans (8)

5 Human caused activities that have sharply increased methane in the atmosphere (13)

Down

1 Colorless and odorless greenhouse gas with formula CH and four hydrogen atoms (7)

2 Type of gas that traps heat in the atmosphere and contributes to warming (10)

6 Long term increase in Earth temperature driven by gases like methane and carbon dioxide (7)