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The Greenhouse Effect

Have you ever wondered why we can live on the Earth but not the moon? Both are floating bodies in space with gravity and are almost the same distance from the sun for light and warmth. Comparing the Earth and the moon from outer space, the blue color of our planet gives away an important answer: there is no water (or not enough that we could get to) on the moon for us to survive. However, there's another answer that we can't see: the moon doesn't have an atmosphere. What exactly is an atmosphere, and why do we need one?

Did You Know?

The temperature on the moon can be as low as negative 157°C (-250°F) and as high as 121°C (250°F).



The atmosphere is a thin layer of gases protecting the Earth.

The **atmosphere**¹ is a thin layer of gases around our planet. It is made of 99% nitrogen and oxygen. Its lower layer makes clouds and gives us weather patterns. The atmosphere is often thought of as a veil that protects living things on Earth from dangers in space, almost like a greenhouse protecting its plants from harsh weather. This veil of air can stop things like meteoroids from hitting the earth. It also keeps harmful radiation from the Sun from

reaching us. The ozone layer filters out a lot of the ultraviolet radiation, while other layers filter gamma and x-rays, which could cause dangerous mutations or other damage to DNA. The third protection is **the greenhouse effect**².

What is the Greenhouse Effect?

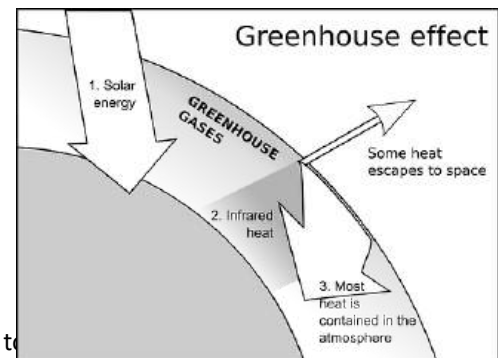
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How does the greenhouse effect work? The name gives it away -- it is about the types of gases.

There are more gases than just nitrogen and oxygen in the atmosphere. Traces of carbon dioxide (CO₂), water vapor, methane, ozone, and many other chemicals known as **greenhouse gases**³ are also found there. These gases are different from others because they can absorb heat. This is



The Greenhouse effect warms the Earth.

¹ **Atmosphere:** thin layer of gases around Earth.

² **The greenhouse effect:** how the atmosphere keeps the Earth warm enough to

³ **Greenhouse gases:** gases, such as CO₂, water vapor, methane, and ozone, that

why they are called greenhouse gases: they trap heat in our atmosphere.

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Before the Industrial Revolution, greenhouse gases were produced naturally.

Sources of Greenhouse Gases

Where do these greenhouse gases come from? Greenhouse gases are made naturally and artificially. Humans send out more CO₂ and methane than any other greenhouse gases. Human and animal breathing, volcanic eruptions, deep sea vent release, decomposition, and natural forest fires are all sources of natural CO₂ emission. Wetlands, termites, and the oceans all send methane into

the atmosphere naturally. The Industrial Revolution, which took place in the 18th century, produced a new kind of CO₂ emission, called **anthropogenic carbon dioxide emission**⁴. Burning fossil fuels in power plants and cars is mainly how we send CO₂ into the atmosphere (87% of human CO₂ emission). However, **deforestation**⁵ and factories also send out CO₂. Once carbon dioxide gets in the atmosphere, it can stay there for hundreds of years. Methane comes from fuel creation and livestock farming (60% of human methane emission). However, landfills, burning, rice farming, and biofuels are also human methane sources.



The burning of fossil fuels is responsible for 87% of human CO₂ emissions.



Global warming can cause many species, including polar bears, to lose their habitats.

Naturally, greenhouse gases keep our planet warm. But what happens when levels of these gases become too high in our atmosphere? **Global warming**⁶. More CO₂ means more heat gets trapped and makes our planet warmer than it should be. Even though the human addition of CO₂ is small compared to what is released naturally, the balance of CO₂ in the atmosphere is delicate. A little more can bring large environmental changes—rising sea levels, droughts, new and intense weather patterns, and melting

⁴ **Anthropogenic carbon dioxide emission:** carbon dioxide made and released into the atmosphere by humans.

⁵ **Deforestation:** cutting down many trees in forests.

⁶ **Global warming:** an average warming of the Earth, which results in many environmental changes.

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What Can You Do to Reduce Greenhouse Gas Emissions?

With such dangers likely, we should try to reduce how much greenhouse gas we send into the atmosphere. But with 7 billion people on the planet and counting, it seems almost impossible. Even so, there are things you can do to bring down your own emissions. Every little bit helps, and if more people try to do better, we may be able to slow the effects of too much greenhouse gas.

There are many things you can do. For example, using renewable energy, like solar power. People can get solar panels for their homes or businesses. You can also help by changing how much you heat and cool your house to use less energy. By letting it stay a bit cooler in the winter and warmer in the summer, you will cut down on how much energy you're using. Energy-efficient devices also reduce



The Energy Star label means energy-efficient.

electricity usage. When you're ready to replace your refrigerator or another large appliance, choose one with an Energy Star label. Energy-saving light bulbs will also help reduce your energy use as will washing your clothes in cold or warm water instead of hot and line-drying them. On top of reducing emissions, lowering how much energy you use can help you save on your electricity bill.



Installing solar panels can help reduce greenhouse gas emissions.

It is up to us to help protect our environment by thinking more about the results of our choices and actions.

Reading Comprehension Questions

1. Why is
2. What are the main parts of the atmosphere?
3. Name
4. Explain the Greenhouse Effect.
5. Name
6. Name
7. Name three dangers of global warming.

Extension Question:

8. What do you think would happen if greenhouse gases disappeared?
9. What
10. Create an infographic (using a template from [canva.com](https://www.canva.com)) about the Greenhouse Effect and what will happen if its effects continue to increase. Be sure to explain what the greenhouse effect is, what it causes, and how it is related to global warming.

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TWESAY

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