# LT: I can compare greenhouse gasses and ozone.

4.7.1

**It is a common misconception that ozone depletion and greenhouse gasses cause global warming.**

**Human activities cause ozone depletion and global warming**
Ozone ($O_3$) depletion does not cause global warming, but both of these environmental problems have a common cause: **human activities that release pollutants into the atmosphere altering it.**

Although we talk about greenhouse gases producing a negative impact (global change), the greenhouse effect serves a natural purpose: maintaining the warmth that sustains life on Earth. The problem arises when too much heat is trapped, causing a rise in average global temperature.

Global warming is caused primarily by putting too much carbon dioxide into the atmosphere when coal, oil, and natural gas are burned to generate electricity or to run our cars.

Carbon dioxide spreads around the planet like a blanket and is one of the main gases responsible for the absorption of **infrared radiation** (felt as heat), which comprises the bulk of solar energy.

Ozone depletion occurs when chlorofluorocarbons (CFCs) and halons—gases formerly found in aerosol spray cans and refrigerants—are released into the atmosphere.

Ozone sits in the upper atmosphere and absorbs **ultraviolet radiation**, another type of solar energy that's harmful to humans, animals and plants. CFCs and halons cause chemical reactions that break down ozone molecules, reducing ozone's ultraviolet radiation-absorbing capacity.

**How ozone works**
The sun emits electromagnetic radiation at different wavelengths, meaning energy at different intensities. The atmosphere acts like a multi-layer shield that protects Earth from dangerous solar radiation.

High level or “good” ozone occurs in the stratosphere and accounts for the vast majority of atmospheric ozone. The stratospheric ozone layer absorbs ultraviolet (UV) radiation, preventing dangerous UV rays from hitting Earth's surface and harming living organisms. UV rays cannot be seen or felt, but they are very powerful and change the chemical structure of molecules.

UV radiation plays a small role in global warming because its quantity is not enough to cause the excess heat trapped in the atmosphere. UV radiation represents a small percentage of the energy from the sun, and is not highly absorbed or scattered in the atmosphere—especially when compared with other wavelengths, like infrared. But, ozone depletion is also concerning because it directly impacts the health of humans, and other living organisms.

| Greenhouse gasses | Ozone |
| --- | --- |
| | |

**Sort the following phrases in the appropriate section of the T-chart that compares greenhouse gasses and ozone.**

*Methane: emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills*

*keeps out ultraviolet radiation*

*Layer getting thinner caused by*
*chlorofluorocarbons (CFCs) breaking down ozone molecules*

*gases found in aerosol spray cans and refrigerants*

*increase rate of skin cancer*
**UV radiation plays a small role in global warming because its quantity is not enough to cause the excess heat trapped in the atmosphere.*

*keeps in infrared radiation (heat)*

*Layer getting thicker caused by*
*greenhouse gasses accumulating*

*CO2: released when coal, oil, and natural gas are burned to generate electricity or to run cars*

*increase rate of global warming*

*serves a natural purpose: maintaining the warmth that sustains life on Earth. The problem arises when too much heat is trapped, causing a rise in average global temperature.*

*occurs in two layers of the atmosphere. The layer closest to the Earth's surface is the troposphere. Here, ground-level or "bad" ozone is an air pollutant that is harmful to breathe, and it damages crops, trees and other vegetation.*