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Module 03: Energy & Climate Change

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## PowerPoint - Greenhouse Effect

Center for Urban Resilience

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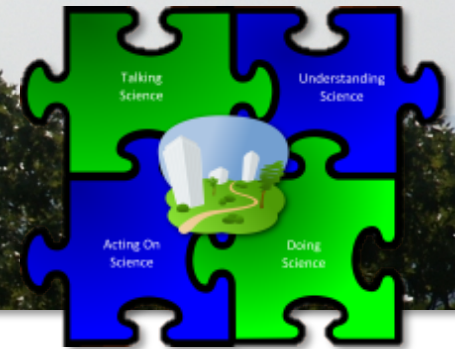
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# Urban EcoLab Curriculum

<http://www.urbanecolabcurriculum.com>



## Is Global Warming caused by...

### A Hole in the Ozone Layer?

Module 3 Lesson 2



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# NO!

Many think that the Ozone hole lets in more solar energy causing the earth to become warmer, but this is not true!

Think about your bottle activity, was the bottle with the open hole warmer than the other bottle with the closed hole?

Instead global warming is caused by the Greenhouse Effect and Ozone is actually a Greenhouse Gas.

# The Greenhouse Effect

What is it, what's causing it, and why does it matter?

# Why is it called the green house effect?

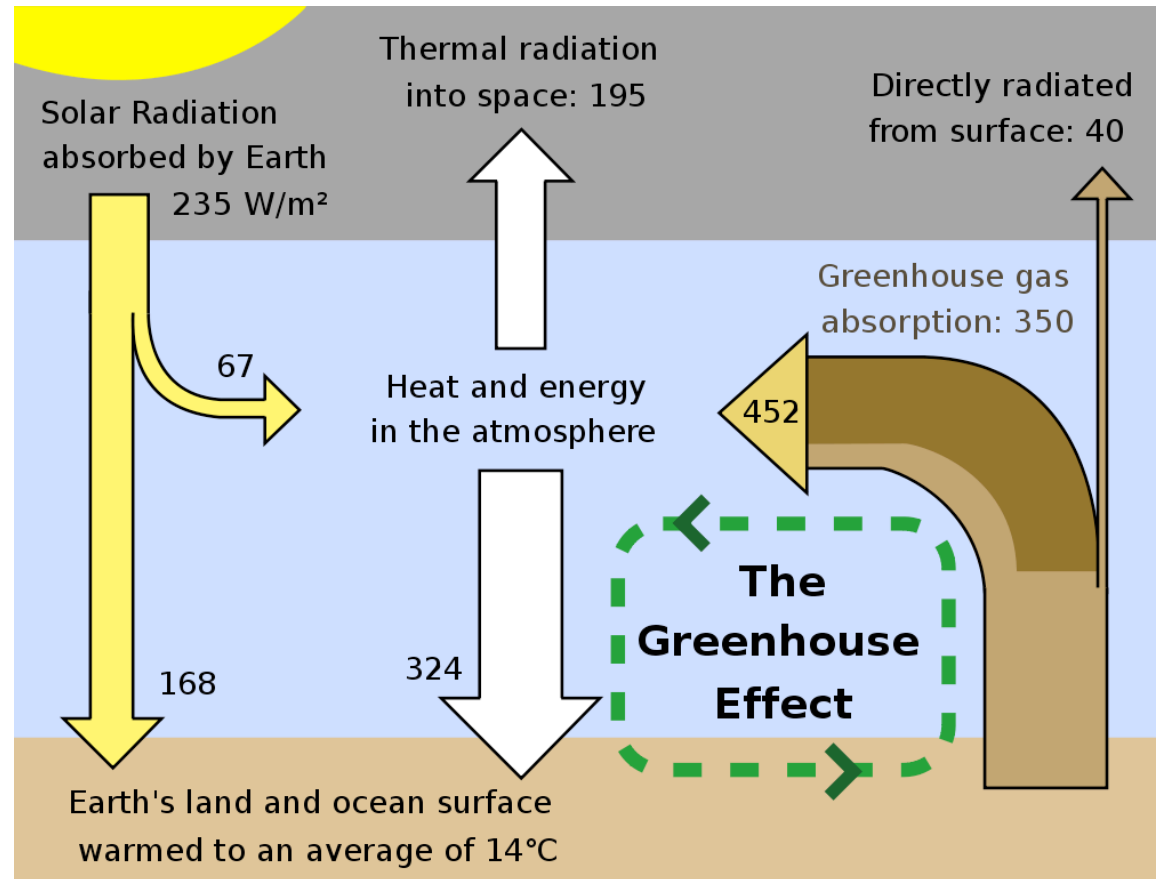
- It's called the greenhouse effect because the atmosphere keeps the earth warm – just like a greenhouse.
- In the atmosphere, however, it isn't a sheet of glass, but gases that absorb the radiation and re-emit it back to earth.

The gases in the atmosphere that act like glass in a greenhouse and are called greenhouse gases.

# Greenhouse effect – The good...

- The Earth absorbs **about 70%** of sunlight and reflects the rest back to space

- Without this process the temperature would be **-19° C, or -3° F**. This is about 35°C colder than the average temperature on the Earth.



[http://commons.wikimedia.org/wiki/File:Greenhouse\\_Effect.svg](http://commons.wikimedia.org/wiki/File:Greenhouse_Effect.svg)

# GREENHOUSE GASES

60%	<b>CO<sub>2</sub></b>	<b>Carbon dioxide*</b>	Burning fossil fuels, deforestation
16%	<b>HFCs</b>	<b>Hydrofluorocarbons</b>	Aerosols, refrigerants
15%	<b>CH<sub>4</sub></b>	<b>Methane*</b>	Organic waste, cattle, fuel production
5%	<b>N<sub>2</sub>O</b>	<b>Nitrous oxide</b>	Fertilizers, soil, fuels
2%	<b>PFCs</b>	<b>Perfluorocarbons</b>	Paint, textile and aluminum production
1%	<b>SF<sub>6</sub></b>	<b>Sulphur hexafluoride</b>	Electrical industry, rubber/Mg production
1%	<b>H<sub>2</sub>O</b>	<b>Water vapour*</b>	Irrigation, evaporation, ice melting

[http://commons.wikimedia.org/wiki/File:Greenhouse\\_Gases.jpg](http://commons.wikimedia.org/wiki/File:Greenhouse_Gases.jpg)



Effect on climate

**\*Natural Greenhouse gases**

# Summary:

- Greenhouse gases, like CO<sub>2</sub>, absorb infrared radiation reflected from the earth that would otherwise escape.
- This is re-emitted back into the lower atmosphere and the earth's surface, heating them up.
- It keeps the earth warm and livable.
- As we increase the amount of greenhouse gases, the earth warms up more and more, which causes problems!



# Next class. . .

- We'll talk more about the consequences of higher global temperatures.