

Greenhouse Effect Online Lab

(<http://phet.colorado.edu/en/simulation/greenhouse>)

Greenhouse Gases:

Carbon Dioxide (CO₂)
Methane (CH₄)
Nitrous oxide (N₂O)
Chlorofluorocarbons (CFCs)
Ozone (O₃)
Atmospheric water vapor (H₂O)

Key:

Yellow Photon = Sunlight (Sun's Radiation)
Red Photon = Infrared Radiation (Heat Radiation)

Step 1: On GREENHOUSE EFFECT tab, set greenhouse gas concentration to **NONE**. Observe the sunlight photons and infrared photons.

- a. What happens to sunlight photons?
- b. What happens to the infrared photons?
- c. What is the temperature reading?
- d. Add 3 clouds. How does the activity of the infrared photons change?
- e. How does the activity of the sunlight photons change?
- f. What is the temperature reading after adding 3 clouds? How was temperature affected by the clouds?

Step 2: Set cloud count back to zero and set greenhouse gas concentration to **LOTS**. Observe the sunlight photons and infrared photons.

- a. What happens to the sunlight photons?

- b. What happens to the infrared photons?

- c. What is the temperature reading? How does the temperature compare to when there was no greenhouse gases in the atmosphere?

Step 3: Select the ice age, 1750's, and today tabs and record the changes in greenhouse gases and temperature.

Greenhouse Gas Concentration	Carbon Dioxide Concentration (CO ₂)	Methane Concentration (CO ₄)	Nitrous Oxide Concentration (N ₂ O)	Temperature
Ice Age				
1750				
Today				

- a. Have greenhouse gas concentrations increased or decreased since 1750?

- b. What happens to temperature as greenhouse gas concentration increases?

Step 4: Go to GLASS tab.

- a. Record temperature.

- b. Add 3 glass panels. Record temperature again.

- c. What effect do glass panels have on temperature?

- d. What effect do glass panels have on the infrared photons?

- e. If glass panels help trap heat, how could they be used to help a farmer keep his plants warm in a cooler climate?