Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Greenhouse Effect Online Lab**

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

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| **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.

1. What do the sunlight photons do?
2. What do the infrared photons do?
3. What is the temperature reading (in Fahrenheit)?
4. Add 3 clouds. How does the activity of the infrared photons change?
5. How does the activity of the sunlight photons change?
6. What is the temperature reading (Fahrenheit) 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.

1. What do the sunlight photons do?
2. What do the infrared photons do?
3. What is the temperature reading (Fahrenheit)? How does the temperature compare to when there was no greenhouse gases in the atmosphere?

Step 3: Click “Reset All.” Then select the ice age, 1750’s, and today tabs and allow at least two minutes for changes to occur. Record the changes in greenhouse gases and temperature.

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| --- | --- | --- | --- | --- |
| Greenhouse Gas Concentration | Carbon Dioxide Concentration (CO2) | Methane Concentration (CO4) | Nitrous Oxide Concentration (N2O) | Temperature |
| Ice Age |  |  |  |  |
| 1750 |  |  |  |  |
| Today |  |  |  |  |

1. Have greenhouse gas concentrations increased or decreased since 1750?
2. What happens to temperature as greenhouse gas concentration increases?

Step 4: Go to GLASS tab.

1. Record temperature.
2. Add 3 glass panels. Record temperature again.
3. What effect do glass panels have on temperature?
4. What effect do glass panels have on the infrared photons?
5. If glass panels help trap heat, how could they be used to help a farmer keep her plants warm in a cooler climate?