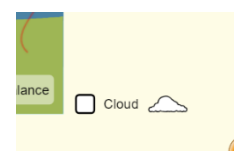
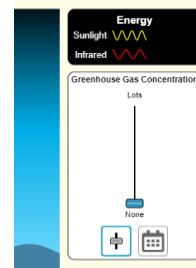


Lab Instructions

Climate Change

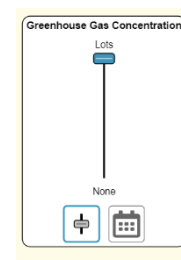
Greenhouse Effect - Waves

1. On the Greenhouse Effect *Waves* tab, set greenhouse gas concentration to *NONE*.
2. Click *Start Sunlight*.
3. Observe what happens to the sunlight energy waves and how it differs from what happens to the infrared energy waves. Notice the temperature reading.
4. Now, uncheck *cloud*.
5. Observe how the activity of the sunlight energy wave changes. How does it differ from the activity of the infrared energy wave? Notice the temperature reading.



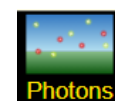
Greenhouse Effect – Waves 2

1. Remain in the *waves* tab. Uncheck *cloud*.
2. Change the greenhouse gas concentration to *LOTS*.
3. Notice what happens to the sunlight energy waves and the infrared energy waves.
4. Notice the temperature reading. How does the temperature compare to when no greenhouse gases were in the atmosphere?



Photons Levels Over Time


1. Click the Photons tab.
2. Click *Start Sunlight*.
3. In your notebook or word-processing program, draw a table like this and record your observations for each period: Ice Age, 1750s, 2020.



Units Key		
ppm = Parts per Million	ppb = Parts per Billion	°C = degrees Celsius

Greenhouse Gas Concentration	Time period			Circle one: Did these values Increase or Decrease over time?
	Ice Age	1750's	2020	
Carbon Dioxide Concentration (CO ₂)				Increase or Decrease
Methane Concentration (CH ₄)				Increase or Decrease
Nitrous Oxide Concentration (N ₂ O)				Increase or Decrease
Temperature				Increase or Decrease

Lab Instructions

4. Select  time period. Then, select the Ice Age, 1750s, and 2020 tabs and record the greenhouse gases and temperature for each period.
5. For each greenhouse gas in the left-most column, note whether concentrations of that gas have increased or decreased since 1750. Circle your answer in the right-most column.
6. Take a moment to determine what happens to temperature as greenhouse gas concentration increases.

Adding Layers

1. Click the Layer Model tab.
2. Click *Start Sunlight*.
3. Wait until you see infrared photons and then notice the temperature.
4. Add three absorbing layers. Observe what effect the absorbing layers have on the temperature.
5. Wait for the temperature to stabilize and observe the temperature again. Consider what effect the absorbing layers have on infrared photons. Think about how the absorbing layers are like greenhouse gases.

