PhET – The Greenhouse Effect

Instructions

1. Go to PhET's "The Greenhouse Effect" page (phet.colorado.edu/en/simulation/greenhouse) and either run or download (then run) the simulation.
2. Select the "Adjustable concentration" option in the "Atmosphere during..." section on the right side of the screen.
3. Use the "Greenhouse Gas Concentration" slider control to vary the amount of greenhouse gases; observe the effect on temperature.
4. Set the greenhouse gas concentration to "Lots", then observe the behaviors of the yellow photons representing sunlight and the red photons representing infrared emissions from Earth. Follow the paths of several photons of each type and report any differences you notice.
The Concord Consortium

What is the Future of Earth's Climate?

Instructions

1. Go to the "What is the Future of Earth's Climate?" lesson module on The Concord Consortium's web site (concord.org/stem-resources/what-future-earths-climate).
2. Click the "Launch Activity" button.
3. Click the link to lesson 2, "Interactions within the atmosphere".
4. This lesson has six sections. You can click the small circles in the upper right to navigate to any of the sections. The greenhouse effect simulation is embedded, in a few slightly different forms, in several of the lesson segments.
5. Use the version of the simulation embedded in section 2 of the lesson, since it includes graphs of temperature and carbon dioxide concentration.
6. Click the "Erupt!" button several times to add carbon dioxide to the atmosphere. Observe the effect on temperature.
7. Click the "Remove CO\textsubscript{2}" button a bunch of times to remove most or all of the carbon dioxide from the atmosphere. Observe the effect on temperature.
8. Use the "Follow energy packet" and "Follow CO\textsubscript{2}" buttons to focus in on individual photons and gas molecules to better understand their behaviors.

![Simulation interface with options to add and remove CO\textsubscript{2} and interact with the environment]