

COMPUTER MODEL DIRECTIONS

EXPLORE 1 LESSON 8



PhET Simulation – “Greenhouse Effect”

Part One

1. Click on “Photons.”
2. Click on “Start Sunlight.”
3. You can turn the music off at the bottom right. Click the speaker to mute the simulation.
4. Make sure to keep “Surface Thermometer” checked so it shows on the screen. You can use the arrow next to the numbers to change it to Fahrenheit if you are more familiar with that.
5. Click to show “Energy Balance.” It is found at the bottom right of the simulation screen.
6. In the Greenhouse Gas Concentration box, move the slide from the middle to “None.” Notice changes that occur on the screen.
7. In the Greenhouse Gas Concentration box, move the slide from the middle to “Lots.”

Part One

1. In the Greenhouse Gas Concentration box, click on the calendar icon next to the slider.



2. Click on the each of the various time periods starting with “Ice Age” moving through time to “2020.”
 - Observe the global temperature differences and note any changes in energy balance.
 - Keep an eye on sunlight photons and infrared photons.
 - You can click on “More Photons” on the bottom left of the screen to fill the simulation.
3. To re-start the simulation, click the orange arrow at the bottom right of the screen.

Concord Consortium – “Interactions within the atmosphere”

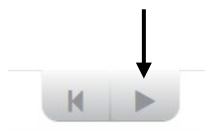
Part One

1. Click on Section 2 from the menu at the top of the screen to play the “carbon dioxide in the atmosphere” simulation.





- Click the play button at the bottom of the simulation screen, shown as a triangle at the bottom of the simulation screen.



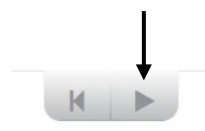
- You can use the slider next to it to slow down the particles.
- Click on “Follow energy packet” or “Follow CO₂” to focus on individual photons or gas molecules to better understand their behaviors.
- As the simulation plays, take note of the changes in temperature and CO₂ concentration.
- You can click on “Zoom” at the top right on each of the graphs to see the numerical data with more detail.

Part Two

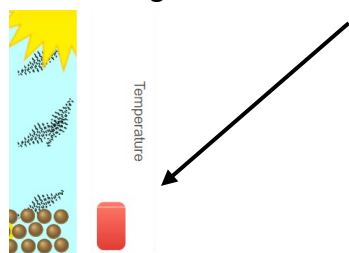
- Click on Section 3 from the menu at the top of the screen to play the “radiation-gas interactions” simulation.



- Go through each of the models by selecting the circles at the left. While engaging with each model, select “Light source on” and “Display heat in molecules.”
- Click the play button at the bottom of the simulation screen, shown as a triangle at the bottom of the simulation screen.



- As each module plays, take notice of the temperature fluctuations that can be seen in the red bar at the right of the simulation screen.



- To slow down what is being shown on the screen, click the “Slow motion” button at the bottom of the simulation screen.

HHMI BioInteractive – “Greenhouse Effect Video”

- Click the play button in the middle of the screen to start the video.
- Click on the CC button at the bottom right to show closed captions.