Greenhouse Effect

Go to [http://phet.colorado.edu/en/simulation/greenhouse](http://phet.colorado.edu/en/simulation/greenhouse) → Click the green RUN NOW! Button → You might need to click run again if the java screen shows up

1. **Under the original/default settings:**
   a. Notice yellow=sunlight (visible) photons, red=infrared photons
   b. Do yellow (visible) photons change directions? _____ Do infrared photons change directions? Explain.
   c. What do you notice about the temperature?

2. Add 3 clouds. Watch for a while (20-30 seconds). Click “View all photons,” and continue observing.
   a. What do you notice about the photon behavior?
   b. What do you notice about the equilibrium temperature?
   c. What flaws are in the model at this level?

3. Change to the atmosphere in 1750.
   a. What has changed about greenhouse gas composition?
   b. What has changed about the temperature?

4. Change to the atmosphere during the ice age.
   a. What has changed about CO₂ composition?
   b. What has changed about temperature?
   c. Albedo is a measure of the reflectivity of a surface. For Earth, it is the fraction of solar energy reflected from the Earth back into space. What has changed about albedo? Explain.

6. **Click on the Glass Layers tab.**
   a. What is the equilibrium temperature?
b. What do you notice about the direction of yellow photons? Red photons?

7. Add a glass layer.
   a. What do you notice about the directions of yellow photons? Red photons?
   
   b. Explain what happens in your car on a sunny day when it is cold outside.

8. Use three layers of glass.
   a. What happens to the temperature? Explain.

9. Click the Photon Absorption tab.
   a. Which of the atmospheric gases resonate in the visible region? How do you know?

   b. Which of the atmospheric gases resonate in the IR region? How do you know?

   c. If 99% of earth’s atmosphere is nitrogen and oxygen, why are we concerned about carbon dioxide? (Carbon dioxide makes up approximately 0.04% of earth’s atmosphere)

10. Create your own atmosphere.
   a. Write your thinking in creating your atmosphere. What happened with the visible and infrared photons in your atmosphere?