It's Getting Hot In Here

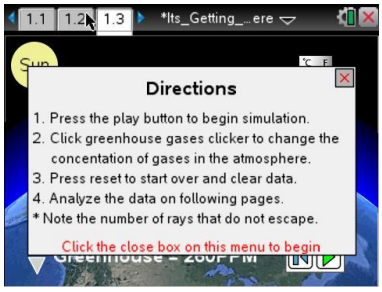
Student Activity

Name _____

Class _____

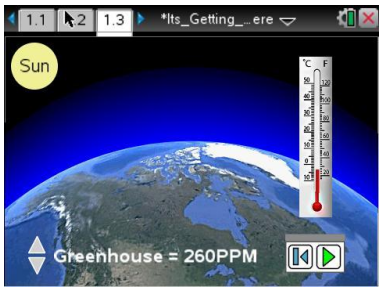
Open the TI-Nspire document *Its_Getting_Hot_in_Here.tns*.

Global warming is perhaps one of the hottest topics today because global temperature increases will affect every living thing on Earth. **Photons** (light energy) from the sun are constantly bombarding Earth's atmosphere and are trapped by Earth's greenhouse gases. Earth then releases excess energy in the form of **infrared radiation**, and some of this escapes into space. With this simulation, you will be able to manipulate the level of greenhouse gases and measure the resulting temperature.



Move to Page 1.3.

Read the directions for the simulation.



1. Select the Play button to begin the simulation. Once the play button has been selected, yellow dotted lines will appear from the sun, which represent the photons entering Earth's atmosphere. You will also see two sets of red dotted lines representing infrared radiation. Some of this radiation is retained by Earth's atmosphere and the rest of it escapes into space.

2. Greenhouse gasses are measured in **parts per million (ppm)**. This tells you the concentration, or level, of gas in the atmosphere. You can change the level of greenhouse gases by selecting the Greenhouse up and down arrows. As you modify the amount of greenhouse gases, you will be recording the gas level and the resulting average temperature on Earth, in degrees Celsius.

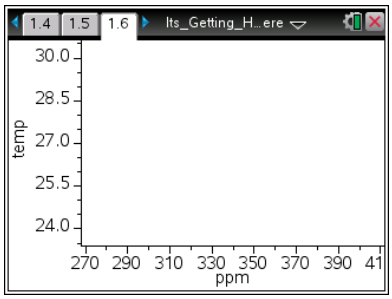
Tech Tip: To access the Directions again, select menu or **Document Tools ( ) > Its Getting Hot in Here > Directions.**

Tech Tip: To access the Directions again, select > **Directions.**

Move to page 1.4.

Here you will see a spreadsheet of the data from the simulation. As you adjusted the level of greenhouse gases, the temperature changed and is indicated on this page.

Move to pages 1.5 – 1.6.



Read the information on page 1.6.

3. On page 1.6, you will be able to graph a line showing the relationship between the level of greenhouse gases and the average temperature on Earth.

Tech Tip: To graph a line, select **Menu** or **> Analyze > Regression > Show Linear (a+bx).** You may need to back-out to the main Tools Menu to see the desired menu option.

Move to pages 1.7 – 1.15. Answer questions 1-9 here and/or in your device.

Q1. Using your graph on page 1.6, you should see a linear regression now (slope -ntercept form). For every 20 ppm increase in greenhouse gasses, how much does the temperature increase?

Q2. Using your graph, is there evidence to support a relationship between the concentration of greenhouse gasses and global temperature?

A. Yes

B. No

Q3. In this simulation, which variable is the outcome (dependent) variable?

A. ppm

B. temperature

C. photons of light

D. amount of energy released by the sun

Q4. The sun releases energy in the form of _____, which heats up our planet.

A. carbon dioxide

B. greenhouse gases

C. photons

Q5. As you decrease the total amount of greenhouse gases in the atmosphere, the temperature increases.

A. True

B. False

Q6. When running the simulation you are able to manipulate the level of greenhouse gases and observe a temperature change. As you increase the amount of greenhouse gases, what happens to the total amount of energy released by the sun?

A. The amount of energy increases.
B. The amount of energy stays the same.
C. The amount of energy decreases.

Q7. As you increase the concentration of greenhouse gases, what happens to the amount of infrared energy that escapes into space?

A. The amount of energy that escapes into space increases.
B. The amount of energy that escapes into space stays the same.
C. The amount of energy that escapes into space decreases.

Q8. How would life on Earth be different if we did not have the greenhouse effect?

Q9. In what ways will Earth change if the average global temperature rises?

©2014 Texas Instruments Incorporated