The Greenhouse Effect: Carbon Dioxide's Effect on Earth's Temperature

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The Problem & Reason for Interest

- The issue is that the Greenhouse Effect is being enhanced by carbon dioxide and other gas releases into the atmosphere. This is causing the Earth to heat up at an alarming rate.

- This is a topic of interest because we are inhabitants of this planet and are affected by climate change in many ways.

Questions & Objectives

Question:

How is the carbon cycle connected to climate change?

Objective:

Compare the temperature changes in 2 environments; greenhouse effect and "enhanced" greenhouse effect.

OUR HYPOTHESIS:

At the end of this activity, we hypothesize that the "enhanced" greenhouse effect environment will be 4*C warmer than the greenhouse effect environment at the end of a 20 minute observation.

Materials

- 2 empty plastic water bottles
- Tongs
- Lamp
- Water
- Dry ice
- Alkaseltzer tablets
- Graduated cylinder
- Modeling clay
- 2 thermometers
- Styrofoam cups
- Plastic tubes

Method & Design

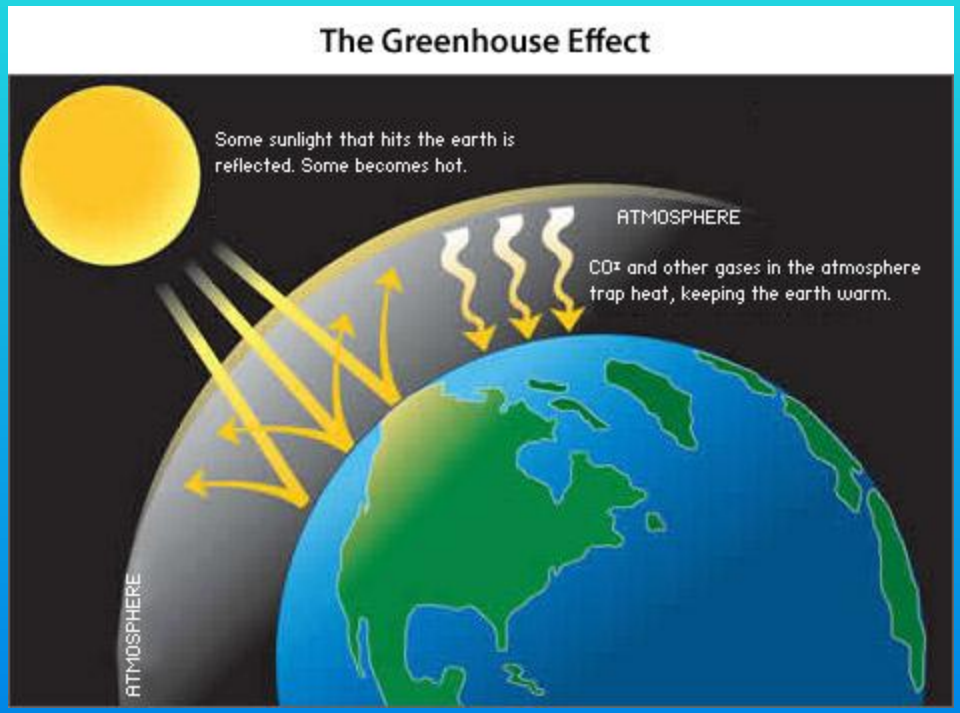
- Make a small hole in mid-section of one water bottle, big enough for plastic tube to fit into it
- Fill each bottle with 100ml of water
- Place the plastic tube into bottle with hole & seal with modeling clay. Drop an Alkaseltzer tablet into designated “enhanced” environment
- Place a thermometer into the top of each bottle and seal with modeling clay
- Using 2 styrofoam cups, punch a hole in the bottom of one cup and insert plastic tubing and seal with modeling clay
- Place dry ice into second cup and add water
- Cover the top of the cup with dry ice with the cup that has the tubing; this is the “enhanced” environment
- Place both cups an equal distance from the lamp

Independent Variable – Carbon dioxide
Dry ice
Alkaseltzer tablets

Dependant Variable –
Temperature change

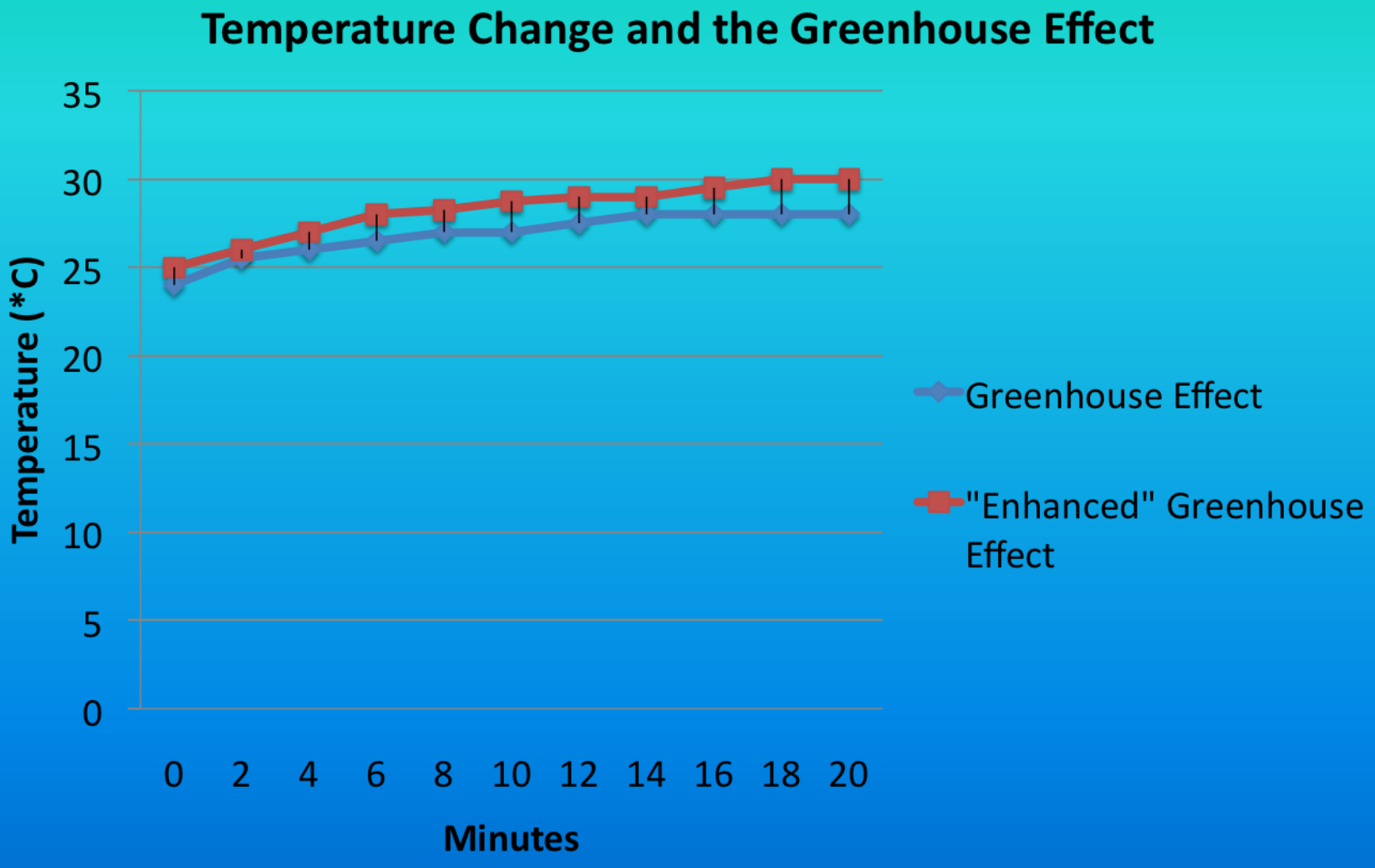
Constant –
Amount of “sunlight” (lamp)

Trials – 2



Data

Type of Greenhouse Effect	Temperature (*C) (minutes)										
	0	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**
Bottle A – Greenhouse Effect	24*C	25.5	26	26.5	27	27	27.5	28	28	28	28
Bottle B – "Enhanced" Environment	25*C	26	27	28	28.25	28.75	29	29	29.5	30	30


Temperature Change and the Greenhouse Effect
Temperature (*C)
35
30
25
20
15
10
5
0
0
2
4
6
8
10
12
14
16
18
20
Minutes
Greenhouse Effect
"Enhanced" Greenhouse Effect

Conclusion

At the end of our research, we found that the Earth's temperature change—increase—is directly related to carbon dioxide and other gas releases into the atmosphere. The carbon cycle is connected to climate change as greenhouse gases get trapped in the atmosphere causing the Earth's temperature to rise. This phenomenon is known as Global Warming.

Suggestions

Devising a more airtight container to hold the carbon dioxide release from the dry ice in the “enhanced” environment.

In conjunction, allowing more time for measuring temperature might prove a wider gap between the two environments.