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CarboSchools

THE GREENHOUSE EFFECT

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Aim

To observe and compare the absorption of thermal radiation by two greenhouse gasses, CO_2 and water vapor, and the effect that greenhouse gasses create when they prevent the emission of the outcoming radiation to space.

Materials

- Three glass jars with lid. The lid has to have a hole to introduce the temperature sensor or the thermometer.
- Plasticine
- Temperature sensors or thermometers
- Two beakers Water
- Yeast and sugar (glucose), or, vinegar and sodium hydrogencarbonate, which will provide CO_2
- Spoon
- Light

http://www.odec.ca/projects/2005/stro5c0/public_html/

The activity

1. Prepare the CO_2.
There are two ways to do this:
Mix vinegar and sodium hydrogencarbonate (for example, 5 g of hydrogencarbonate and 75 cm^3 of vinegar.) or add sugar to a mixture of warm water and yeast.

2. Fill a beaker with water (75 cm^3 or the same quantity you have used for the CO_2 formation). This will produce your water vapour.

3. Put a beaker with the mixture producing CO_2 in a glass jar. Put the beaker with water in another glass jar. You also need an empty glass jar.

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4. Put the three jars in the sun with the sensors or the thermometers inside. We need an extra sensor or thermometer to measure the outside temperature (control). Be careful to put it in a place that has only contact with the air.

5. Measure the initial temperature and the temperature changes every 5 minutes for 15 minutes if we are using thermometers. If you are using sensors you can take continuous data. In each case note the temperature changes every 5 minutes.

DATA

	Outside Temperature (°C)	Vinegar + hydrogencarbonate Temperature (°C)	Water vapour Temperature (°C)	Empty jar Temperature (°C)
Initial Temperature (°C)				
5 minutes later				
10 minutes later				
15 minutes later				

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Questions

1. What does each treatment simulate?

Outside Temperature	Vinegar + hydrogencarbonate Temperature	Water vapour Temperature	Empty jar Temperature

2. Write the conclusions to your experiment.

What do you think happens due to the rise of anthropogenic CO_2 emissions?

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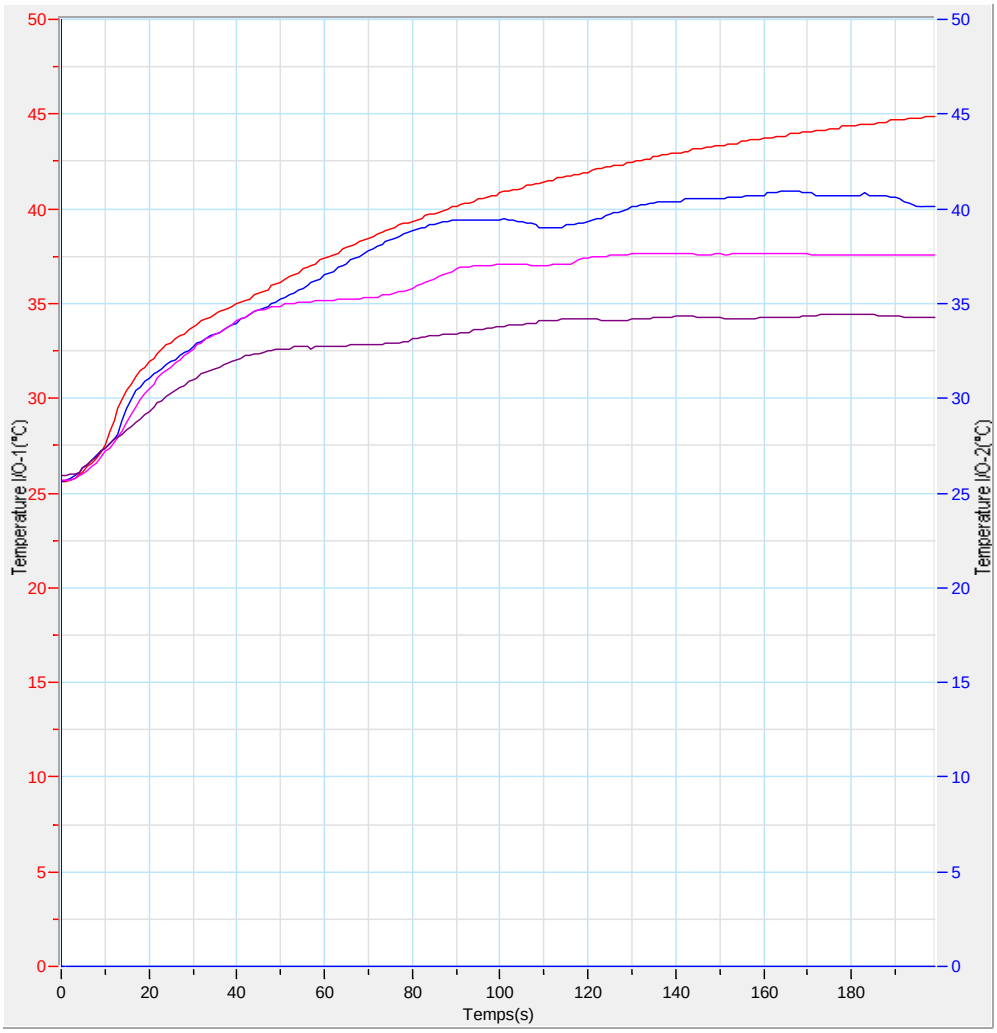
Results obtained using temperature sensors



Treatments

Sensor 1: Sodium hydrogencarbonate and vinegar

Initial temperature: 25,5º C – Final temperature: 44,8º C.

Sensor 2: Water

Initial temperature: 25,5º C - Final temperature: 40,1º C.

Sensor 3: Glass jar.

Initial temperature: 25,5º C-Final temperature: 37,5º C.

Sensor 4: Outside temperature.

Initial temperature: 25,6º C -Final temperature 34,2º C.

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