



SCIENCE PROGRAM AT SCHOOL "GLOBAL WARMING"

2022

CEIP "Nuestra Señora de los Ángeles" El Esparragal (Murcia) *Global Warming of Planet Earth*

First Session

- 1) Brainstorming: We will prepare some questions to check the previous knowledge of our students and how much they remember about gases.
- 2) First experiment: The Hadley Cell
We are going to start with this experiment in order to motivate them to think about what it could be happened.
- 3) Gases behavior: experiment: Two plastic cups. One empty and other full of water (pass the air to the other plastic cup: air occupies space)
- 4) Gases have not a definite volume and shape: syringe experiment
- 5) States of matter: ice (solid, liquid, water vapor)

Conclusions: Air is made up of gases.
Gases occupies space and behave differently if they are in contact with heat.

Material:

Internet
Notebooks
For the experiment:
Plastic cups
Water
Container
Metal cups
Ice
Hot water
Two containers
Can
Balloon
Syringe



Second Session

- 1) We start the lesson by summarizing the last session.
- 2) Let's show some gases (carbon dioxide-oxygen) with experiments: shaking "casera" we obtain carbon dioxide. With a candle and a glass we can see how oxygen is consumed by fire and leave space to the water-which level rises.
- 3) How the heat acts on gases? A can of coke with a balloon and two containers with cold and hot water. Let see what happens.
- 4) Introducing the thermoscopio (heat and temperature)
Conclusions
Air is made of gases.
We find air in the atmosphere
Gases behave differently in response to a heat source.
Heat:
Temperature: he degree or intensity of heat present in a substance or object.
Heat: heat seen as a form of energy arising from the random motion of the molecules of bodies, which may be transferred

Material

Internet
Notebook
Casera
Balloons
Two cans of coke
Metal cup
Ice



Third Session

1. Summary of the last lesson.
2. We will start the lesson with a video of an Italian coffee machine.
<https://youtu.be/dkp7v9P0Ozg>
3. Pressure introduction: the bottle that pees (experiment)
4. Measuring heat: Two thermometers: one in hot water, other in the cold water (experiment). Heat is like a fluid that passes from one object to another. 0 Law
5. With the thermometers we measure the heat from different containers (glass, plastic cup, metal cup)
6. Bottles wearing a coat. 1 cold water (coat). 2 hot water (coat) 3 hot water (without coat)
7. Question: what is the coat of Planet Earth?

Material

Bottle
Straw
Balloon
Container with water
Hot and cold water
Glass
Metal cup
Plastic cup
Coats



Fourth session Summary last session 1. Bernoulli. More volume – Less pressure/ More Pressure – Less volume. Syringe experiment (syringe with a balloon inside) 2. Vacuum experiment: bottle, rope, syringe, water. 3. Pressure gauge experiment: plastic tube, funnel, container with water. 4. In the atmosphere is the same: less pressure: rain	<u>Material</u> Syringe Balloon Rope Water Plastic tube Funnel
Fifth session Summary last lesson 1. Let's create clouds. Experiment: bottle of plastic with hot water at the bottom, matches 2. Condensation point. The dew point is the temperature the air needs to be cooled to (at constant pressure) in order to achieve a relative humidity (RH) of 100%. At this point the air cannot hold more water in the gas form.	<u>Material</u> Bottle of plastic Thermometers Ice Metal cups Vinegar Sodium bicarbonate Jars Lamp Hadley Cell



3. Experiment: metal container, ice cubes, thermometers
4. Global warming: Carbon dioxide experiment: two jars (one with air- other with carbo dioxide), two thermometers, lamp.
5. Hadley Cell. We close the session using the same experiment we did the first day. Explanation- Conclusions.

The planet has an excess of carbon dioxide due to the use of fossil fuels, the large number of cattle and the effects of air pollution.

The increase in temperature is due to the greater presence of carbon dioxide in the atmosphere, which retains the heat of the sun's rays. High temperatures are producing a global warming effect on the planet that is altering air currents and therefore the climate.

The average temperature of the Earth has changed throughout history. Some of this is due to natural changes in temperature that occur over time due to a



large number of variables. Even slight changes in nutrient cycles such as the carbon cycle, the oxygen cycle, and the water cycle likely have an impact on the climate over time.

Facts about Global Warming:

Some scientists think that the current warming trend is just a part of the Earth's natural changes in temperature and it will eventually start to cool again.

Greenhouse Gases

The reason the Earth isn't a ball of frozen ice is because of greenhouse gases. Greenhouse gases act like insulation to keep the Earth warm. However, as more and more greenhouse gases get into the atmosphere, the Earth will start to grow warmer. The main greenhouse gases that keep the Earth warm are water vapor, carbon dioxide, and methane.



In the past 100 years humans have been the cause of a significant increase in greenhouse gases in the atmosphere, especially carbon dioxide. Every time we drive our cars or use electricity, more carbon dioxide is released into the air



