

Teaching Module: Climate Consequences

Siti Syafinaz Al Khabli Sheikh Haniff, Qurratul Aini Sherry Voon*, Norazah Mohammad Namawi

Centre for Foundation and General Studies,
University Selangor, Bestari Jaya Campus, 45600 Kuala Selangor, Selangor,
MALAYSIA

*Corresponding Author Designation

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Abstract : My main focus of the study was on the development of the module. In this paper , I focus on showing the consequences on the climate. Global climate change is a phenomenon of gas trapping known as greenhouse gases involving groups of gases (carbon dioxide (CO₂), carbon monoxide (CO), chlorofluorocarbons (CFCs), methane, (nitrogen oxides) that prevent and trap the earth's heat from being released into the space[1]. The earth's temperature is rising at different rates according to specific continents and regions and the warming of the climate system is no small matter to be ignored [2] Hence, We aim to raise the affect that it haves on our climate. By demonstrating this with the two activities that we created in this teaching module. This module is quite vital because world temperature change is due to continuous global warming. Humans are the cause of climate system disruption and most notably, since the mid-20th century. Hence, alternative methods need to be developed to help the community understand this problem.

Keywords: : Learning Module; Ozone Layer; Greenhouse Gases; STEM; Temperature

1. Introduction

Many of us think so little about the greenhouse effect and the blow it gives to our ozone layer. Admittedly, most of us don't even want to acknowledge this has been inflicting major pain on our earth. We always ask ourselves when we are in the process of creating this teaching module what effect does daily use of gas emission caused to our ozone layer? How have advanced technology contributed to handling this problem?[3], Is greenhouse effect going to get worse in the future?. Indeed there is a lot climate-focused youth organizations in Malaysia but is it exposed locally? so from previous research, We want to make this module a part of the contribution with the assumption that the younger generation are more inspired and have an interest in understanding not just about our earth and science itself but curious enough to learn about our youth organization for example Yayasan Anak Warisan Alam (YAWA), Malaysian Youth Climate Justice Network (MYCJN) [4] and a lot more but the level of

awareness of environmental care among Malaysian society is still at a low level compared to the developing countries such as Japan, Denmark and Germany [5] . Our wake up call was the discovery of the stratospheric ozone hole, a consequence of anthropogenic atmospheric pollution, sparking global concern about the potentially harmful effects of ultraviolet (UV)-B radiation to biological, including human, systems from researching about the antartica, Antartica and the surrounding Southern Ocean are facing complex environmental change. Their native biota has adapted to the region's extreme conditions over many millions of years. This unique biota is now challenged by environmental change and the direct impacts of human activity[6]. Needless to say, Climate consequence teaching module is a module in hopes to be used in STEM as an educational tool and This module was developed by two intrigued STEM students and in it (1) How Greenhouse gases are trapped (2) Mini ozone layer that illustrate for the user to learn through interacting with the module at hand and have the attentiveness in STEM. Therefore, we want the material in this module to allow the students to acquire STEM abilities such as problem-solving, critical thinking, and creativity and exposed to support or join local youth organization.

2. Materials and Methods

For the first activity, how Greenhouse gases are trapped we needed something practical and easy to be explained to students and from this activity we came up with our own mini ozone layer model to complement or complete our little but hopefully impactful module for the students

2.1 Materials

Greenhouse gases activity uses our housewares stuff making it a practical demonstration. The material needed for this activity is listed below

- a. Two glasses
- b. Jug full of water
- c. Thermostat
- d. Ice cubes
- e. Plastic wrapper or plastic bag

Mini Ozone layer uses a bit more than housewares stuff, to make a fuctional model to demonstrate I needed the material listed below

For the model

- a. Cardboards
- b. Double sided transparent tape
- c. Plastic wrapper
- d. Fake grass
- e. Colour papers
- f. Water colour
- g. Candle

To demonstrate

- a. Paint scraper
- b. A lighter
- c. Tissue
- d. Laser Pointer

2.2 Methods

For the greenhouse activity, The procedure started with transferring a jug of water to the two empty glasses. Next I dropped 5 ice cubes in both of the glasses. Then I wrapped a plastic bag on one of the glasses and proceeded to put the glasses under the sun. Lastly, we waited two minutes before our data was recorded. This was the easiest activity to set up and because of how easy it was I am sure students will find a lot of joy in doing this anywhere and anytime.

For the second activity in my module the mini ozone layer The process to make this model was a bit complicated because I needed to attach both cardboard on each side of the base of the rectangular cardboard and it kept on leaning to the left or right but I did manage to make it stand with the help of the plastic wrapper that was in between of the cardboard. For the procedure to present this model I had placed the candle on the paint scraper and slide it in from the back of the model, Once it was in I ignited the candle(gases that is trapped in earth) with a lighter and watch as it disintegrate the plastic on the model that acted as the ozone layer. After that, slide out the candle and replaced it with tissue, then I used the laser pointer(sun) to shine through the hole and burn the tissue.

3. Results and Discussion

3.1 Results

The first activity was an experiment that relates to the module, it was to prove that the temperature increased in only 2 minutes. The ice in the glass with plastic melted faster resulting in the temperature increased 20 celcius. This is similar to the Greenhouse Effect. Heat is trapped in the glass, causing the water's temperature to rise. This was an inspiration for my second activity.

For the second activity once the candle was lit inside of the model the plastic started to melt and make holes and when there was a big enough hole and when I switched it with the tissue, the laser pointer showed how strong the sun can penetrate earth and it burned the tissue without the protection of the plastic. To simplify it, this activity explained and describe the reason why the gas that are trapped in earth is causing the rise in temperature. The heat from the fire that was lit on the candle helps to slowly thinning and rip the plastic open. The model can't restore its ozone layer like earth, so it was the intention that my demonstration showed why our earth is being destroyed. I wanted to emphasize the importance of knowing the main consequences to how the greenhouse gases that are trapped is changing our climate.

3.2 Discussions

From my observation, this project has a few limitations. For example, both of this activity is not designed to be technology advanced this might affect the interest of the younger generations. Other than that, the structure for the second activity is quite unstable, I needed to make sure the cardboard didn't lean to one side. There is also the chance of accidentally burning the whole plastic on the model of the second activity. But this module advantage is that it can be used by everyone, they can try to make one themselves. Who knows there even might be a chance in improving the design on the model for the second activity. Moving on, this teaching module does have the potential of being distributed locally through local publisher or through ministries of education. This teaching module is diverse when it comes to understanding it, there would not be any language barrier with demonstrating this teaching module, it would be a multilingual teaching module that uses more gesture. The potential to be distributed in the market would be 50/50 because there is a diverse topics of teaching module In the market but rarely heard of a teaching module that emphasized on earth problems, this is the chance for my teaching module to stand out and maybe piqued the interest of organization that related to education. This strategy is cost-effective since I am only distributing it locally. This with the ambition to exposed the students to the importance of saving our earth like how people in japans are very serious about

making sure to reuse and recycle, also helping to raise awareness and implement the importance of saving earth enough that we have the simple habit to apply on our daily routine.

4. Conclusion

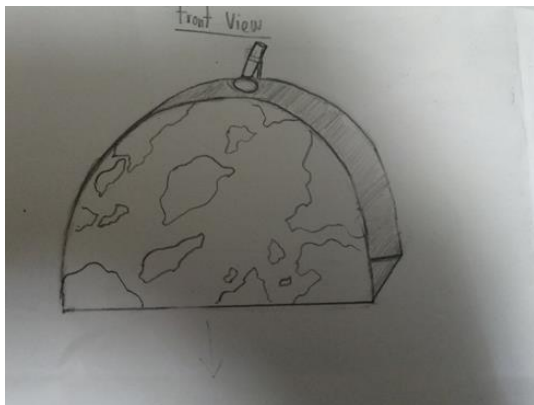
In conclusion, Even if this teaching module might seem like it's too basic, the point of both these activities is to directly show the effect on earth with the hope that the younger generation acknowledge the main consequence for destroying the earth or we would not have a generation that would be eager to find a solution to stop this problem for our earth.

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Appendix A (Optional)

Rough Sketch of the mini ozone layer mode



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- [3] [https://www.science.org.au/learning/general-audience/science-booklets/science-climate change/summary](https://www.science.org.au/learning/general-audience/science-booklets/science-climate-change/summary)(Research Question)
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