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| 1. **OBJECTIVES** |  |
| 1. **Content Standards** | The learners demonstrate understanding of the factors that affect climate, and the effects of changing climate and how to adapt accordingly. |
| 1. **Performance Standards** | The learners should be able to participate in activities that reduce risks and lessen effects of climate change. |
| 1. **Learning Competencies** | Describe certain climatic phenomenon that occur on a global level.(**S9ES-IIIe-31**)  **Learning Objectives:**  At the end of this lesson, the students should be able to:   * Identify the main factor in the increase of global temperature; * Interpret the relationship of Carbon dioxide and temperature; and * Relate Global warming and Climate change. |
| 1. **GAD Integration/ Values Integration/Comprehensive Sexuality Education Integration** | * Cooperation * Analysis * Creativity * Inclusive |
| 1. **CONTENT** | Global warming |
| 1. **LEARNING RESOURCES** 2. **References** | * It’s AumSum Time. (2015, May 28). *Global Warming | #aumsum #kids #science #education #children* [Video]. YouTube. https://www.youtube.com/watch?v=PqxMzKLYrZ4   <https://youtu.be/PqxMzKLYrZ4?si=Vo2pIf5Ym4GR35M8> |
| **1. Teachers Guide pages** | Science 9 – Unit 3, Module 2: Climate, pp.153-155 |
| **2. Learner’s Material pages** | Science 9 – Unit 3, Module 2: Climate, pp.201-204 |
| 1. **Materials** | * **For Teacher:** * PowerPoint Presentation/chalk board, Manila Paper, Marker, Adhesive Tape, Laptop, television, speaker * **For Learners:** * Pen/pencil, paper |
| 1. **Other Resources** | PowerPoint Presentation, Video Presentation, Pictures, Checklist, Internet Resources, Print-outs, Manila Papers, Permanent Markers |

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| 1. **PROCEDURES** |  | **Teacher's Activity** | **Student's Activity** |
| **Preliminaries** |  | **A. Greeting**  “Good morning, 9-Santan!” “How are you today?”  “Class, today is Monday, or let's just say Happy Monday, because today is another amazing day to learn something new.”  **B. Opening Prayer**  “Before we start our lesson this morning, may I ask the student of the day (name of the learner) to lead us in prayer.”  “Before you take your seat, kindly check your chairs if there are some trashes and also kindly arrange your chairs.”  **C. Checking of Attendance**  “Again, good morning, class!”  “May I ask who are not around today? Row 1…2…3…4…5…6?”  **D. Classroom Rules**  “Before we proceed to our lesson, let us recall our five classroom rules.  Who can give me the first rule?  How about the second rule?  What is our third rule?  And, our fourth rule?  Lastly, our fifth rule?  Very good, class. Can I expect you to follow all these classroom rules? Sure?” | “Good morning,Sir Kitz !”  “Good, Ma’am”  “Happy Monday”  (Learner will lead the prayer)  (Learners will arrange their chairs and pick up some trashes)  “Good morning, Siir  “None, Sir”  Sit properly.  Listen attentively.  Speak politely.  Participate actively.  Respect everybody.  “Yes,Sir!” “Sure, na sure!” |
| 1. **Reviewing previous lesson or presenting the new lesson** | **ELICIT** | “Last meeting, we've tackled about all the factors that affects the climate.     * Ask students: "What factors do you think contribute to the warming of the Earth?" | “Answer may vary” |
| 1. **Establishing a purpose for the lesson** | **ENGAGE** | ***“Carbon footprint”***  The generally accepted **definition of carbon footprint** is the amount of carbon dioxide, or greenhouse gases, produced as a result of our daily living. In other words, many things we do creates carbon dioxide or greenhouse gases. If you add up the number and number of emissions our daily activity produces you have an idea of the size of the impact we have on the environment.  The teacher will ask the students to brush the paint or draw on the bottom of student’s foot and the stamp into the coupon.  carbon footprint black footprint painted on board  Once we had our footprint stamped on the poster it was time to start thinking about what contributes to a BIG carbon footprint.  These are some of the items that we came up with…   * Driving a car – burning fuel (gasoline) * Flying in a plane – burning fuel (jet fuel) * Wasting energy in our house – burning fuel (natural gas/coal/nuclear energy) * Buying imported food – food that travels great distances – burning fuel (gasoline/jet fuel) * Buying non-organic food – pesticide production and transportation burn fuel * Using inefficient lights – burning fuel (natural gas/coal/nuclear energy) * Wasting water at home – cleaning water uses fuel (natural gas/coal/nuclear energy)   “Are you done class?”  The teacher will ask the students to present their output Infront of the class.  In the end, we not only figured out**what is meant by the term carbon footprint**, but we also figured out how to **shrink our carbon footprint**. We are going to hang our **Carbon Footprint poster** in a spot where we can see it and be reminded of the importance of keeping our footprint small.  “Excellent observation class!” This is our topic for today and it all about the Global warming, a climatic phenomenon that occur on a global level, are you ready to learn now class? | “Yes, Sir” |
| 1. **Presenting examples/ instancesof the new lesson** |
| 1. **Discussing new concepts and practicing new skills #1** | **EXPLORE** | Global warming occurs when carbon dioxide (CO2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth’s surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants- specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases are known as greenhouse gases, and their impact is called the greenhouse effect. Our current era of global warming is directly attributable to human activity specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect.    Carbon dioxide is a chemical compound made from 1 atom of carbon and 2 atoms of oxygen. Plants use carbon dioxide in photosynthesis…releasing oxygen into the atmosphere for animals and humans to breathe. However, in high concentrations, carbon dioxide can be very harmful to our environment and contributes to global warming. Carbon dioxide is created when people burn fossil fuels (coal, natural gas, crude oil). Unfortunately, greenhouse gases hold onto the sun’s energy and trap the energy in our atmosphere – thus, increasing the global temperature.  Human action like burning of fossil fuels ***causes*** an increase in global  temperature. Some of the consequences we are suffering now are melting of glacial masses, desertification of fertile area, flooding of coastal areas, spreading of diseases and pandemics which are risks to our survival.  “Based on the discussion class, what factors contribute to the increase in global temperature?”  “Very good!”  When the carbon dioxide concentration goes up, temperature goes up. When the carbon dioxide concentration goes down, temperature goes down.    “What can you observe with this graph?”  “Excellent class!”  **Guide Questions:**  **1.** What happens to water vapor as it rises over the mountain?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **2.** Which side of the mountain experiences low temperature?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **3.** Which side of the mountain experiences high temperature?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **4.** What happens when air becomes warmer and drier as it moves down the leeward side?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  **5.** How does topography affect climate?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  “Did you now, class, understand the relationship of carbon dioxide and temperature?”  “Very good class!” | “The carbon dioxide and air pollutants and human activities as well like burning fuels ma’am”  “It is directly proportional ma’am, when co2 concentration increases, same goes to temperature.  “Yes, Sir” |
| 1. **Discussing new concepts and practicing new skills #2** | **EXPLORE** | The teacher will show video on global warming in relation to climate change.  It’s AumSum Time. (2015, May 28). *Global Warming | #aumsum #kids #science #education #children* [Video]. YouTube. https://www.youtube.com/watch?v=PqxMzKLYrZ4  <https://youtu.be/PqxMzKLYrZ4?si=Vo2pIf5Ym4GR35M8>    “Now, based on the video what is the relation of global warming to climate change?”  “It is. Excellent class!”  Global warming is one indication of the much larger problem of human caused climate change. | (The students will response base on the observation)  “Climate change is the result of global warming.” |
| 1. **Developing mastery** | **EXPLAIN** | **Question and Answer**  The teacher will ask some students to answer the following questions:  ***“What I Have Learned?”***  Learners will be asked a question prior to their understanding of the lesson.   * 1. What is Global warming?   2. What do you think are the reasons for these phenomena?   3. What can be done to reduce global warming?   The teacher will say after the student’s response, “Excellent class!” | “Global warming is an increasing rise in the earth's temperature, generally due to the greenhouse effect produced by higher levels of CO2, CFCs, and other pollutants.”  “Human activities are responsible for almost all of the increase in greenhouse gases in the atmosphere. The largest source of greenhouse gas emissions from human activities from burning fossil fuels for electricity, heat, and transportation”  “Ma’am by eliminating all emissions of heat-trapping gases”.  We can all play a part in protecting our planet, from simple daily changes, like reusing and recycling, to bigger lifestyle decisions like switching to [**electric vehicles**](https://www.nationalgrid.com/stories/journey-to-net-zero/5-myths-about-electric-vehicles-busted).” |
| 1. **Finding practical application of**   **concepts and skills in daily living** | **ELABORATE** | **Activity:** *Am I a climate culprit or a Climate Hero?”*  Procedure: Each member of the group will compute his/her carbon footprint by using WWF Philippines’ Carbon Footprint Checklist.    **How did you score?**  **20-50 –** You’re a Green Queen/King and a globally aware consumer! Keep up the good work.  **50-80 –** You’ve made a start but there are more you can do to reduce your ecological footprint.  **80-110 –** You still have a long way to go; it is best to start now.  Guide Questions:   1. Which member has the highest carbon footprint? 2. Which member has the lowest carbon footprint? 3. What is the average carbon footprint of the group? 4. What is your highest source of carbon emission? 5. What is your lowest source of carbon emission?   The teacher will say “Thank you for sharing class!” | Answers may vary  (The student will response based on their learnings) |
| 1. **Making generalization and abstractions about the lesson** | **ELABORATE** | To summarize what you have learned, complete the following statements. Choose your answer in the word pool below.  1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ keeps us warm on planet Earth.  2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ results of excessive greenhouse gases.  3. The sources of greenhouse gases are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_,  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the greatest Greenhouse gas emission.  5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the least Greenhouse gas emission.  6. Global warming is the continuing increase in the earth’s overall \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.  7. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is one of the greatest of all threats to the environment, biodiversity and human life.  Global warming Energy Industrial Temperature Climate change Greenhouse effects Wastes Agriculture  “Did you now, class, understand the lesson even more? | (The student will response according to the activity)  “Yes,sir” |
| 1. **Evaluating learning** | **EVALUATE** | “Now that you’ve learned about the topography and ocean currents that affects climate, it’s time to assess your learning. Kindly bring out ¼ whole sheet of paper for your short test.  Question 1: What happens to the concentration of carbon dioxide (CO2) in the atmosphere when fossil fuels are burned?   1. It decreases b) It stays the same c) It increases d) It becomes neutral   Answer: c) It increases  Question 2: Which of the following is a greenhouse gas primarily responsible for trapping heat in the Earth's atmosphere?  a) Oxygen (O2) b) Nitrogen (N2) c) Methane (CH4) d) Argon (Ar)  Answer: c) Methane (CH4)  Question 3: How does an increase in carbon dioxide (CO2) levels affect global temperatures?   1. It has no effect on global temperatures b) It causes global temperatures to increase c) It causes global temperatures to decrease d) It has a neutral effect on global temperatures   Answer: b) It causes global temperatures to increase  Question 4: Which human activities contribute to the release of carbon dioxide (CO2) into the atmosphere?   1. Eating vegetables b) Riding a bicycle c) Using fossil fuels for transportation d) Recycling paper   Answer: c) Using fossil fuels for transportation  Question 5: What is the main source of carbon dioxide emissions from human activities?   1. Deforestation b) Industrial processes c) Agricultural practices d) Burning of fossil fuels   Answer: d) Burning of fossil fuels  “Alright, who answered all the questions correctly?”  “Excellent class! give yourself a clap! | (The students raised their hands who got the perfect scores”  “Me! Sir! |
| 1. **Additional activities for application or remediation** | **EXTEND** | **Assignment**    **Passage Scenario based Questions**  *Sara has been researching the effects of carbon dioxide on temperature for her science project. She discovered that reducing carbon dioxide emissions is crucial to mitigate climate change. She wants to propose a solution to her classmates. What suggestions would you give to Sara on how to reduce carbon dioxide emissions?*    Question 2: List three ways Sara can contribute to reducing carbon dioxide emissions.  “The submission of your assignment will be on Monday”  “Any questions or clarifications? If there’s nothing more, let’s call it a day. Thank you for listening and I do hope you learned something. Before you leave, kindly arrange the chairs and check if there are some trashes.  Again, thank you 9- Santan and never forget to always shine bright like a Scimazing. Class dismissed!” | “Thank you and good bye,Sir Kitz” |
| 1. **REMARKS** |  |  |  |
| 1. **REFLECTION** |  |  |  |
| 1. **No. of learners who earned 80% in the evaluation** |  |  |  |
| 1. **No. of learners who require additional activities for remediation who scored below 80%** |  |  |  |
| 1. **Did the remedial lessons work? No.**   **of learners who have caught up with the lesson** |  |  |  |
| 1. **No. of learners who continue to require remediation** |  |  |  |
| 1. **Which of my teaching strategies worked well? Why did this work?** |  |  |  |
| 1. **What difficulties did I encounter which my principal or supervisor can help me solve?** |  |  |  |
| 1. **What innovation or localized**   **materials did I use/discover which I wish to share with other teachers?** |  |  |  |

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