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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** | Explain how different factors affect the climate of an area (**S9ES-IIIe-30**)  **Learning Objectives:**  At the end of this lesson, the students should be able to:   * Differentiate Windward and Leeward sides of a high land; and * Explain how topography and ocean currents affects climate. |
| 1. **GAD Integration/ Values Integration/Comprehensive Sexuality Education Integration** | * Cooperation * Analysis * Creativity * Inclusive |
| 1. **CONTENT** | Topography and Ocean currents affects Climate |
| 1. **LEARNING RESOURCES** 2. **References** |  |
| **1. Teachers Guide pages** | Science 9 – Unit 3, Module 2: Climate, pp.148-150 |
| **2. Learner’s Material pages** | Science 9 – Unit 3, Module 2: Climate, pp.191-194 |
| 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 Wednesday, or let's just say Happy Wednesday, 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 Cerwin!”  “Good, Sir Kitz Cerwin”  “Happy Wednesday”  (Learner will lead the prayer)  (Learners will arrange their chairs and pick up some trashes)  “Good morning, Sir!”  “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 the distance of sea that affects the climate.  Now, let's move to another fun and interesting topic.  **Thought Experiment:**  If you could have magic power to choose/make a city or town, how would you design it to create the most favorable climate for your community? What factors would you consider?  “That’s awesome class!” | “"Sir, I will create it with a tropical climate, close to the beach, and also with trees and mountains." |
| 1. **Establishing a purpose for the lesson** | **ENGAGE** | The teacher will show images of different landscapes (mountains, valleys, coastlines) and ask students to discuss how they think the climate differs in each of these areas.     * Ask students to discuss with a partner what differences they notice in terms of climate between the two regions. * Engage students by posing the question: "How do you think living in a mountainous area would differ from living near the coast in terms of climate?" | (The student will response based on their observation) |
| 1. **Presenting examples/ instances of the new lesson** |
| 1. **Discussing new concepts and practicing new skills #1** | **EXPLORE** | **Topography** – it describes the natural features or arrangement of an area of land including mountains, valleys, hills and other landforms.    The teacher will show an illustration of a mountain. Mountain is an example of topographical features of the land. As you noticed, the picture shows the two sides of the mountain. One side is facing the wind blows and has low temperature this side is called **windward side**. Here, the wind is blocked by the mountain, forcing it to move upward. As it moves up, the water vapor condenses and forms clouds. This will result in precipitation on the windward side.  The air moves down towards the opposite region called **leeward side**. On this side of the mountain, there is no cloud formation. The cold air mass starts to absorb heat and becomes warm and dry. As a result, the area near the leeward side becomes dry and has less precipitation. The dry region on the leeward side is called *rain shadow*. Vegetation in this region includes desert plants and grassland.  The teacher will ask, who can differentiate between windward and leeward?”  “Excellent class!”  **Activity:** *Title: “Which should I choose, Windward or Leeward?”*  Procedure:  Study the illustration of windward and leeward below, and answer the questions that follow.    **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?  **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 how topography impacts climate?  “Very good class!” | “Yes, Sir Windward refers to the direction from which the wind blows, i.e. the point from which the breeze is projected. Leeward, on the other hand, is the point towards which the wind is blowing.”  “Yes, Sir” |
| 1. **Discussing new concepts and practicing new skills #2** | **EXPLORE** | **Ocean Currents** move like rivers. They flow through the ocean through the ocean in different directions.  (The teacher will pair students up and give each pair a map of the world with ocean currents marked.)    Instruct students to study the map and discuss:   * What patterns do you notice in the ocean currents? * How might these patterns impact climate in different regions?   “Excellent observation class!”  **Based on depth**  The ocean currents may be classified based on their depth as surface currents and deep-water currents:  **Surface currents** constitute about 10 percent of all the water in the ocean, these waters are the upper 400 m of the ocean;  **Deep water currents** make up the other 90 percent of the ocean water. These waters move around the ocean basins due to variations in density and gravity.  **Based on temperature**  Ocean currents are classified based on temperature: as cold currents and warm currents:  **Cold currents** bring cold water into warm water areas [from high latitudes to low latitudes]. These currents are usually found on the west coast of the continents (currents flow in the clockwise direction in the northern hemisphere and in anti- clockwise direction in the southern hemisphere) in the low and middle latitudes (true in both hemispheres) and on the east coast in the higher latitudes in the Northern Hemisphere;  **Warm currents** bring warm water into cold water areas [low to high latitudes] and are usually observed on the east coast of continents in the low and middle latitudes (true in both hemispheres). In the northern hemisphere, they are found on the west coasts of continents in high latitudes.  **Activity:** *Title: “What brings Ocean Current?”*  Procedure: Study the map of ocean currents below and answer the guide questions that follows.    Guide Questions:   1. What are the different ocean currents that carry warm water? Give at least three examples. 2. What are the different ocean currents that carry warm water? Give at least three examples? 3. What kind of air does Greenland Current take long? Explain 4. How do ocean currents affect climate?   **“**Very good Class!” Now did you understand how ocean currents affects the climate? | (The students will response base on the observation)  “Sir, it moves like river”  “Sir, some areas would have warm or cold temperature.”  (The student will answer the following questions)   1. Kurisho Current, Gulf current, aguilhas current, north equatorial current 2. Labrador Current, Kamchika Current, East Australian Current. Greenland current 3. Cold air because it carries cold water from the pole towards the equator. 4. “When that oceans currents bring cold water move towards a coastal region, the temperature of that area decreases. When that ocean currents take long warm air go to a land mass, the temperature of that place rises.”   “Sir” |
| 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 topography?   2. How would you describe in an area with windward side compared to leeward side?   3. What are ocean currents?   4. In what ways do ocean currents impact the distribution of heat and energy across the Earth's surface, influencing regional climate variations?   The teacher will say after the student’s response, “Excellent class!” | **“Topography** – it describes the physical features of an area of land including mountains, valleys, hills and other landforms.”  “This is the side of the mountain facing the wind, it is called **windward side.”**  “The wind flowing down the other side called l**eeward side.”**  “Ocean currents are the continuous, predictable, directional movement of seawater driven by gravity, wind (Coriolis Effect), and water density. Ocean water moves in two directions: horizontally and vertically. Horizontal movements are referred to as currents, while vertical changes are called upwellings or downwelling.”  “Ocean currents act much like a conveyer belt, transporting warm water and precipitation from the equator toward the poles and cold water from the poles back to the tropics.  Thus, currents regulate global climate, helping to counteract the uneven distribution of solar radiation reaching Earth's surface.” |
| 1. **Finding practical application of**   **concepts and skills in daily living** | **ELABORATE** | Guide Questions:   1. Would you rather live in a coastal area with a warm ocean current nearby or in a landlocked area near a mountain range? Why? 2. Would you rather live near a warm ocean current or a cold ocean current? Explain your choice.   The teacher will say “Thank you for sharing class!” | (The student will response based on their learnings) |
| 1. **Making generalization and abstractions about the lesson** | **ELABORATE** | Let us summarize the lesson. How does altitude and land topography affect climate? Complete the table below.   |  |  | | --- | --- | | **FACTORS** | **EFFECT TO CLIMATE** | |  |  | | Land Topography |  | | Ocean currents |  |   “Did you now understand our lesson for today class, and what is the effect of topography and ocean current on climate?” | (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.  **1. How does topography impact climate?**  a. Topography has no impact on climate b**. Topography can block weather patterns, leading to different climates on different sides of a mountain** c. Topography only affects temperature but not precipitation d. Topography causes global warming  **2. Which side of a mountain typically experiences the windward effect?**  a. **The side facing the wind** b. The sheltered side c. Both sides equally d. None of the above  **True or False**:   1. Ocean currents play a significant role in regulating the Earth's climate. **TRUE** 2. Warm ocean currents tend to bring cooler temperatures to coastal regions. **FALSE** 3. Ocean currents have no impact on marine ecosystems and the distribution of marine life. **FALSE**   “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**  Distribute magazines, scissors, and glue sticks to students. Ask them to search for and cut out images related to topography and ocean currents that affects climate of a certain region. Then, have them create a collage by pasting the images onto a large sheet of paper. Encourage students to discuss their collages and explain the connections of it.  “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- (Gumamela, Rose, Sampaguita) and never forget to always shine bright like a Scimazing. Class dismissed!” | “Thank you and good bye, Sir Kitz Cerwin” |
| 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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