MATATAG
Bansang Makabata Batang Makabansa
BAGONG PILIPINAS

School Logo

Name of School:		*Quarter:*	*4th Quarter*
Grade Level & Section:	*Grade 7*	*Week:*	*Week 8 Day 1*
Subject:	*SCIENCE*	*Date and Time:*	
Topic:		*Teacher:*	

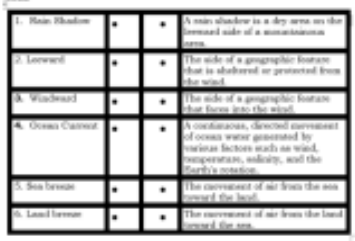
I. CONTENT, STANDARDS AND LEARNING COMPETENCIES		*ANNOTATIONS*
A. CONTENT STANDARDS	The learners learn that: 1. Solar energy influences the atmosphere and weather patterns	
B. PERFORMANCE STANDARDS	By the end of the quarter, learners will use reliable scientific information to identify and explain how solar energy influences the atmosphere and weather systems of the Earth. They will also use such information to appreciate and describe the dominant processes that affect the climate of the Philippines.	
C. LEARNING COMPETENCIES	**Make a physical model or use drawings to demonstrate how the tilt of the Earth relative to its orbit around the Sun affects the intensity of sunlight absorbed by different areas of Earth over a year.** **Explain how solar energy contributes to the occurrence of land and sea breezes, monsoons, and the Intertropical Convergence Zone (ITCZ).** Lesson Objectives: 1. Explain how topography affects climate. 2. Differentiate the windward and leeward sides of the mountains. 3. Explain the occurrence of land breezes and sea breezes. 4. Explain the role of solar energy in driving processes that contribute to the formation of ocean currents.	

I. CONTENT	
The Tilt of the Earth and Its Effect on Earth's Climate	
II. LEARNING RESOURCES	
A. REFERENCES	
B. OTHER LEARNING RESOURCES	● Pavico, Josefna et.al (2013). Exploring Life Through Science. Phoenix Publishing Inc. ● Pepito, Leah Joy Desamparado-Walan, (2020). Science – Grade 7 Learner's Module First Edition. DepEd – Instructional Materials Council Secretariat (DepEd-IMCS. Pasig City ● See, D. A., & See, D. A. (2019, February 7). Baguio's temperature dips to 9.0 degrees Celsius. HERALD EXPRESS | News in Cordillera and Northern Luzon. https://baguioheraldexpressonline.com/baguios-temperature-dips-to-9-degrees-celsius/ ● Stewart, M. (n.d.). orographic effect. Flickr. https://www.flickr.com/photos/megstewart/8644087724 ● Category:Sea and land breezes - Wikimedia Commons. (n.d.). https://commons.wikimedia.org/wiki/Category:Sea_and_land_breezes#/media/File:Sea_Land_Breeze.svg ● Category:Sea and land breezes - Wikimedia Commons. (n.d.). https://commons.wikimedia.org/wiki/Category:Sea_and_land_breezes#/media/File:Sea_Land_Breeze.svg ● Category:Sea and land breezes - Wikimedia Commons. (n.d.). https://commons.wikimedia.org/wiki/Category:Sea_and_land_breezes#/media/File:Bryza_dzienna.svg ● Bryza nocna.svg - Wikimedia Commons. (2006, October 3). https://commons.wikimedia.org/wiki/File:Bryza_nocna.svg ● Corrientes-oceanicas.png - Wikimedia Commons. (2007, August 10). https://commons.wikimedia.org/wiki/File:Corrientes-oceanicas.png

III. TEACHING AND LEARNING PROCEDURE

BEFORE/PRE-LESSON PROPER

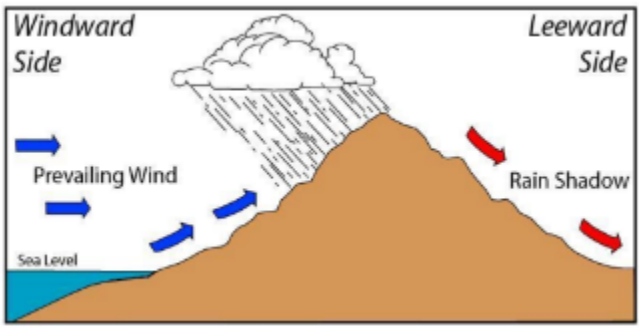
ACTIVATING PRIOR KNOWLEDGE	**Short Review** Instruct the learners to find the three ways of heat transfer.  C Q S X K Y H U Y K F O L M O S M I O V C O N D U C T I O N I R R V S U N U J H W Q Q E E B Z C N L C Y A E G C I F V X T O Y N D U T L W X Z O K V V H V I G T B O A V N W R K O X N O I T A I D A R N Clues: • The transfer of heat energy from one molecule to another by direct contact. • The movement of heat by a fluid such as water or air. • The transfer of heat by electromagnetic waves.	Note: ▪ The teacher may provide positive feedback to the learners' answer. ▪ The word hunt puzzle is created using a puzzle maker. ▪ https://puzzlemaker.discoveryeducation.com/word-search/result Answer: 1. Conduction 2. Convection 3. Radiation The teacher may use some examples, such as - Conduction (happens in land) - convection (occurs in the bodies of water) - Radiation (infrared and visible light travels from the sun to Earth)
LESSON PURPOSE/INTENTION	**Self-Assessment** Instruct the learners to read the statement and assess their skills and knowledge using the emoticons. Ask them to draw	The teacher may use other symbols or strategies.

	the appropriate number of emoticons that describe their skills and understanding of the concepts before the lesson. ☺ **No, I cannot do it.** ☺☺ **Yes, I can do it alone.** ☺☺☺ **Yes, I can do it and apply what I have learned.** Before the lesson | Statements | After the lesson 1. I can explain how topography affects climate. 2. I can differentiate between the windward and leeward sides of the mountains. 3. I can explain the occurrence of land breezes and sea breezes. 4. I can explain the role of solar energy in driving processes that contribute to the formation of ocean currents.	This activity will assess learners' level of understanding and confidence about the lessons.
LESSON LANGUAGE PRACTICE	**Unlocking Content Vocabulary** Ask the learners to connect the dots to match each statement with the correct term. 1. Rain Shadow — The side of a geographic feature that faces into the wind. 2. Windward — A dry area on the leeward side of a mountainous area. 3. Leeward — The side of a geographic feature that is sheltered or protected from the wind. 4. Sea breeze — The movement of air from the sea toward the land. 5. Ocean Current — The movement of air from the land toward the sea. 6. Land breeze — Various factors, such as wind, temperature, salinity, and the Earth's rotation, generate the continuous, directed movement of ocean water.	Answers: 
DURING/LESSON PROPER		
READING THE KEY IDEA/STEM	Effects of Differentiated Heating of the Earth & How Topography Affects Climate **I. Effects of Differentiated Heating of the Earth** The Earth receives energy from the sun, but this energy is not distributed evenly. The way different parts of the Earth heat up affects weather patterns, ocean currents, and overall climate. 1. **Unequal Heating of Land and Water** o Land heats up and cools down **faster** than water.	

	o Water retains heat longer, which influences coastal climates, making them milder compared to inland areas. 2. **Latitude and Solar Radiation** o Areas near the equator receive **direct sunlight**, making them warmer. o Polar regions receive sunlight at an **angle**, leading to cooler temperatures. 3. **Atmospheric and Ocean Circulation** o Unequal heating causes **wind patterns** (e.g., trade winds, monsoons) and **ocean currents** (e.g., Gulf Stream, El Niño). o These influence global climate patterns, such as rainfall distribution and storm formation. 4. **Seasonal Variations** o The Earth's **tilt and orbit** around the sun lead to different seasons. o Summer occurs when a hemisphere tilts **toward** the sun, while winter occurs when it tilts **away**. **II. How Topography Affects Climate** 1. **Elevation and Temperature** o Higher altitudes have **lower temperatures** due to decreased air pressure. o Example: **Baguio City** is cooler than Metro Manila because it is in a mountainous region. 2. **Mountains and Rainfall (Orographic Effect)** o When moist air moves up a mountain, it **cools and condenses**, causing rain on the **windward** side. o The **leeward** side (rain shadow area) receives **less rainfall**, leading to drier conditions. 3. **Bodies of Water and Coastal Climate** o Coastal areas experience **moderate temperatures** due to the ocean's ability to absorb and release heat slowly. o Example: Manila has a milder climate compared to inland provinces. 4. **Valleys and Temperature Inversion**	

	o Cold air settles in valleys at night, sometimes causing **temperature inversions**, where warm air traps cold air below, leading to foggy conditions. Read the news report of Mr. Dexter A. See, dated February 07, 2019, in Baguio City Herald Express, and answer the questions below. The weather condition in the country's undisputed Summer Capital continues to get colder, with 9.0℃ as the coolest temperature recorded this year by the local office of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) early Wednesday morning, January 30. From the 9.8 ℃ temperature in the city recorded by PAGASA Monday morning of January 28, it slightly improved to 10.6 ℃ early Tuesday morning, further dipping to 9.2 ℃ Wednesday early morning before finally settling at 9. The PAGASA official disclosed that even the warmest temperature in the city ranges from 19 to 22 ℃, which is much cooler compared to the usual 24 to 26℃ warmest temperature recorded in the city during the middle of the day. In other highly elevated areas in Benguet, the coldest temperature in Paoay, Atok, Benguet was around four ℃ Wednesday morning, while the coldest temperature was in Mount Sto. Tomas in Tuba, Benguet was around 6.5 ℃. See, D. A., & See, D. A. (2019, February 7). Baguio's temperature dips to 9.0 degrees Celsius. HERALD EXPRESS | News in Cordillera and Northern Luzon. https://baguioheraldexpressonline.com/baguios-temperature-dips-to-9-degrees-celsius/ a. What is the possible reason for such weather conditions in Baguio City and other highly elevated areas in Benguet? b. Do you think it is still possible for Baguio City to experience the city's lowest recorded temperature of 6.3 degrees Celsius, registered on January 18, 1961? Why? **Activity 1.** Analyze the illustration of a mountain in worksheet 8.1 to answer the following questions. 	The teacher may let the whole class read the news article aloud. **Answers:** **a.** Baguio City's high elevation plays a crucial role in shaping its distinctive weather conditions, characterized by cooler temperatures, increased moisture, frequent fog, and a relatively stable climate. **b.** Answers may vary. Such low temperatures in Baguio City would depend on a combination of natural climate variability, geographical factors, urbanization, land use changes, and the influence of climate change. The teacher must emphasize the following: ✔ The topography of the earth's surface is one factor affecting the weather system and climate. ✔ The difference in elevation and mountain ranges determine the distribution of precipitation on Earth. ✔ The mountainous areas tend to have extreme weather because

	Guide Questions: **a.** Which side of the mountain would generally receive more precipitation? **b.** Which side of the mountain would generally receive less precipitation? **c.** What happens to the air as it comes down the leeward side of the mountain? **d.** Which side of the mountain range often produces rain shadow? **e.** What happens to the air as it travels up the mountain?	it is a barrier to air movements and moisture. ✔ The windward side of the mountain faces the wind and receives warm and moist air. As the wind hits the mountain, the air is forced to move upward along the slope and begins to cool due to a decrease in atmospheric pressure. The cooling of air results in the formation of clouds and precipitation. Because of this, the windward side of the mountain is cooler and rich in vegetation. ✔ The mountain's leeward side is the wind ward's opposite side. The air descending the leeward slope has lost its moisture on the windward side, resulting in warm air and low relative humidity. As the dry air descends in the leeward slope, it expands and reduces the possibility of precipitation, forming a rain shadow effect. This side of the mountain is the driest place. Answers to worksheet 8.1: a. Winward b. Leeward c. It warms and expands. d. Leeward side e. The air cools, condenses, and rain falls.

DEVELOPING and DEEPENING UNDERSTANDING OF THE KEY IDEA/STEM	**Ask the learners to analyze the illustration and answer the questions that follow.**  **Stewart, M. (n.d.). orographic effect. Flickr. https://www.flickr.com/photos/megstewart/8644087724** **Guide Questions:** **a.** Which side of the mountain experiences low temperature? **b.** Which side of the mountain experiences high temperature? **c.** What dry region forms on the leeward side of the mountain? **d.** What happens to the water vapor as it rises over the mountain?	**Answers:** a. windward b. leeward c. rain shadow d. becomes clouds due to condensation.
AFTER AFTER/POST-LESSON		
MAKING GENERALIZATIONS AND ABSTRACTIONS	Worksheet Synthesis/Extended What you have learned In a one sheet of paper write something you understand about the lesson we discussed today.	
EVALUATING LEARNING	**Directions:** Read each question carefully and choose the correct answer by selecting the letter of the best option. 1. What causes the Earth's surface to heat up unevenly?	**ANSWER** **1.B** **2.A** **3.B** **4.B**

	a) The Moon’s gravitational pull b) The Sun’s rays striking different areas at different angles c) The rotation of the Earth stopping at night d) The presence of human activities 2. Why do land and water heat up at different rates? a) Water absorbs and releases heat slower than land b) Land reflects all sunlight, while water absorbs it completely c) Water is a poor heat conductor d) Land never changes temperature 3. Which factor is responsible for the occurrence of seasons on Earth? a) The Sun changing temperature b) The Earth's tilt on its axis c) The Earth's distance from the Sun d) The rotation of the Moon 4. What is the main effect of unequal heating of the Earth’s surface? a) It causes the rotation of the Earth b) It leads to the formation of wind and ocean currents c) It creates earthquakes and volcanic eruptions d) It makes the Moon orbit the Earth 5. Why are polar regions colder than equatorial regions? a) They receive more sunlight throughout the year b) They receive sunlight at an angle, spreading the energy over a larger area c) They are closer to the Moon’s cooling effects d) They have no oceans to store heat 6. How does elevation affect temperature? a) Higher altitudes are warmer because they are closer to the Sun b) Higher altitudes are cooler due to lower air	**5.B** **6.B** **7.A** **8.A** **9.A** **10.A**

	pressure c) Temperature remains the same at all elevations d) Lower altitudes are cooler due to wind patterns 7. What happens when moist air rises along a mountain? a) It cools, condenses, and forms precipitation on the windward side b) It speeds up and becomes drier c) It becomes hotter as it moves upward d) It stops moving at the mountain peak 8. What is the term for the dry area on the leeward side of a mountain? a) Rain shadow b) Windward zone c) Monsoon belt d) Coastal front 9. Why do coastal areas have milder climates compared to inland areas? a) Water absorbs and releases heat slowly, regulating temperature b) Water heats up quickly and stays warm permanently c) Coastal areas receive no sunlight d) Land in coastal areas is made of special heat-resistant rocks 10. How does a valley affect temperature at night? a) Cold air sinks into valleys, sometimes trapping pollution and causing fog b) Valleys heat up faster than mountains and stay warm at night c) Warm air moves downward, making valleys the hottest places at night d) Temperature remains the same in valleys and mountains	
ADDITIONAL ACTIVITIES FOR APPLICATION OR	**Directions:** Answer the following questions based on what you have learned. Provide clear and complete explanations. 1. Why do some parts of the Earth receive more heat than others?	

REMEDIATION (IF APPLICABLE)	2. How does the unequal heating of land and water affect climate? 3. How does the Earth's tilt contribute to the changing seasons? 4. Why do higher altitudes have colder temperatures? 5. Explain the orographic effect and how it influences rainfall.	
REMARKS		
REFLECTION		

Prepared by:

_____

Subject Teacher
Teacher

Reviewed by:

Master Teacher/Head