<u> </u>	Batang Makabansa BACONG PILIPINAS	School Logo	
Name of	·	Quarter:	4 th
School:			Quarter
Grade Level & Section:	Grade 7	Week:	Week 8 Day 1
Subject:	SCIENCE	Date and Time:	
Topic:		Teacher:	

I.	CON	ITENT, STANDARDS AND LEARNING COMPETENCIES	ANNOTATIONS
A.	CONT ENT STAND ARDS	The learners learn that: 1. Solar energy influences the atmosphere and weather patterns	
B.	PERF ORMA NCE STAND ARDS	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.	LEARN ING COMP ETEN CIES	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.	
		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

RENC ES B. OTHE

A. REFE

B. OTHE R LEARN ING RESO URCE

- 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_dz ienna.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

II. TEACHING AND LEARNING PROCEDURE

BEFORE/PRE-LESSON PROPER

ACTIVATING PRIOR KNOWLEDGE

Short Review

Instruct the learners to find the three ways of heat transfer.



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.discov eryeducation.com/word-se arch/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/IN TENTION

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			This activity will assess	
	and under	standing of the co	ncepts before the les	son.	learners' level of
	\odot	No, I cannot do it.			understanding and confidence about the
	$\odot \odot$	Yes, I can do it alo	ne.		lessons.
	$\odot\odot\odot$	Yes, I can do it an	d apply what I have learned		iccoone.
	Before the	Stat	tements	After the	
	lesson	1. I can explain how to	pography affects climate.	lesson	
		I can differentiate be leeward sides of the	tween the windward and mountains.		
		 I can explain the occ sea breezes. 	currence of land breezes and		
			le of solar energy in driving tribute to the formation of		
LESSON LANGUAGE	Unlocking	Content Vocabula	ary	<u> </u>	Answers:
PRACTICE	Ask the lea	arners to connect	the dots to match ead	ch statement	A nairs Shandow A nairs shandow in a day areas us the literature side of a suscentralization acres.
	with the co	orrect term.			2. Locused The side of a gragraphic feature that is sheltered or presented from the wind. The side of a gragraphic feature.
	Rain Shadow The side of a geographic feature that faces into the wind.			This feat on a gas-gas-point restance that feats into the alternation that feats into the above section of the continuous factors each ne wind, representation, seafficier, and the	
	Windward A dry area on the leeward side of a mountainous area.		S. Sea brease The convented of air from the eou award the back Land brease The convented of air from the eou award the back Land brease The convented of air from the land beyond the sand.		
	3. Leeward		The side of a geographic that is sheltered or protective wind.		
	4. Sea breeze	• •	The movement of air from toward the land.	n the sea	
	5. Ocean Cur	rrent • •	The movement of air from toward the sea.	n the land	
	6. Land bree	zze • •	Various factors, such as temperature, salinity, and Earth's rotation, generate continuous, directed mov ocean water.	d the e the	
DURING/LESS	ON PROPE	R			
READING	Effects of	Differentiated H	eating of the Earth	& How	
THE KEY	Topography Affects Climate				
IDEA/STEM					
	I. Effects of Differentiated Heating of the Earth The Forth receives energy from the earn but this energy				
	The Earth receives energy from the sun, but this energy is not distributed evenly. The way different parts of the				
	is not distributed evenly. The way different parts of the Earth heat up affects weather patterns, ocean currents,				
	and overall climate.				
	Unequal Heating of Land and Water				
	o Land heats up and cools down faster than				
	water.				

 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).
- 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.
- 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.
- 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

 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 °C 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 °C temperature in the city recorded by PAGASA Monday morning of January 28, it slightly improved to 10.6 °C early Tuesday morning, further dipping to 9.2 °C 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 $^{\circ}$ C, which is much cooler compared to the usual 24 to 26 $^{\circ}$ C 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 $^{\circ}$ C Wednesday morning, while the coldest temperature was in Mount Sto. Tomas in Tuba, Benguet was around 6.5 $^{\circ}$ C.

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 UNDERSTANDI NG OF THE KEY IDEA/STEM	Ask the learners to analyze the illustration and answer the questions that follow. Windward Side Side Rain Shadow 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 GENERALIZA TIONS AND ABSTRACTIO NS	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 	5.B 6.B 7.A 8.A 9.A 10.A
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

b) It leads to the formation of wind and ocean

c) It creates earthquakes and volcanic eruptions

a) They receive more sunlight throughout the yearb) They receive sunlight at an angle, spreading the

c) They are closer to the Moon's cooling effects

a) Higher altitudes are warmer because they are

b) Higher altitudes are cooler due to lower air

a) It causes the rotation of the Earth

d) It makes the Moon orbit the Earth

energy over a larger area

closer to the Sun

5. Why are polar regions colder than equatorial

d) They have no oceans to store heat

6. How does elevation affect temperature?

Earth's surface?

currents

regions?

	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 upwardd) 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	Directions: Answer the following questions based on what you	
ACTIVITIES FOR	have learned. Provide clear and complete explanations.	
APPLICATION OR	1. Why do some parts of the Earth receive more heat than others?	

REMEDIATIO N (IF APPLICABLE)	2. How does the unequal heating of land and water affect climate?	
, a r Eloribelly	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:	Reviewed by:
Subject Teacher Teacher	Master Teacher/Head