

Lesson Exemplar for Science



Lesson Exemplar for Science Grade 7 Quarter 4: Lesson 8 (Week 8) SY 2024-2025

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SCIENCE (EARTH AND SPACE SCIENCE) / QUARTER 4/ GRADE 7

I. CURRICULI	UM CONTENT, STANDARDS, AND LESSON COMPETENCIES
A. Content Standard	
B. Performa Standard	======================================
C. Learning Compete and Obje	encies Sun affects the intensity of sunlight absorbed by different areas of Earth over a year.
• Content	Topic: The Tilt of the Earth and Its Effect on Earth's Climate • Sub-Topic 1. Effects of Differentiated Heating of the Earth a. Topography b. Presence of Bodies of Water c. Ocean Current
• Integrati	SDG#7 - Affordable and Clean Energy SDG#11 - Sustainable Cities and Communities SDG#13 - Climate Action IKSP - Indigenous Knowledge Systems and Practices

II. 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 **NOTES TO TEACHERS** A. Activating Prior 1. Short Review Note: Knowledge Instruct the learners to find the three ways of heat transfer. • The teacher may provide positive feedback to the Clues: learners' answer. The word hunt puzzle is • The transfer of heat energy from one created using a puzzle molecule to another by direct contact. maker. The movement of heat by a fluid such as water or air. https://puzzlemaker.discoveryeducation.com /word-search/result The transfer of heat by electromagnetic waves. 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)
B. Establishing Lesson Purpose	Self-Assessi Instruct the knowledge u	nent e learners to read the statement and assess the sing the emoticons. Ask them to draw the appropriate at describe their skills and understanding of the control of the	ate number of incepts before	The teacher may use other symbols or strategies. This activity will assess learners' level of understanding and confidence about the lessons.
	Before the lesson	Statements 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.	After the lesson	

		_	s that	ne role of solar energy in driving contribute to the formation of			
3.	Unlocking Con Ask the learne term.			ots to match each statement with the correct	Answers: 1. Rain Shadow 2. Leeward	: - - - -	A rain shadow is a dry area on the leeward side of a mountainous area. The side of a geographic feature that is sheltered or protected from
1	. Rain Shadow	•	•	The side of a geographic feature that faces into the wind.	Windward Ocean Current	• •	The side of a geographic feature that faces into the wind. A continuous, directed movement of ocean water generated by various factors such as wind, temperature, salinity, and the
2	. Windward	•	•	A dry area on the leeward side of a mountainous area.	5. Sea breeze 6. Land breeze		Earth's rotation. The movement of air from the sea toward the land. The movement of air from the land toward the sea.
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 Curren	t •	•	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.			

6. Developing and Deepening Understanding

SUB-TOPIC 1: EFFECTS OF DIFFERENTIATED HEATING OF THE EARTH: TOPOGRAPHY

1. Explicitation

Instruct the learners to 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 °C, which is much cooler compared to the usual 24 to 26 °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 °C Wednesday morning, while the coldest temperature was in Mount Sto. Tomas in Tuba, Benguet was around 6.5 °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?

The teacher may let the whole class read the news article aloud. Answers:

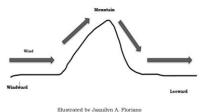
- a. Baguio City's high elevation plays a crucial role in shaping its distinctive weather conditions, characterized by cooler temperatures, increased moisture, frequent fog, and a relatively stable climate.
- b. Answers may vary. Such low temperatures in Baguio City would depend on a combination of natural 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 it is a barrier to air movements and moisture.
- ✓ The windward side of the mountain faces the wind and receives warm and moist air.

2. Worked Example

Activity 1. Ask the learner to analyze the illustration of a mountain in worksheet 8.1 to answer the following questions.

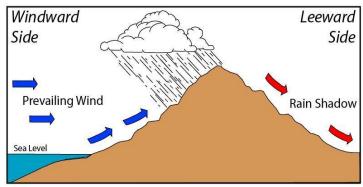


Guide Questions:

- 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?

3. Lesson Activity

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

- 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 windward'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.

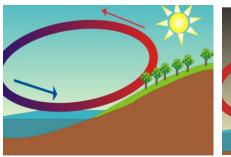
Guide Questions:

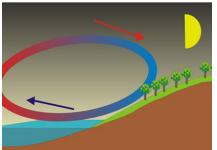
- a. Which side of the mountain experiences low temperature?
- b. Which side of the mountain experiences high temperature?
- c. What dry region forms on the leeward side of the mountain?
- d. What happens to the water vapor as it rises over the mountain?

SUB-TOPIC 2: PRESENCE OF BODIES OF WATER

1. Explicitation

Instruct the learners to identify the sea breeze and the land breeze.





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

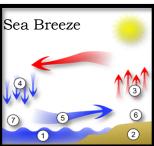
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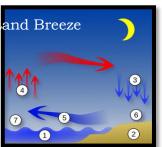
2. Worked Example

Category:Sea and land breezes - Wikimedia

Commons. (n.d.).

Activity 3. Ask the learners to label the numbered parts in the illustration.





Bryza nocna.svg -Wikimedia Commons. (2006,

Answers:

- a. windward
- b. leeward
- c. rain shadow
- d. becomes clouds due to condensation.

Answers:

- a. sea breeze
- b. land breeze

The teacher may use a short YouTube video clip further to understand the difference between sea breeze and land breeze.

https://www.youtube.com/watch?v=HmRwGDgr0VE

The teacher must explain the following:

√ A sea breeze is a local wind that occurs near coastal areas and is characterized by airflow from the sea towards the land. Sea breezes

7

3. Lesson Activity

Ask the learners to read the scenario and complete the Venn diagram below to differentiate between sea breeze and land breeze.

The Breezes

It is a warm summer day along the coast, and the sun is shining brightly in the sky. In a coastal town nestled between the mountains and the sea, residents and tourists alike are enjoying the pleasant weather.

As the day progresses, the temperature inland begins to rise steadily, reaching its peak by mid-afternoon. Meanwhile, out over the ocean, the water remains relatively cool due to the moderating influence of the sea.

In the late afternoon, a gentle breeze begins to pick up, blowing from the sea toward the land. This refreshing breeze, known as a sea breeze, brings relief from the heat as it sweeps across the coastal town. Residents and visitors feel the cool, salty air on their skin and welcome the respite from the warm inland temperatures.

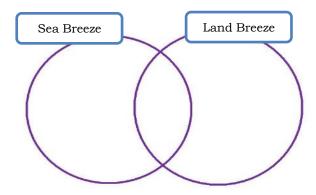
As evening approaches and the sun begins to set, the temperature inland starts to drop, cooling more rapidly than the sea. With the cooling of the land, the air above it becomes denser and begins to flow seaward. This movement of air from the land toward the sea creates a gentle breeze known as a land breeze.

As night falls, the land breeze continues to blow gently, carrying with it the scent of pine trees and flowers from the coastal town. Meanwhile, out over the ocean, the sea breeze subsides, and the water remains calm under the light of the stars.

The cycle of sea breezes and land breezes continues throughout the summer months, providing both residents and visitors with a welcome relief from the heat and creating a tranquil atmosphere along the picturesque coastal town.

typically occur during the daytime when the land heats up more rapidly than the adjacent water. As the land becomes warmer than the sea, the air above it also warms up and rises, creating a low-pressure area over the land. Conversely, the cooler air over the sea creates a high pressure area. This pressure difference causes air to flow from the sea towards the land, resulting in a gentle, cool breeze blowing inland from the coast. Sea breezes are often accompanied by lower temperatures and increased humidity near the coast, providing relief from the heat for coastal communities

A land breeze is a local wind that occurs near coastal areas and is the opposite of a sea breeze. It typically happens at night when the land cools more rapidly than the adjacent water. As the land loses heat more quickly, the air above becomes cooler and denser. Meanwhile, the water retains heat longer, keeping the air above relatively warmer and less dense. As a result, the cooler, denser air over the land moves seaward, while the warmer, less dense air over the water moves toward the land. This movement of air from the land toward the sea creates a breeze known as a land breeze. Land breezes are often accompanied by cooler temperatures and reduced humidity near the coast during the nighttime hours.



The teacher may use a table or smart art instead of a Venn diagram.

SUB-TOPIC 3: OCEAN CURRENTS

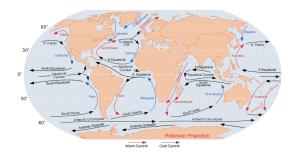
1. Explicitation

show to the video on ocean currents - https://www.youtube.com/watch?v=p4pWafuvdry then ask the learners to answer the questions below:

- a. What is an ocean current?
- b. What are the factors affecting ocean currents

2. Worked Example

Activity 4. Instruct the learners to use the illustration of ocean currents (red = warm, blue = cold) to answer the question below.



- a. An ocean current is a continuous, directional movement of water that flows horizontally within the ocean. It is driven by various factors such as wind, temperature, salinity, the Earth's rotation, and the shape of the ocean basins.
- b. wind, temperature, salinity, earth's rotation and shape of the ocean basins.

Corrientes-oceanicas.png -Wikimedia Commons. (2007, August 10). https://commons.wikimedia.org/wi ki/File:Corrientes-oceanicas.png

Guide Questions

- a. What is the general direction of ocean currents in the Northern Hemisphere?
- b. What is the general direction of ocean currents in the Southern Hemisphere?
- c. Look at the pattern of cold and warm water currents. What seems to determine if a current carries warm or cold water?
- d. How does cold current water affect the continental coastline it borders?
- e. Which warm ocean current flows along the eastern coast of the Philippines, contributing to the country's humid climate and providing favorable conditions for coral reefs and marine biodiversity?

3. Lesson Activity

Ask the learners to complete the Ocean Currents' Cloze by choosing the correct answer from the word bank.

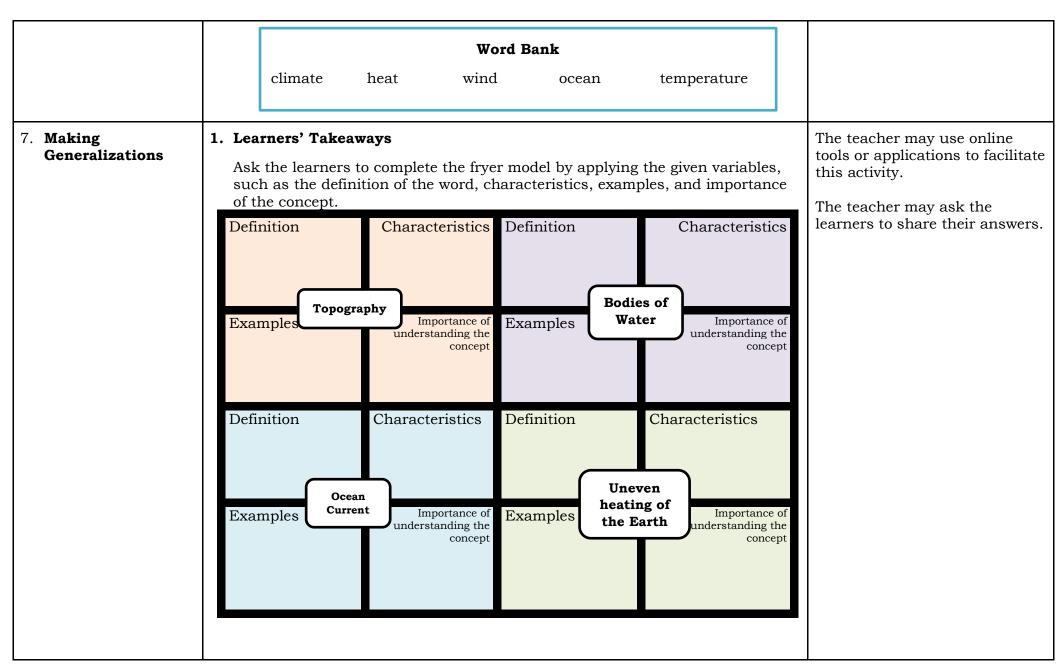
Ocean currents are continuous, directional movements of ocean water that flow horizontally within the 1) ______. These currents are driven by various factors such as 2) ______, 3) ______, salinity, the Earth's rotation, and the shape of the ocean basins. Surface currents, which occur in the upper layer of the ocean, are primarily driven by 4) ______. They play a crucial role in redistributing 5) _____ around the Earth, influencing 6) _____, weather patterns, and marine ecosystems. Deep ocean currents occur in deeper layers and are driven by density differences caused by variations in temperature and salinity. Overall, ocean currents are dynamic and complex systems that have an impact on the Earth's 7)_____ and the organisms that inhabit them.

Answers:

- a. Clockwise
- b. Counterclockwise
- c. Warm water comes from the equator, and cold water comes from the poles.
- d. It brings a cooling effect.
- e. The Philippine or Mindanao Current

Answers:

- 1. ocean
- 2. wind
- 3. temperature
- 4. wind
- 5. heat
- 6. climate
- 7. climate



2. Reflection on Learning

Instruct the learners to read the statement and assess their skills and knowledge using the emoticons. After the lesson, ask them to draw the appropriate number of emoticons that describe their skills and understanding of the concepts.

\odot	No, I cannot do it.
$\odot \odot$	Yes, I can do it alone.
$\odot\odot\odot$	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.	

IV. EVALUATING LE	ARNING: FORMATIVE ASSESSMENT AND TEACHER'S REFLECTION	NOTES TO TEACHERS
A. Evaluating Learning	1. Formative Assessment Multiple-Choice Questions: Encircle the letter of the best answer. 1. Which statement BEST describes topography? A. It is the total distance above sea level. B. It is the side of the mountain that experiences floods. C. It is the curve of the earth and the distance from the equator. D. It is an area's physical attributes, surface shapes, and features. 2. Which part of the mountain has more vegetation? A. top B. leeward C. sideward D. windward 3. Which BEST describes the leeward side of a mountain? A. The side of the mountain that experiences floods. B. The side of the mountain that receives less precipitation. C. The side of the mountain that receives more precipitation. D. The side of the mountain that experiences more vegetation. 4. How do oceans affect the climate of an area? A. The ocean absorbs the solar radiation. B. Ocean currents act much like a conveyor belt. C. The ocean helps to distribute heat around the globe. D. All of the above. 5. Why do mountainous areas generally have colder climates than the surrounding land? Because of A. higher altitude C. far from the ocean D. far from the lowland 6. What happens to the temperature as you go to the top of a mountain? A. does not change. B. temperature increases	Answer Key: 1. D 2. D 3. B 4. D 5. A 6. C 7. B 8. C 9. C 10.B 11.D 12.B 13.B 14.A 15.B

- C. temperature decreases
- D. temperature goes up and down.
- 7. How does higher altitude affect the climate of an area?
 - A. The closer you get to the equator, the hotter it gets.
 - B. The higher you go above sea level, the colder it gets.
 - C. The farther you get from the equator, the colder it gets.
 - D. The process by which heat from the sun is trapped near Earth's surface.
- 8. Land heats and cools faster than the sea. Therefore, coastal areas have a lower temperature range than those inland. Which factor affects the temperature of an area?
 - A. winds
 - B. altitude
 - C. distance from the sea
 - D. elevation from the sea
- 9. Some areas are drier and warmer than surrounding flatlands because of mountains and valleys. What factor affects the climate?
 - A. elevation
 - B. latitude
 - C. topography
 - D. vegetation
- 10. What is the basis of classifying an area's climate?
 - A. air pollution, wind, and temperature
 - B. precipitation, temperature, and wind
 - C. topography, wind, and water cycle
 - D. water cycle, wind, and precipitation
- 11. When moist winds approach a mountain, these often drop rain as winds rise over the hill and come down on the other side. As the air comes down the leeward side, it warms, and expands. How does this phenomenon affect the leeward side of the mountain?
 - A. The leeward side of the mountain is cooler and wet.
 - B. The leeward side of the mountain is cooler and drier.
 - C. The leeward side of the mountain is warmer and wet.
 - D. The leeward side of the mountain is warmer and drier.

	do you think make A. latitude B. altitude C. topography D. distance from th 13. Why do mountain of A. The temperature B. The temperature C. The altitude incomplete and the second of th	ne ocean climbers bring thick jackets we increases as the altitude increases as the altitude increases as the temperature increases	when they go up? reases. reases. reases. reases. rard side of a high land? n the leeward. ne leeward side. e windward side. chan the windward side.	
B. Teacher's Remarks	Note observations on any of the following areas:	Effective Practices	Problems Encountered	
	strategies explored			

	materials used
	learner engagement/ interaction
	Others
C. Teacher's Reflection	Reflection guide or prompt can be on: • principles behind the teaching What principles and beliefs informed my lesson? Why did I teach the lesson the way I did? • students What roles did my students play in my lesson? What did my students learn? How did they learn? • ways forward What could I have done differently? What can I explore in the next lesson?