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DepED
DEPARTMENT OF EDUCATION

Lesson Exemplar for Science

Quarter 4
Lesson
6

Lesson Exemplar for Science Grade 7
Quarter 4: Lesson 6 (Week 6)
SY 2024-2025

Development Team

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

I. CURRICULUM CONTENT, STANDARDS, AND LESSON COMPETENCIES	
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 use reliable scientific information to identify and explain how solar energy influences the atmosphere and weather systems of the Earth and use such information to appreciate and explain the dominant processes that influence the climate of the Philippines.
C. Learning Competencies and Objectives	**Explain how solar energy contributes to the occurrence of land and sea breezes, monsoons, and the Intertropical Convergence Zone (ITCZ).** Lesson Objectives: 1. Explain the formation of clouds. 2. Describe the effect of the difference in temperature and pressure on the movement of air. 3. Identify and describe the effects of different monsoons in the Philippines. 4. Infer the occurrence of intertropical convergence zone (ITCZ) in the Philippines.
● **Content**	**Topic: Monsoons and ITCZ** ● Sub-Topic 1. Cloud Formation ● Sub-Topic 2. ITCZ a. news analysis b. trade winds and global circulation patterns c. modeling/ simulations ● Sub-Topic 3. Monsoons a. Amihan b. Habagat
● **Integration**	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
- Earth-lighting-summer-solstice TR.png - Wikimedia Commons. (2021, October 22). https://commons.wikimedia.org/wiki/File:Earth-lighting-summer-solstice_TR.png#/media/File:Earth-lighting-summer-solstice_EN_-_corrected.png
- Atmospheric circulation.svg - Wikimedia Commons. (2007, May 31). https://commons.wikimedia.org/w/index.php?curid=2180960
- Inter Tropical Convergence Zone (ITCZ) | SKYbrary Aviation Safety. (n.d.). https://skybrary.aero/articles/inter-tropical-convergence-zone-itcz
- ITCZ january-july.png - Wikipedia. (2006, December 13). https://en.m.wikipedia.org/wiki/File:ITCZ_january-july.png
- Philippines location map (square).svg - Wikimedia Commons. (2013, June 17). https://commons.wikimedia.org/wiki/File:Philippines_location_map_%28square%29.svg

III. TEACHING AND LEARNING PROCEDURE		NOTES TO TEACHERS
A. Activating Prior Knowledge	**1. Short Review** Instruct the learners to classify the clouds from the Cloud Bank into High-Level Cloud, Low-Level Cloud, Mid-Level Cloud, or Vertical Cloud.	The teacher may provide pictures to show to help the students recall the previous lesson on clouds

Types of Clouds			
High-Level	**Mid-Level**	**Low-Level**	**Vertical Cloud**

Cloud Bank

Cumulonimbus	Nimbostratus	Cumulus
Stratus	Stratocumulus	Cirrus
Altocumulus	Cirrocumulus	Altostratus
Cirrostratus		

B. Establishing Lesson Purpose

2. Lesson Purpose
Self-Assessment

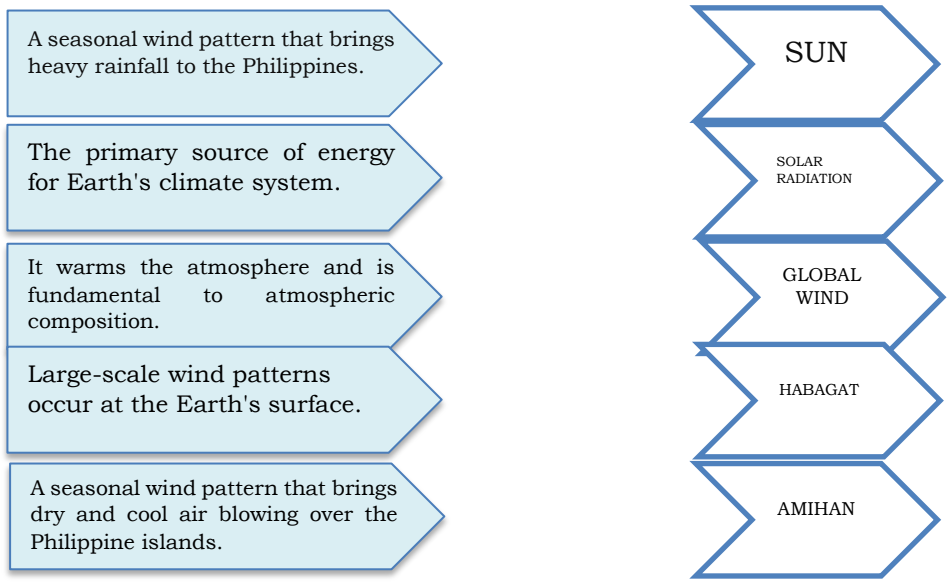
Instruct the learners to read the questions and assess their skills and knowledge using emoticons. Ask them to draw the appropriate number of emoticons that describe their level of confidence in answering the questions before the lesson.

☺	**I cannot answer the question.**
☺☺	**I can answer the question, but I need to read my notes.**
☺☺☺	**I can answer the question without my notes.**

Statements	Before the lesson	After the lesson
1. How do clouds form?		
2. How does the variation in temperature and pressure affect the movement of air?		
2. What are the effects of different monsoons in the Philippines,		
3. What can be inferred about the occurrence of the Intertropical Convergence Zone (ITCZ) in the Philippines?		

The teacher may use other symbols or strategies.

This activity will assess the level of understanding and confidence of learners about the lessons.

	2. Unlocking Content Vocabulary **Match the Shape.** Ask the learners to match the correct word being described by each statement.  	
4. **Developing and Deepening Understanding**	**SUB-TOPIC 1: CLOUD FORMATION** **1. Explicitation** **Activity 1. Video Watching**. Instruct the learners to watch the video and answer the questions that follow. Title: How do clouds form? Source: https://www.youtube.com/watch?v=q87Ekar3emA Guide Questions: 1. How does cloud formation start? 2. What is a condensation nucleus? 3. Which cycle is the formation of clouds part of?	The teacher may present in different ways: a. Download the video (recommended). b. Stream it (only if you have a strong internet connection). The teacher must emphasize that clouds are a large collection of droplets of water or ice crystals.

2. Worked Example

Let the students do worksheet 6.1. Further, explain the process of cloud formation below with the students then have them answer the following cloud cloze.

The process begins when water on the Earth's surface, such as oceans, lakes, and rivers, absorbs energy from the Sun and evaporates into the atmosphere in the form of water vapor.

As the warmed air containing water vapor rises, it encounters cooler air at higher altitudes. The rising air cools due to decreasing atmospheric pressure, causing the water vapor to condense into droplets or ice crystals.

Water vapor needs a surface to condense onto. Dust particles, salt particles from the ocean, or other microscopic particles known as condensation nuclei provide the surface for water vapor to condense and form cloud droplets.

When the water vapor condenses onto condensation nuclei, it forms cloud droplets. These droplets continue to accumulate and collide with each other, forming visible clouds.

The type of cloud that forms depend on various factors such as temperature, humidity, and atmospheric pressure. Common types of clouds include cumulus clouds or the puffy and cotton-like clouds, stratus clouds or the layered clouds, cirrus clouds or the thin and wispy clouds and cumulonimbus clouds or the towering and thunderstorm clouds.

Cloud Cloze

A cloud is a visible condensation of water that is suspended in the air. Clouds form as warm air **1)** _____ in the atmosphere and then cools **2)** _____. The **3)**_____ heats water, which causes it to **4)**_____ into the air. Warmer air rises and cooler air sinks. As the warmer air containing water vapor rises, it is cooled. As the water vapor cools, it **5)** _____ into water droplets onto particles, such as dust, in the air. As more and more air cools, more droplets are formed and create different visible **6)** .

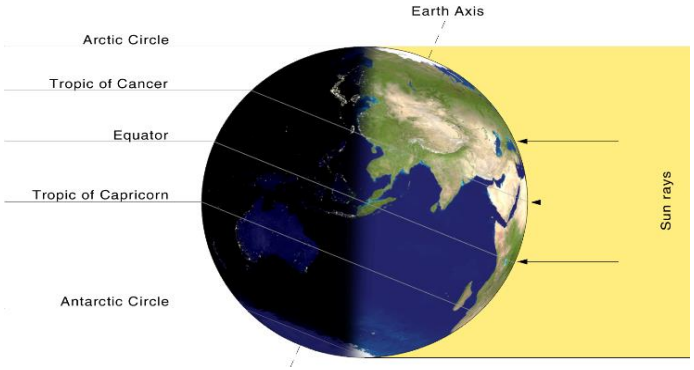
Answer Key:

1. Cloud formation begins with the process of evaporation, where heat from sources like the Sun gives water molecules enough energy to transform from liquid to gas and rise into the atmosphere. When this water vapor cools, it condenses on tiny particles in the air, known as condensation nuclei, to form clouds.
2. A condensation nucleus is a small particle, either solid or liquid, that provides a surface for water vapor to condense upon. These particles can range from a few microns to a few tenths of a micron in diameter and are essential for the formation of cloud droplets.
3. The formation of clouds is part of the water cycle, which is the continuous movement of water within the Earth and atmosphere. This cycle includes the processes of evaporation, condensation (cloud formation), and precipitation (rain or snow).

The teacher may use illustrations of the cloud formation and ask the learners to explain.

	Cloud Bank cloud condenses sun rises down evaporate **3. Lesson Activity** **Activity 2. Cloud in Jar Experiment.** Ask the learners to create a cloud inside a clear jar so that they can see the cloud formation and movement. See Worksheet 6.2 for the details. Provide simple reminders before the conduct of the experiment. **SUB-TOPIC 2: Intertropical Convergence Zone (ITZC) – a. news analysis, b. trade winds and global circulation patterns, c. modeling/simulations.** **1. Explicitation**	**Answer Key:** 1. rises 2. down 3. sun 4. evaporate 5. condenses 6. cloud **Answers to Guide Questions:** 1. The water is warm while the cover is cold due to the ice. The warm water represents the portion of the bodies of water that receives the sun's energy while the cold jar cover represents the cooler layer of the atmosphere. 2. Condensation occurred when the hairspray was added into the jar, evidenced by water droplets condensing onto the hairspray and forming a visible cloud. 3. The swirling of the cloud visible in the jar is caused by air circulation. Warm air rises while cooler air sinks, creating a cyclical motion. Emphasize that the sun's energy warms the Earth but not all areas on Earth's surface receive the same amount of energy due to the angle at which the sunlight hits the surface.

Try to Infer. Instruct the learners to infer the amount of radiant energy received at different locations on the Earth's surface.



https://upload.wikimedia.org/wikipedia/commons/1/10/Earth-lighting-summer-

AGREE OR DISAGREE. Ask the learner to decide whether they agree or disagree with the given statements.

a. Warm air rises and cold air sinks.
b. Warm air is more dense than cooler air.
c. Air pressure is low over the tropics.
d. Air pressure is high over the colder areas such as the poles.
e. The difference in temperature creates wind.

The areas near the equator are referred to as the tropics. Radiant energy strikes the tropics at nearly a 90° angle all year-round. This causes the land, water, and air at the tropics to always be warm.

At the latitudes near the Pole, the radiant energy strikes the Earth's surface at a low angle. As a result, the sunlight is spread over a larger surface leading to a lesser amount of energy received.

Answers:
a. agree
b. disagree. Warm air is less dense than cold air.
c. agree
d. agree
e. disagree. The difference in air pressure creates wind.

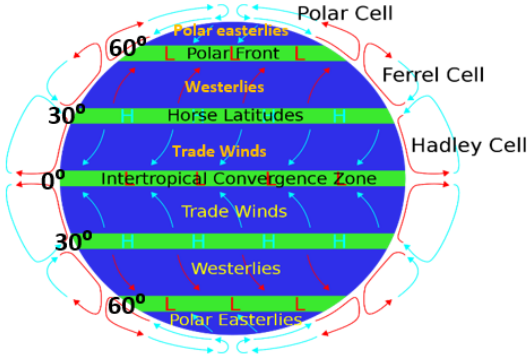
The teacher needs to emphasize that the difference in air pressure and uneven heating of earth's surface creates wind.

The teacher may ask learners to describe wind.

✓ Wind is the movement of air from areas of high pressure to areas of low pressure.

2. Worked Example

GLOBAL WINDS. Instruct the learners to analyze the illustration and answer the questions about global winds.



Atmospheric circulation.svg - Wikimedia Commons. (2007, May 31). https://commons.wikimedia.org/w/index.php?curid=2180960

What are the names of the three atmospheric cells depicted in the image, and how do they contribute to Earth's weather patterns?

Can you identify the wind systems shown between the Horse Latitudes and the Intertropical Convergence Zone in the image?

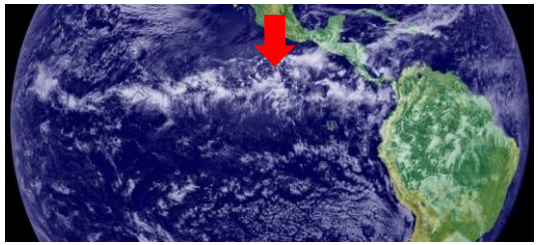
In the image, where are the high-pressure and low-pressure areas located, and how do they affect the movement of air in the atmosphere?

3. Lesson Activity

The ITCZ. Let the student watch the video on ITCZ.
https://www.youtube.com/watch?v=9of3wMKjBCI.
Then have them read the material from the NOOA site.
https://www.noaa.gov/jetstream/tropical/convergence-zone

Ask the learners to answer the given questions.

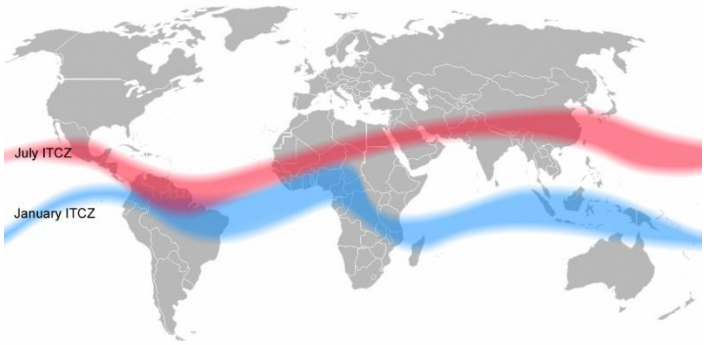
a. What is an Intertropical Convergence Zone?



https://skybrary.aero/articles/inter-tropical-convergence-zone-

The teacher may use this reference https://www.ces.fau.edu/nasa/content/resources/global-wind-patterns.php to aid in the discussion of global winds

b. Why is the ITCZ further North in July than January?



ITCZ january-july.png - Wikipedia. (2006, December 13). https://en.m.wikipedia.org/wiki/File:ITCZ_january-july.png

SUB-TOPIC 3: MONSOONS – AMIHAN AND HABAGAT

1. Explicitation

Show a short video clip from YouTube discussing Amihan and Habagat https://www.youtube.com/watch?v=VR59UqKikw4

Alternatively, you can present some pictures showing the effects of Habagat and Amihan in the Philippines.

After watching the video and reading the materials, ask the students to answer the following questions

a. What is monsoon?
b. What is the difference between Habagat and Amihan?

2. Worked Example

Ask the learners to read and analyze the statements. Instruct them to identify whether the statement describes the Amihan or Habagat by putting a check (/) in the appropriate column.

Emphasize that monsoon is a seasonal rain and wind pattern. "Monsoon" is from the Arabic word, "mawsim" which means season.

The teacher may provide concept notes to learners.

Amihan Habagat Monsoon. (n.d.). DiveScotty. https://www.divescotty.com/underwater-blog/amihan-habagat-monsoon.php#:~:text=In%20the%20Philippines%2C%20Amihan%20and,seasonal%20rain%20and%20wind%20pattern.

Amihan	Monsoons	Habagat
	Southwest monsoon	
	Northeast monsoon	
	A cool and dry northeast wind coming from Siberia and China and blows down to Southeast Asia.	
	The high-pressure area is at the Australian continent, and the low-pressure area is at North China, Mongolia, and Siberia.	
	Characterized with slight to moderate rainfall and a prevailing cold wind that affects east of the Philippines.	
	Occurs from October to late March	
	It brings the best weather conditions.	
	Occurs from late June to October	
	It brings frequent rainfall and high humidity.	

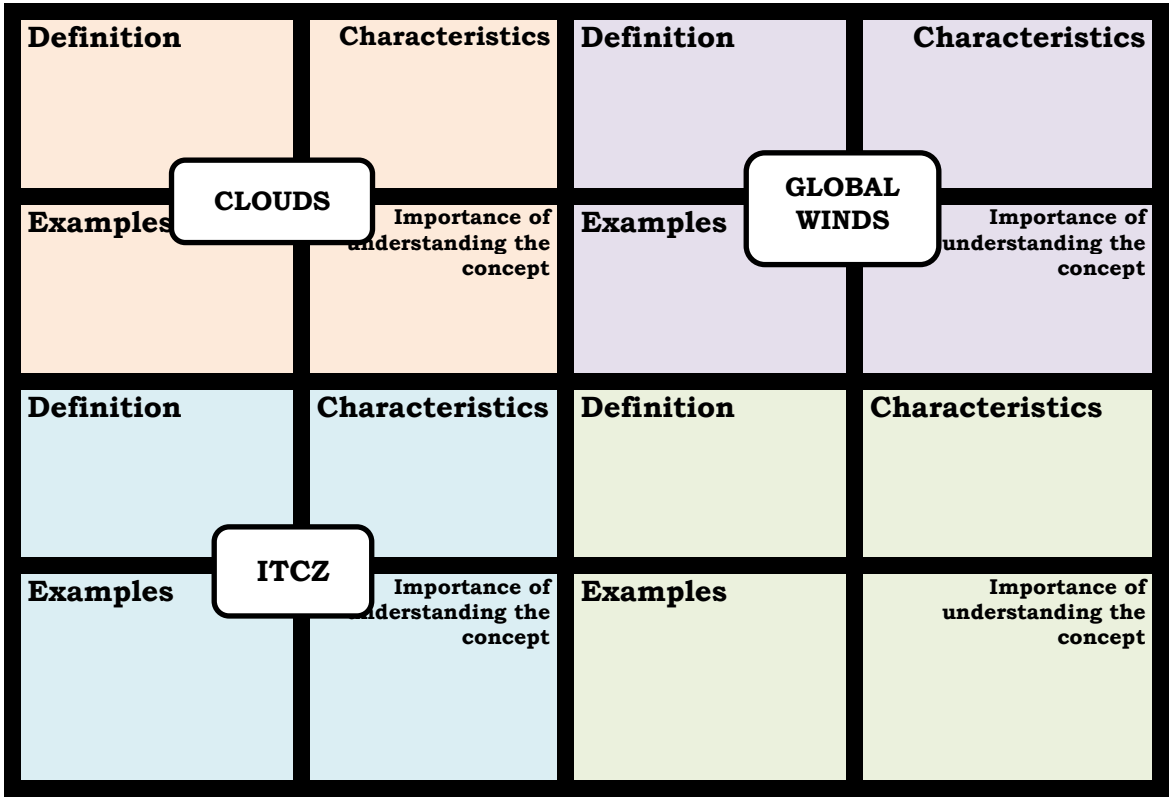
3. Lesson Activity

Ask the learners to answer worksheet 6.3

Answers to worksheet 6.3:

Southwest Monsoon
Origin: *West or Southwest Part*
Characteristics: *Warm and Humid*
Effects: *Heavy rains and Formation of cumulus clouds*
Filipino Name: *Habagat*

Northeast Monsoon
Origin: *Eastern Part*
Characteristics: *Cold and Dry*
Effects: *Light rains and Cold weather and formation of cirrus clouds.*
Filipino Name: *Amihan*

5. **Making Generalizations**	**1. Learners' Takeaways** Ask the learners to complete the fryer model by applying the given variables such the definition of the word, characteristics, examples, and importance of the concepts.  	The teacher may use online tools or applications to facilitate this activity. The teacher may ask the learners to share their answers.

2. Reflection on Learning

Instruct the learners to read the questions and assess their skills and knowledge using emoticons. Ask them to draw the appropriate number of emoticons that describe their level of confidence in answering the questions after the lesson.

☺	**I cannot answer the question.**
☺☺	**I can answer the question, but I need to read my notes.**
☺☺☺	**I can answer the question without my notes.**

Statements	**Before the lesson**	**After the lesson**
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IV. EVALUATING LEARNING: 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. What factors determine the type of cloud that forms during cloud formation? A. Wind speed B. Humidity levels C. Atmospheric pressure D. Temperature and humidity 2. Which of the following best describes the process of cloud formation? A. Warm air rises and cools, causing water vapor to condense. B. Cold air rises and warms, causing water vapor to condense. C. Warm air sinks and cools, causing water vapor to evaporate. D. Cold air sinks and warms, causing water vapor to evaporate.3. 3. What is the role of condensation nuclei in cloud formation? A. absorbs water vapor. B. releases water vapor. C. causes water vapor to evaporate. D. provides a surface for water vapor to condense onto. 4. What is the role of Coriolis effect in global wind patterns? A. It has no effect on wind patterns. B. It causes winds to move in a straight line. C. It accelerates wind speeds from the northern hemisphere to southern hemisphere. D. It deflects winds to the right in the northern hemisphere and to the left in the southern hemisphere. 5. Which global wind pattern blows between 30º and 60º latitude in both hemispheres? A. Easterlies B. Westerlies C. Trade winds D. Polar easterlies	**Answer Key:** 1. D 2. A 3. D 4. D 5. B 6. C 7. D 8. A 9. C 10. B 11. B 12. D 13. A 14. C 15. D

6. What weather conditions are typically associated with the ITCZ?
   A. Dry and arid conditions
   B. Clear skies and sunny weather
   C. Heavy rainfall and thunderstorms
   D. Cold temperatures and moderate rain
7. How does the ITCZ contribute to global weather patterns?
   A. Creating regions of high pressure at the poles
   B. Causing hurricanes and typhoons near the equator
   C. Generating strong westerly winds in the mid-latitudes
   D. Influencing the movement of trade winds and monsoons
8. How does *habagat* affect the weather system of the Philippines?
   A. It brings frequent heavy rainfall.
   B. It causes sunny and dry weather.
   C. It causes droughts during May or June.
   D. It brings cold to moderate temperatures.
9. Will weather patterns exist if the earth's surface receives the same amount of energy in all areas?
   A. Yes, because air particles will move down and sink.
   B. No, because air particles move up and create a high-pressure region.
   C. No, because there will be no rising air particles, and this will not create differences in air pressure.
   D. Yes, because there will be no differences in air pressures that will make the air move. in any direction.

10. Which is **TRUE** about cold air?
   A. Cold air rises.
   B. Cold air sinks.
   C. Warm air is denser.
   D. Cold air spreads out.
11. In which direction does the wind flow in different parts of the world?
   A. From low pressure area to a high-pressure area
   B. From high pressure area to a low-pressure area
   C. From low pressure area to another low-pressure area
   D. From high pressure area to another high-pressure area

	12. What type of monsoon occurs during the month of July? A. Northeast monsoon B. Northwest monsoon C. Southeast monsoon D. Southwest monsoon 13. How does Southwest monsoon affect the climate of a region? A. By bringing heavy rainfall B. By bringing dry weather and drought conditions C. By moderating temperatures and reducing humidity D. By creating stable weather patterns with minimal precipitation 14. Where are monsoons commonly experienced? A. Near the poles B. Near the equator C. In tropical and subtropical regions D. In the subtropical high-pressure belts 15. What weather conditions are associated with Amihan? A. Dry and sunny weather B. Hot and humid conditions C. Heavy rainfall and thunderstorms D. Cool temperatures and clear skies			
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?*	