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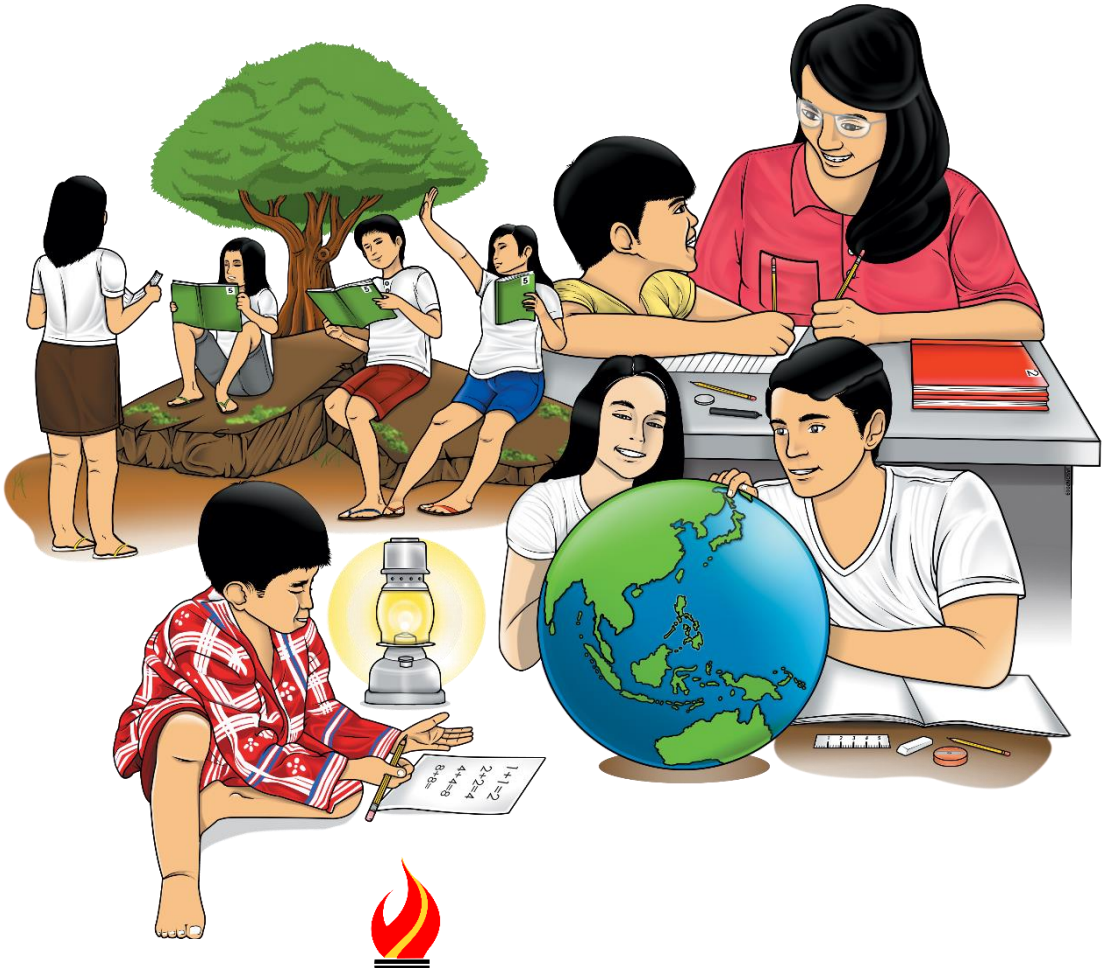
DepED
DEPARTMENT OF EDUCATION

Science
Quarter 2 - Module 5: Tracking a Typhoon



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Science
Quarter 2 - Module 5: Tracking a Typhoon

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

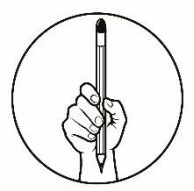
Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you master the nature of typhoons. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

After going through this module, you are expected to:

> Trace the pathway of typhoon that enters the Philippine Area of Responsibility (PAR) using a map and tracking data. *(MELC Week 5 S8ES-IIf-21)*



What I Know

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. What is the most powerful typhoon that hit the Philippines in 2013?
   A. Ramon
   B. Ruping
   C. Sendong
   D. Yolanda

2. Landmasses and bodies of water affects typhoon. Which of these differentiate the characteristics of landmasses and bodies of water?
   A. Landmasses have more water vapour than bodies of water.
   B. Landmasses produce strong wind and heavy rain while bodies of water cannot.
   C. Landmasses disrupt the spin of a typhoon while bodies of water strengthen typhoon.
   D. Landmasses strengthen typhoon while bodies of water disrupt the spin of a typhoon.

3. What agency tracks the activities of typhoon that enters PAR?
   A. Department of Education (DepEd)
   B. Department of Social Welfare and Development (DSWD)
   C. Department of Environment and Natural Resources (DENR)
   D. Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

4. Typhoon Grasya is 186 km away from Bislig City, and its landfall is expected in 3.00 hrs. What is the speed of the typhoon?
   A. 60.0 kph
   B. 61.5 kph
   C. 62.0 kph
   D. 63.5 kph

5. Which of the following is the MOST probable cause why a typhoon dies out as it hits the landmass?
   A. Its pressure remains constant
   B. Its wind speed is affected by steep mountains
   C. Its wind speed will be affected by the barrier trees
   D. It has no enough fast rising water vapor to sustain it

6. Which statement is INCORRECT about the importance of tracking the pathway of typhoon?
    A. People will know how strong or weak a typhoon is.
    B. People may know the accurate time and date of the arrival of a typhoon.
    C. Residents in the affected area will be prepared for the coming of typhoon.
    D. Each family will have enough time to spend for a family bonding before the typhoon arrives.

7. Which part of the typhoon has a calm condition?
    A. eye
    B. eyewall
    C. rain band
    D. wind system

8. Which statement below is INCORRECT about typhoon?
    A. It generally moves in northwest direction.
    B. The eye has lesser wind speed than the eyewall.
    C. It requires ocean waters to form regardless of its location.
    D. Air pressure within typhoon increases as distance from the eye of the storm increases.

9. What would be the consequence of an incorrect prediction of typhoon?
    A. There is no direct effect if the tracking is incorrect.
    B. The forecast for the typhoon's intensity and direction would also be incorrect.
    C. People would have no time to prepare for the danger that the typhoon would bring.
    D. There would be a massive destruction of properties and lives of the people in the affected area.

10. How long should the movement of typhoon from ocean to land be tracked?
    A. 4 days
    B. 5 days
    C. 6 days
    D. 7 days

11. What does PAR mean?
    A. Philippine Aeronautics of Radar
    B. Philippine Area of Responsibility
    C. Philippine Atmospheric Radiation
    D. Philippine Astronomical Responsibility

12. Which does NOT refer to a tropical cyclone?
    A. hurricane
    B. storm
    C. tsunami
    D. typhoon

13. Where does typhoon usually start to develop?
    A. mountain ranges
    B. low pressure area
    C. high pressure area
    D. area with high temperature

14. Which set of weather conditions characterizes the eyewall of typhoon?
    A. light winds, no clouds, no rains, and high temperatures
    B. heavy winds, no clouds, no rains, and high temperatures
    C. light winds, large clouds, heavy rains, and low temperatures
    D. heavy winds, large clouds, heavy rains, and low temperatures

15. Which phenomenon happens after typhoon?
    A. earthquake
    B. landslide
    C. pyroclastic flow
    D. volcanic eruption

Lesson 1 Pathway of Typhoon

Tracing the pathway of a typhoon is essential in determining which location will be greatly affected by it. In this module, you are going to learn how to track the path of a typhoon.

What's In

In the previous lesson, you have described how landforms and bodies of water affect the formation of a typhoon. Let us now see how far you have learned by doing the activity below.

Activity 1. Hunt Me Down

Directions: Find and encircle the following words in the word search puzzle. Words are positioned vertically, horizontally, and diagonally.

catalyst	mountain ranges	warm ocean	typhoon
evaporation	condensation	obstacle	wind speed
leeward	dissolve shadow	windward	vaporization
rain	humid air	tropical cyclones	

M	H	R	W	I	N	D	S	P	E	E	D	L	H	B	D	Z	T
W	C	O	N	D	E	N	S	A	T	I	O	N	P	W	I	D	Y
A	C	J	B	J	Q	B	W	H	U	M	I	D	A	I	R	I	P
R	A	Y	N	O	B	S	T	A	C	L	E	A	I	L	X	S	H
M	T	R	M	O	U	N	T	A	I	N	R	A	N	G	E	S	O
O	A	P	T	V	A	P	O	R	I	Z	A	T	I	O	N	O	O
C	L	F	C	E	V	A	P	O	R	A	T	I	O	N	Z	L	N
E	Y	G	D	P	N	L	E	E	W	A	R	D	I	C	S	V	V
A	S	H	L	E	I	R	A	I	N	S	H	A	D	O	W	E	M
N	T	J	R	Q	U	G	T	F	O	P	E	Z	V	J	A	A	O
T	R	O	P	I	C	A	L	C	Y	C	L	O	N	E	S	G	H
P	I	W	I	N	D	W	A	R	D	K	R	B	Q	Y	F	D	Q

What's New

Super typhoon Yolanda is considered as one of the most powerful typhoons ever recorded in the history of the Philippines. It hit the country on November 8, 2013. Despite the early precautionary warnings issued by PAGASA as to where and when the typhoon would make its landfall, many did not heed to it. According to the World Vision Organization, this super typhoon killed over 6,000 people and left 1,800 people missing. How does PAGASA predict the pathway of typhoon? Do Activity 2 to find out.

Activity 2. When to Expect

Directions: Using your knowledge on speed, study and complete the missing information in the table below, then answer the questions that follow. Write your answers on a separate sheet of paper.

Table 1. Theoretical Data of Super Typhoon Renee

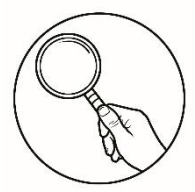
Date	Time (12-hour format)	Movement (kph)	Location/Details
11/6/2013	5:00 AM	15 kph	Outside PAR
11/7/2013	5:00 AM	30 kph	East of Guiuan
11/8/2013	12:00 PM	24 kph	Guiuan
11/9/2013	5:00 AM	1._____	Guiuan is about 130 km away from Tacloban; and another landfall is expected in 17 hours.
11/9/2013	2._____	54 kph	Tacloban to Biliran has an airline distance of 70 km.

Questions:

1. At what time did typhoon Renee move the fastest?
   _____
2. In which date did typhoon Renee make its first landfall?
   _____
3. Why is tracking a tropical cyclone important?
   _____

Rubric

4 points	3 points	2 points	1 point
Main idea is clear and well supported with 2 detailed information	Main idea is clear and supported with 1 detailed information	Main idea is clear but not supported with detailed information	Main idea is not clear and not supported with detailed information



What is It

Typhoon tracking and forecasting involve the prediction of the path of a typhoon every 6 to 12 hours over a period of at least five days. With this, PAGASA uses a variety of meteorological tools and methods to deliver accurate forecasts. The weather in a specific location will show signs of an approaching typhoon, like an increasing wave height and frequency, increasing cloudiness, falling air pressure, and heavy rainfall.

Accurate track prediction depends in the position and strength of high-and low-pressure areas, and on how those areas will migrate during the lifetime of a tropical system. Computer forecast models aid in determining this motion at least 5 to 7 days ahead. An accurate track forecast is essential because if the track forecast goes wrong, the intensity, rainfall, storm surge, and tornado threat will also be incorrect.

Typhoons have lower air pressure in the middle. This is often the explanation as to why the air in the surroundings moves towards the “eye” where wind speed is low. But within the eyewall, where dense clouds are found, the wind speed is great. Whenever news report emphasizes that typhoon has sustained winds of 200 kph for example, they are pertaining to the winds at the eyewall.

When the eye of typhoon passes over a specific place, it is the winds at the eyewall that wreak lots of destructions. As one side of the eyewall approaches, it brings robust winds blowing in one direction. Then comes the center of typhoon, with its calm weather. As it leaves, the opposite side of the eyewall brings strong winds again, but this time in the opposite way**.**

What's More

Activity 3. Dissecting a Typhoon

Directions: Study the details in Figures 1 and 2. Answer the questions that follow. Write your answers on a separate sheet of paper.

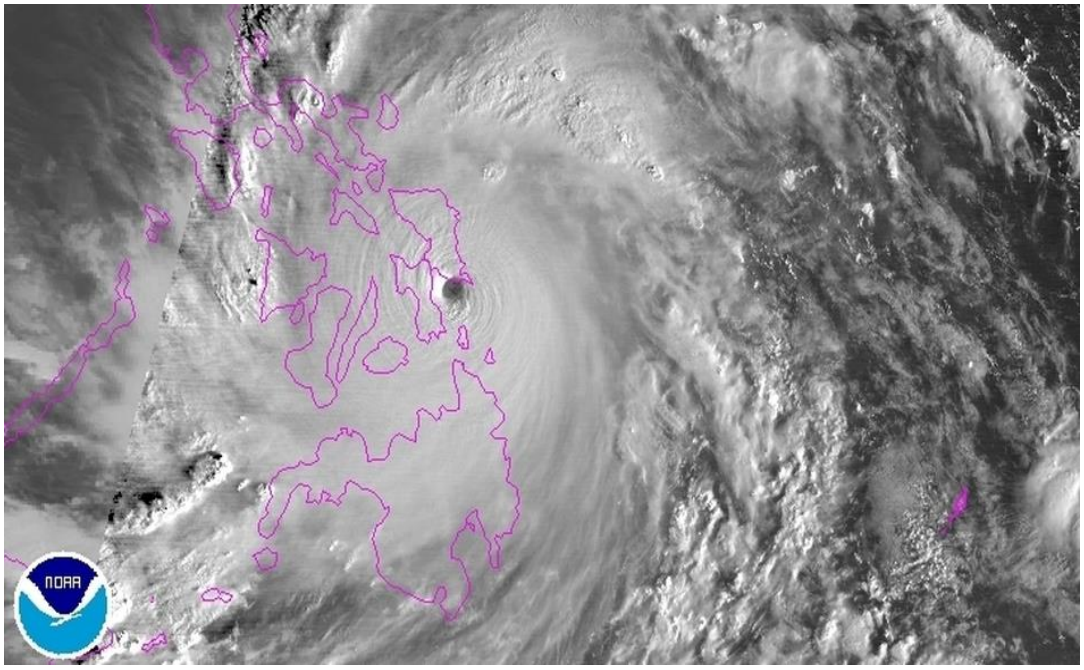


Figure 1. View of a Tropical Cyclone at an Angle. White Rain Bands Move Around the "Eye"

Source: https://www.ospo.noaa.gov/Organization/History/imagery/Haiyan/img/20131107_2230Z-rgb.jpg?fbclid=IwAR0wWErolPmqKTiUt_hyeHQG0G3nqzjwjduk2u4KQlR3rVOmGMwup3l9Jqk

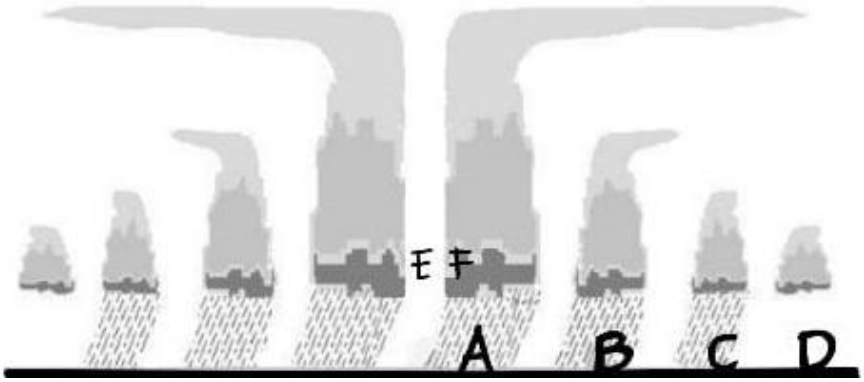


Figure 2. Cross section of a typhoon viewed from the side

Illustrated by: Rosa Mia L. Pontillo

Location **A** is the eyewall of the typhoon. **B, C,** and **D** are locations that are getting farther from the eye. The air pressures at the different locations are:

Location	*Air pressure in pascal (pa)
A	93,000
B	96,000
C	98,000
D	99,000

*Air pressure refers to the weight of air over a certain area.

Source: Campo et al. Science-Grade 8 Learner's Module (Philippines: FEP Printing Corporation, 2016), 148.

Location **E** is within the eye of the typhoon. Location **F** is within the clouds surrounding the eye. The clouds at F make up the eyewall. The wind speeds at the two locations are:

Location	Wind speed (kph)
E	10
F	200

Source: Campo et al. Science-Grade 8 Learner's Module (Philippines: FEP Printing Corporation, 2016), 148.

Questions:

1. Which location in the typhoon has the highest air pressure?

   _____

2. What part of the typhoon can cause heavy damage?

   _____

3. What is the relationship between typhoon's wind speed and distance from the eye?

   _____

Rubric

4 points	3 points	2 points	1 point
Main idea is clear and well-supported with 2 detailed information.	Main idea is clear and supported with 1 detailed information.	Main idea is clear but not supported with detailed information.	Main idea is not clear and not supported with detailed information.

What I Have Learned

Directions: Fill in the blanks with the correct term to complete the statements. Write your answers on a separate sheet of paper.

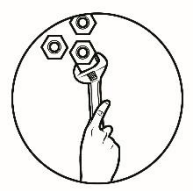
1. Tracking the movement of a _____ the moment it is formed, is very essential because if the track forecast is incorrect, wind speed, rainfall and storm surge threats will also be incorrect.

2. Ocean waters must reach a minimum temperature of _____ in order for a tropical cyclone to develop.

3. A large-scale wind moving in a particular direction over the ocean pushes the tropical cyclones to move in _____ direction.

4. When tropical cyclones reach land, they _____ because they are cut off from the water supply.

5. In the eye of a tropical cyclone, wind speed is _____.



What I Can Do

Activity 4. Tracking Tropical Storm (TS) Sendong

Directions: Plot on the map in Figure 5 the location and pathway of TS Sendong using the latitude and longitude (lat-long) locator in the table below.

Table 2. Lat-Long Location of TS Sendong (International Name: Washi)

Month/Day/Year	Time	Latitude (°N)	Longitude (°E)
12/13/2011	6:00 AM	6.00	145.00
12/13/2011	12:00 PM	6.00	143.00
12/14/2011	6:00 PM	6.00	142.00
12/14/2011	12:00 AM	6.00	140.00
12/14/2011	6:00 AM	6.00	139.00
12/14/2011	12:00 PM	7.00	137.00
12/14/2011	6:00 PM	7.00	136.00
12/15/2011	12:00 AM	7.00	134.00
12/15/2011	6:00 AM	7.00	132.00
12/15/2011	12:00 PM	8.00	131.00
12/15/2011	6:00 PM	8.00	129.00
12/16/2011	12:00 MN	7.00	128.00
12/16/2011	6:00 AM	8.00	127.00
12/16/2011	12:00 PM	8.00	125.00
12/16/2011	6:00 PM	8.00	124.00
12/17/2011	12:00 MN	9.00	122.00
12/17/2011	6:00 AM	9.00	121.00
12/17/2011	12:00 PM	10.00	120.00
12/17/2011	6:00 PM	10.00	119.00
12/18/2011	12:00 MN	11.00	117.00
12/18/2011	6:00 AM	10.00	116.00
12/18/2011	12:00 PM	10.00	114.00
12/18/2011	6:00 PM	9.00	114.00
12/19/2011	12:00 MN	9.00	113.00

Source: Campo et al. Science-Grade 8 Learner's Module (Philippines: FEP Printing Corporation, 2016), 145.

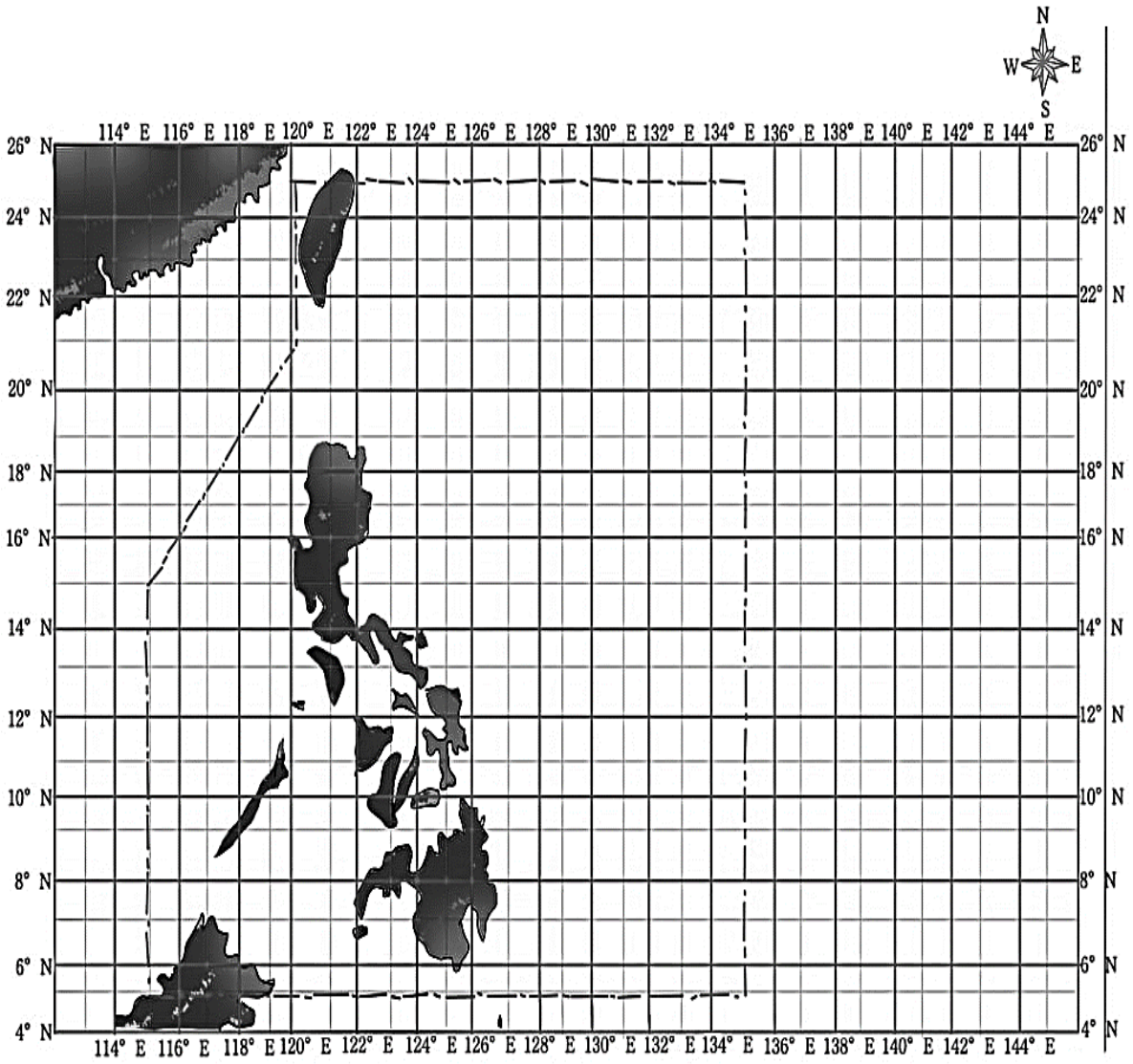


Figure 3. Map of the Philippine Area of Responsibility (PAR)

Illustrated by: Rosa Mia L. Pontillo

Questions:

1. Where did tropical storm Sendong start to form?

   _____

2. When did tropical storm Sendong enter the PAR?

   _____

3. When did tropical storm Sendong leave the PAR?

   _____

4. In what direction did tropical storm Sendong move?

   _____

5. Was your province hit by tropical storm Sendong?

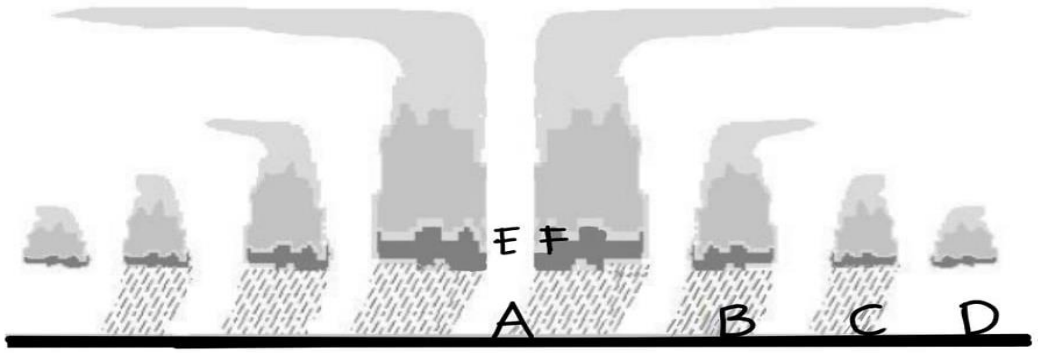
   _____

Assessment

Directions: Choose the letter of the correct answer. Write your answers on a separate sheet of paper.

1. What agency oversees the tracking of the movement and strength of a typhoon once it enters PAR?
   A. Department of Environment and Natural Disaster (DENR)
   B. National Disaster Risk Reduction and Management Council (NDRRMC)
   C. Philippine Institute of Volcanology and Seismology (PHIVOLCS)
   D. Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

For item numbers 2-4, refer to the figure below. Write the letter of the correct answer.



Illustrated by: Rosa Mia L. Pontillo

2. Which location has the highest air pressure? _____
3. Which location is the eyewall? _____
4. Which location has a calm condition? _____
5. Which statement is INCORRECT about tracking the typhoon?
   A. It predicts the path as to where typhoon will take its course.
   B. It involves determining the position and strength of high-and-low pressure areas.
   C. It involves using a single weather instrument to predict its strength and movement.
   D. It involves predicting the movements of typhoon within 5 to 7 days, and in 6 to 12 hours whenever there is a storm.

6. Which is NOT a sign of an approaching typhoon?
   A. decreasing rainfall
   B. increasing cloudiness
   C. decreasing barometric pressure
   D. increasing wave height and frequency

7. When forecasting a typhoon, PAGASA usually talks about sustained winds. These sustained winds are at the _____.
    A. eye
    B. eyewall
    C. rain band
    D. top

8. A typhoon is moving at 15 kph and is making a landfall at point A at exactly 5:30 AM. At what time will the typhoon hit point B if the distance between the two points is 225 km?
    A. 7:30 AM
    B. 7:30 PM
    C. 8:30 AM
    D. 8:30 PM

9. Which is an effect of a typhoon?
    A. tsunami
    B. earthquake
    C. storm surge
    D. calm weather condition

10. How often PAGASA monitors the weather and predicts typhoon movement in the Philippines?
    A. daily
    B. monthly
    C. quarterly
    D. yearly

11. Super typhoon Yolanda hit the Philippines in 2013. According to the World Vision Organization, how many people died during this natural disaster?
    A. 5000
    B. 6000
    C. 7000
    D. 8000

12. What are the factors to consider to have an accurate typhoon track prediction?
    A. typhoon's size, strength of high-and-low pressure areas and how these areas will migrate
    B. typhoon's position, strength of high-and-low pressure areas and how these areas will migrate
    C. typhoon's position, vicinity of high-and-low pressure areas and how these areas will migrate
    D. typhoon's size, temperature of high-and-low pressure areas and how these areas will migrate

13. Which best explains why the air in the surroundings moves towards the eye during the formation of typhoon?
    A. Typhoons have no air pressure in the middle thus, pulling the air towards it.
    B. Typhoons have lower air pressure in the middle thus, pulling the air towards it.
    C. Typhoons have higher air pressure in the middle thus, pulling the air towards it.
    D. Typhoons have normal air pressure in the middle thus, pulling the air towards it.

14. Super typhoon Yolanda is considered one of the most powerful typhoons ever recorded in the history of the Philippines. It recorded the highest wind speed measured at landfall of 315 kph. Where did super typhoon Yolanda start?
    A. warm waters of northwest over the South China Sea
    B. warm waters of South East Asia in Vietnam and China
    C. warm waters of west and northwest towards the Philippines
    D. warm waters of the Western Pacific Ocean at a location greater than 5°north or south of the equator

15. Tacloban is 70 km away from Biliran Island and is about to experience typhoon that is expected to landfall in 1.50 hr. What is the speed of the typhoon?
    A. 46.0 kph
    B. 46.3 kph
    C. 46.4 kph
    D. 46.7 kph

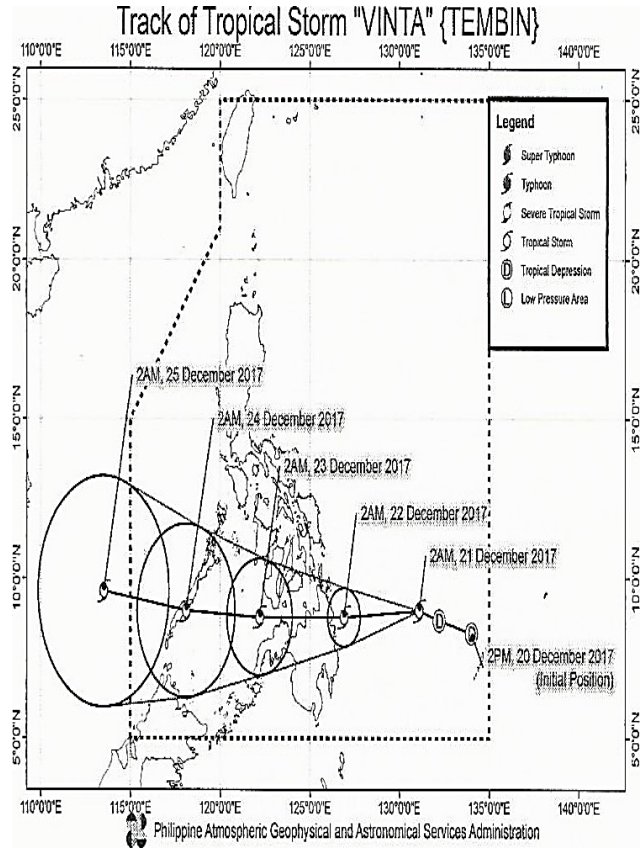
Additional Activities

Activity 5. Analyze Me

Directions: Study the weather bulletin in Table 3. Answer the following questions that follow. Write your answers on a separate sheet of paper.

Table 3. Severe Weather Bulletin for Tropical Storm Vinta (Tembin)

<table>
<tr><td colspan="3">ISSUED AT 5:00 AM, 21 December 2017
(Valid for broadcast until the next bulletin to be issued at 8 AM today)</td></tr>
<tr><td colspan="3">"VINTA" HAS INTENSIFIED INTO A TROPICAL STORM AS IT CONTINUES TO TRACK WESTWARD.</td></tr>
<tr><td colspan="3">Scattered to widespread moderate to heavy rains is expected over Eastern Visayas, Caraga and Davao Region within 24 hours. Residents of these areas must undertake precautionary measures, coordinate with their respective local disaster risk reduction and management offices, and continue monitoring for updates.

Sea travel is risky over the eastern seaboard of Visayas and Mindanao due to the approaching Tropical Storm. Expected to make landfall over Caraga - Davao Region area between Thursday (December 21) evening and Friday (December 22) morning.
Possible inclusion of Bohol, Lanao del Norte, Lanao del Sur, and Maguindanao in areas under Tropical Cyclone Warning Signal No. 1 within 6 hours.</td></tr>
<tr><td>Location of eye/center</td><td>At 4:00 AM today, the center of Tropical Storm "VINTA" was estimated based on all available data at 510 km East of Hinatuan, Surigao del Sur (9.0^0 N, 130.90E).</td><td rowspan="4"> 
</td></tr>
<tr><td>Strength</td><td>Maximum sustained winds of up to 65 kph near the center and gustiness of up to 80 kph.</td></tr>
<tr><td>Forecast Movement</td><td>Forecast to move West at 18 kph.</td></tr>
<tr><td>Forecast Positions</td><td>24 Hour(Tomorrow morning): 80 km Northeast of Hinatuan, Surigao del Sur (8.8^{0}N, 126.9^0 E)
48 Hour(Saturday morning): 130 km West of Dipolog City, Zamboanga del Norte (8.8^{0}N, 122.2^{0}E)
72 Hour(Sunday morning): 110 km Southwest of Puerto Princesa City,Palawan (9.0^{0}N, 118.1 ^{0} E)
96 Hour(Monday morning): 170 km South Southwest of Pagasa Island, Palawan (OUTSIDE PAR) (9.6°N, 113.5^{0}E)</td></tr>
</table>

Source: https://reliefweb.int/report/philippines/pagasa-severe-weather-bulletin-3-tropical-storm-vinta-issued-at500-am-21-december

Questions:

1. Where was the location of tropical storm Vinta on December 21, 2017?

   _____

2. What was the strength of the tropical storm?

   _____

3. After 48 hours, where was the tropical storm located?

   _____

4. What was the speed of the tropical storm?

   _____

5. Enumerate at least 5 places that were affected by the tropical storm.

   _____

Answer Key

What I Know

1.	D	9.	B
2.	C	10.	B
3.	D	11.	B
4.	C	12.	C
5.	D	13.	B
6.	D	14.	B
7.	A	15.	B
8.	C		

What's New

1. 8kph
2. 6:30 AM
1. 6:30 AM
2. 11/8/2003
3. For the public to be ready for the danger the typhoon might bring. Forecast for intensity and direction of typhoon will also be incorrect

What's In

M	H	R	W	I	N	D	S	P	E	D	L	H	B	D	Z	T
W	C	O	N	D	E	N	S	A	T	I	O	N	P	W	I	D	Y
A	C	J	B	J	Q	B	W	H	U	M	I	D	A	I	R	I	P
R	A	Y	N	O	B	S	T	A	C	L	E	A	I	L	X	S	H
M	T	R	M	O	U	N	T	A	I	N	R	A	N	G	E	S	O
O	A	P	T	V	A	P	O	R	I	Z	A	T	I	O	N	O	O
C	L	F	C	E	V	A	P	O	R	A	T	I	O	N	Z	L	N
E	Y	G	D	P	N	L	E	E	W	A	R	D	I	C	S	V	V
A	S	H	L	E	I	R	A	I	N	S	H	A	D	O	W	E	M
N	T	J	R	Q	U	G	T	F	O	P	E	Z	V	J	A	A	O
T	R	O	P	I	C	A	L	C	Y	C	L	O	N	E	S	G	H
P	I	W	I	N	D	W	A	R	D	K	R	B	Q	Y	F	D	Q

What I Can Do

1. Pacific Ocean
2. 12/15/2011
3. 12/18/2011
4. Northwest

What's More

1. location D.
2. Location F or eyewall
3. typhoon's intensity increases as distance from the eye also increases.

What I have Learned

1. Tropical cyclone
2. 26.5°C
3. Northwest
4. Weakened
5. Low/ high

Assessment

1.	D	8.	D
2.	D	9.	C
3.	F	10.	A
4.	E	11.	B
5.	C	12.	B
6.	A	13.	B
7.	B	14.	D
		15.	D

Additional Activities

1. 510 km east of Hinatuan / 9.0°N, 130°E
2. 65kph
3. 130 km west of Dipolog City, Zamboanga del Norte
4. 18 kph west
5. Dipolog City

Puerto Princesa
Dagasa Island
Eastern Visayas
Caraga
Davao Region
Bohol
Lanao del Norte/Sur
Maguindanao

References

A. Book

Campo, Pia, May Chaves, Maria Helen Catalan, PhD, Leticia Catris, PhD, Marlene Ferido, PhD, Ian Kendrich Fontanilla, PhD, Jacqueline Rose Gutierriez, et al. *Science-Grade 8 Learner's Module*. Philippines: FEP Printing Corporation, 2016.

B. Websites:

A satellite image of super typhoon Yolanda
https://www.ospo.noaa.gov/Organization/History/imagery/Haiyan/img/20131107_2230Zrgb.jpg?fbclid=IwAR0wWErolPmqKTiUt_hyeHQG0G3nqzjwjduk2u4KQlR3rVOmGMwup3l9Jqk

An image of weather bulletin Tropical Storm Vinta
https://reliefweb.int/report/philippines/pagasa-severe-weather-bulletin-3-tropical-storm-vinta-issued-at500-am-21-december

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