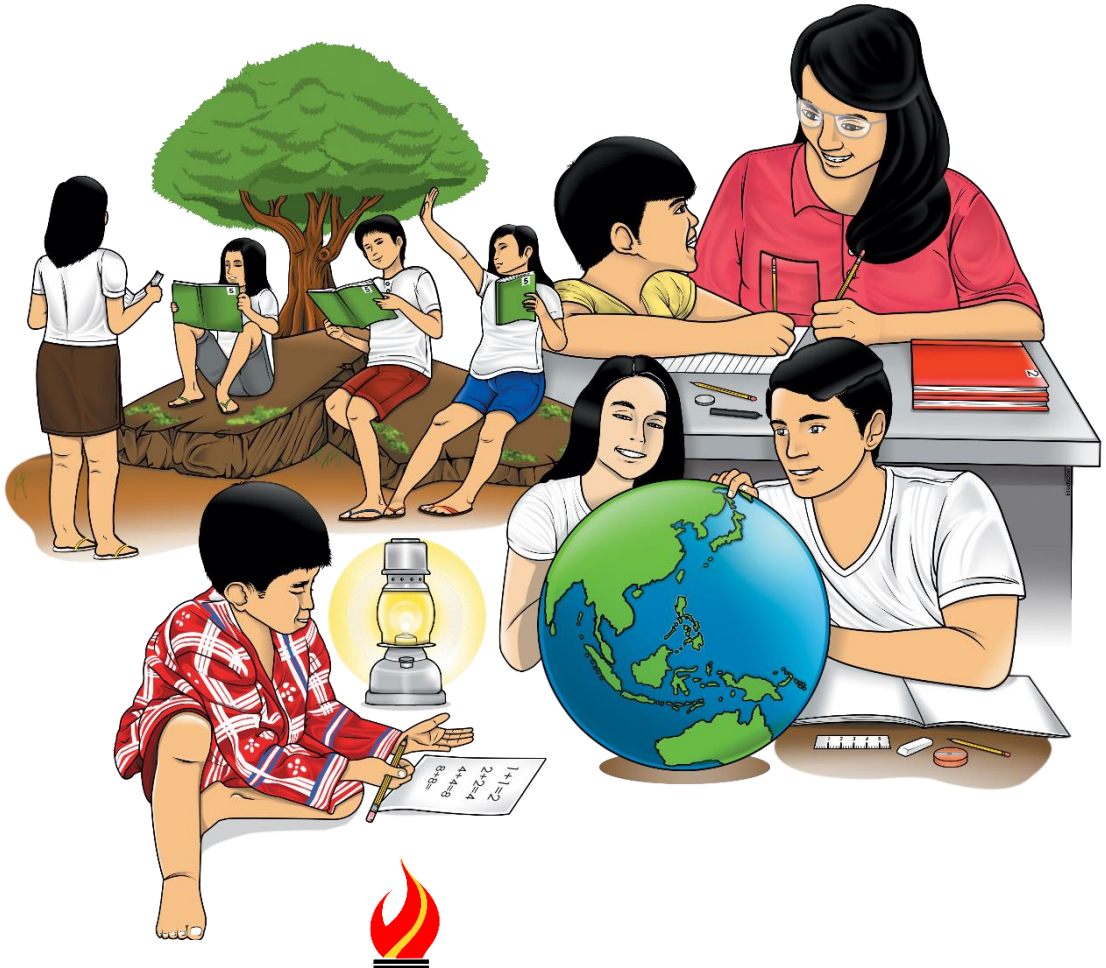
Senior High School

DepED
DEPARTMENT OF EDUCATION

Disaster Readiness and Risk Reduction

Quarter 2 – Module 6:

Hydrometeorological Hazards



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ADM

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Alternative Delivery Mode
Quarter 2 – Module 6: Hydrometeorological Hazards
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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.

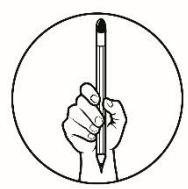
What I Need to Know

This module was designed and written with you in mind. It is here to help you master the Disaster Readiness and Risk Reduction. 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.

The Module is intended to equip you with knowledge concerning "Signs of impending hydrometeorological hazards; typhoon, thunderstorm, flashflood, flood, storm surge, El Niño and La Niña".

After going through this module, you are expected to:

1. Define hydro-meteorological hazards;
2. Identify different hydro-meteorological hazards;
3. Recognize the signs of impending hydro-meteorological hazards.
4. Improve creativity through brochure making about signs of hydro-meteorological hazards.
5. Value and apply the learned knowledge about hydrometeorological hazards.



What I Know

Read each item carefully and choose the best answer that corresponds to your answer.

1. Which of the following is an atmospheric, hydrological or oceanographic nature that may cause loss of life?
   a. acid rain
   b. geological hazard
   c. hydrometeorological hazard
   d. storm surge

2. Which of the following Hydro meteorological hazard is characterized by localized storm cloud that produces lightning and thunder, and often brings heavy rain shower and strong gusty winds?
   a. El Niño
   b. La Niña
   c. Storm Surge
   d. Thunderstorm

3. Which of the following is NOT a type of hydro-meteorological hazards?
   a. landslides
   b. locust plagues
   c. wildland fires
   d. all of the above

4. Which of the following hydrometeorological hazards has an overflow of water onto normally dry land in an existing waterway, such as a river, stream, or drainage ditch?
   a. El Niño
   b. Flood
   c. La Niña
   d. Storm Surge

5. Which of the following refers to the large-scale ocean-atmosphere climate interaction linked to a periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific?
   a. El Niño
   b. Flood
   c. La Niña
   d. Storm Surge

6. Which of the following hydro-meteorological hazards is the abnormal sea level rise occurring during tropical cyclones or "bagyo" and is caused by the strong winds and low atmospheric pressures that tropical cyclones produce?

a. El Niño
b. Flood
c. La Niña
d. Storm Surge

7. Which of the following is a violent, short-lived weather disturbance that is almost always associated with lightning, thunder, dense clouds, heavy rain or hail, and strong, gusty winds?

a. El Niño
b. Flood
c. La Niña
d. Storm Surge

8. It is the stage wherein the sun heats the Earth's surface during the day. The heat on the surface and warms the air around it.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

9. It is the stage when the cumulus cloud becomes very large, the water in it becomes large and heavy. Raindrops start to fall through the cloud when the rising air can no longer hold them up.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

10. It is the stage when the downdrafts in the cloud begins to dominate over the updraft. Since warm moist air can no longer rise, cloud droplets can no longer form.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

11. Which of the following predicting signs of a typhoon where clouds are often seen as fluffy, fair-weather cotton balls in the sky?

a. cloud color
b. towering clouds
c. arcing shelf clouds
d. cloud location and sun rays

12. It is a predicting sign of a typhoon where at first glance of this scene looks peaceful, with shafts of sunlight trickling through gaps in the clouds. A large number of smaller cumulus clouds in the foreground are beginning to build upward and are unusually dark.

a. cloud color
b. towering clouds
c. arcing shelf clouds
d. cloud location and sun rays

13. It is a predicting sign of a typhoon where a rotating wall cloud with a lowered cloud base is characteristic of a severe thunderstorm (supercell). It's the most obvious sign of a severe storm: twisting, rotating, and unusually quick-moving clouds.

a. cloud color
b. towering clouds
c. arcing shelf clouds
d. cloud location and sun rays

14. Which of the following factors contribute to flooding?

a. El Niño
b. cloud movements
c. slow moving thunderstorms
d. rainfall intensity and duration

15. Which of the following hydro meteorological hazards represents periods of below-average sea surface temperatures across the east-central Equatorial Pacific?

a. El Niño
b. La Niña
c. storm surge
d. thunderstorm

Lesson 6

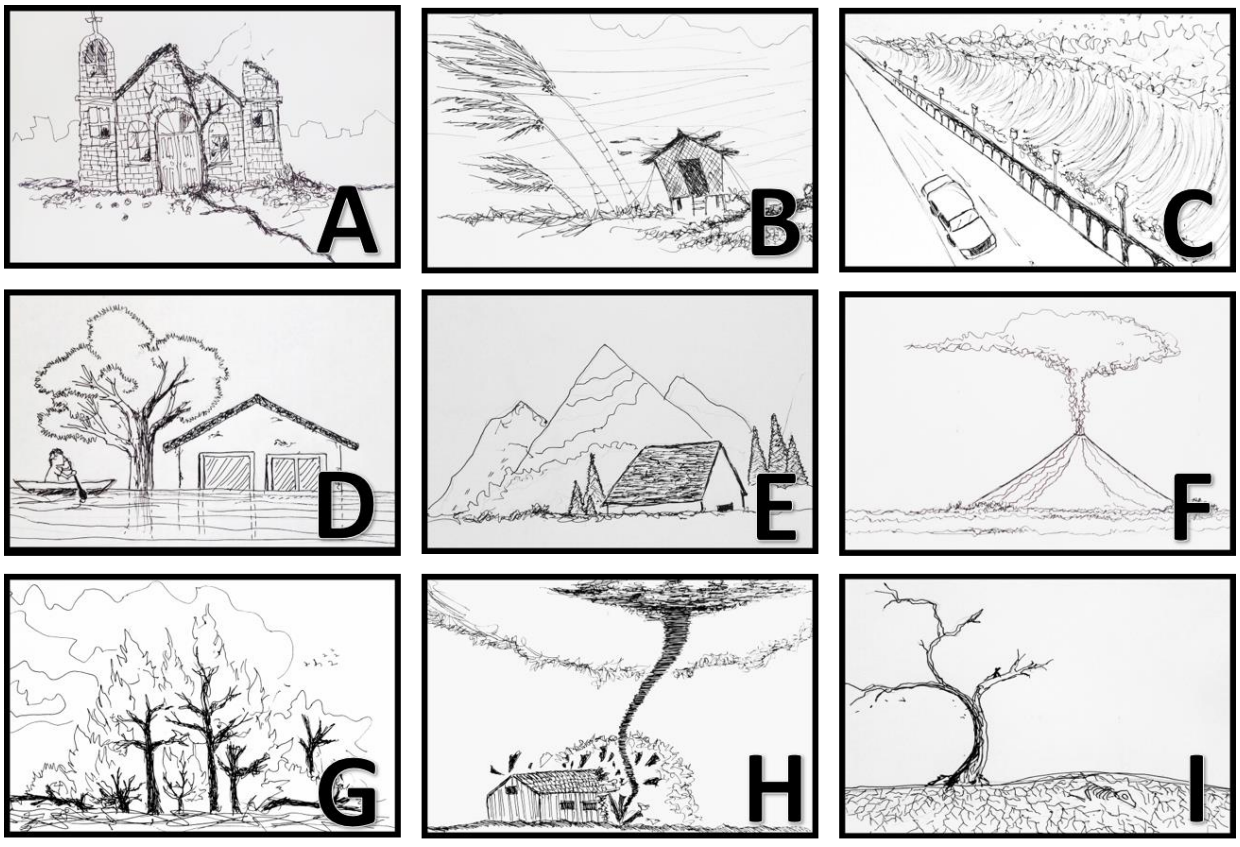
Signs of Impending Hydrometeorological Hazards

In this module, the term "hydrometeorological hazards" is taken to include the wide variety of meteorological, hydrological and climate phenomena which can pose a threat to life, property, and environment. These are probably the most frequently occurring and most extensively and routinely observed hazards. Hydrometeorological hazards have several unique characteristics which are especially significant in the early warning context. Hydrometeorological phenomena are often highly mobile and transboundary in nature and as a result, their impacts can be regional or even global.

What's In

Activity 1: Picture Perfect

Direction: Match the sketches with their corresponding terms. Then, if the sketch shows a geological hazard, write GEO; if it shows a hydrometeorological hazard, write HYDRO. Write your answers on the table that follows.



HAZARD	LETTER	CLASSIFICATION
1. Drought		
2. Flood		
3. Tsunami		
4. Landslide		
5. Bushfire		
6. Earthquake		
7. Tornado		
8. Typhoon		
9. Volcanic eruption		

Notes to the Teacher

This Lesson comprises of various activities. Ensure all students understand the lesson clearly and encourage them to answer each activity vigorously.

What's New

Activity 2.1:

Directions: Identify the Hydro-meteorological Hazard in the given pictures. Write your answer on a separate sheet.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

Activity 2.2

Jumbled Words

Directions: Given the definition of the jumbled words, write the correct term on the blank provided.

_____1. PHYNOTO - is a low-pressure area, or a wide and violent tropical cyclone. It rotates in the counterclockwise direction, with warm air rising above Western Pacific Ocean warm water. Many people on the other side of the planet name it storm or wily-wily.

_____ 2. LFODO - is characterized as superfluous water that swamps normally dry land and properties.

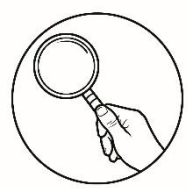
_____ 3. AÑNIAL - represents periods of under-average sea surface temperatures across the Equatorial Pacific in the east-central.

_____ 4. MRSTO GRSUE- is an abnormal rise in sea level during tropical cyclones or "bagyo".

_____ 5. MROTSREDNUHT – is local storm created by cumulonimbus clouds and are often accompanied by lightning and thunder, usually with strong wind gusts, heavy rain and occasionally hail and/or tornado.

_____ 6. ÑNOELI - refers to the large-scale ocean-atmosphere climate interaction linked to a regular warming of sea surface temperatures around the Equatorial Pacific region and east-center.

_____ 7. AFLSOHFLOD - is often caused by heavy rainfall in a short time span, typically less than 6 hours.

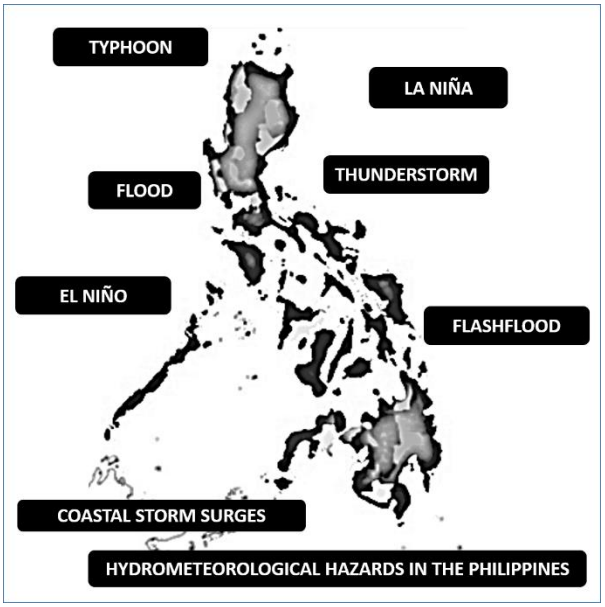


What is It

HYDROMETEOROLOGICAL HAZARDS

The Philippines being located in the Southeast Asia is considered very vulnerable to natural hazards and disasters, which include typhoons, earthquakes, floods, volcanic eruptions, landslides, and fires that affect the country and its inhabitants.

Surrounding the Pacific Ocean basin is a circular arm of active volcanoes known as the "Pacific Ring of Fire" in which most of the volcanoes in the Philippines are part of. Continental plate activities around this area result to volcanic eruptions and tsunamis in the country.



National Disaster Management Plan of 2016 stated that **HYDROMETEOROLOGICAL** is a process or phenomenon of atmospheric, hydrological or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Hydrometeorological hazards include:

1. Typhoon
2. Thunderstorm
3. Flood
4. Flashflood
5. Storm Surge
6. El Niño
7. La Niña

Hydrometeorological conditions lead to other hazards such as landslides, fires, plagues, epidemics and in transport and dispersal of toxic substances and volcanic eruption material.

Signs of Impending Hydro-meteorological Hazards

A. Tropical cyclone, also called **typhoon** or **hurricane**, an intense circular storm that originates over warm tropical oceans and is characterized by low atmospheric pressure, high winds, and heavy rain.

Philippine Atmospheric Geophysical and Astronomical Services Administration **(PAGASA)** stated that **WEATHER FORECAST** is a scientific estimate of future weather condition, wherein a weather condition is a state of the atmosphere at a given time expressed in terms of the most significant variables. In the Philippines, cloudiness, rainfall and wind are the weather parameters with significant variation, and therefore of interest to the forecast users.

How is a Weather Forecast Made?

Weather forecasting is done by a Meteorologist; he/she must know about the existing weather condition over a large area. The accuracy of forecast decision is based on forecasting tools known as the Weather Map.

The weather map displays the air pressure, wind, temperature, and humidity distribution trends at various atmospheric rates. There are two forms, namely the surface map and the upper-air maps, of the basic weather map. Weather forecasting comprises of 5 steps as follow:

1st Step: Observation

A meteorologist forecasts weather decision through surface observations at least every three hours over land and sea, and upper air stations at least every twelve hours.

Meteorological satellites, geostationary and polar orbiting, take pictures of the cloud imagery of the atmosphere. These satellites take pictures of the cloud formations of the earth every hour, and continually, respectively.

Weather radars are also used to track the position of the atmosphere within radar range. **A numerical weather prediction** is fed to the computer which analyzes data as programmed and makes a time integration of physical equations.

2nd Step: Collection and Transmission of Weather Data

Collection and Transmission of Weather Data are condensed into coded figures, symbols and numerals are transmitted via radiophone, teletype, facsimile machine or telephone to designated collection centers for further transmission to the central forecasting station. Weather satellite images are transmitted to receiving stations on the ground while radar measurements are transmitted through a local communication network to forecast centers.

3rd Step: Plotting of Weather Data

Observations on land and sea are plotted on charts of surface or mean sea level, which are prepared four times a day. Once the coded messages have been received, they are decoded, and each set of observations is plotted over the respective areas or regions in symbols or numbers on weather charts. Observations of radiosonde, theodolite, aircraft, and satellite wind are plotted on top-level charts that are prepared twice daily.

4th Step: Analysis of Weather Maps, Satellite and Radar Imageries and Other Data

Current weather maps are analyzed through different weather charts namely **SURFACE (MSL) CHART**, where data plotted on this weather map are analyzed isobarically. This means the same atmospheric pressure at different places are inter-connected with a line taking into consideration the direction of the wind; **UPPER AIR CHARTS,** data plotted on this weather map are analyzed using streamline analysis; **NUMERICAL WEATHER PREDICTION MODEL OUTPUT, t**he computer-plotted weather maps are analyzed manually so that weather systems like cyclones and anticyclones are located; and **MONITOR WEATHER CHARTS,** plotted cross-section data, rainfall charts and 24 hour pressure change charts are analyzed to determine wind wave movement, rainfall distribution and atmospheric pressure behavior.

https://www.namria.gov.ph/jdownloads/Others/PGM2016-_a_new_geoid_model_for_the_philippines_docx.pdf

5th Step: Formulation of the Forecast

Upon completion of review of all available meteorological information / data, the preparation of forecasts follows. The first and one of the preliminary steps is to determine the position of the various weather systems and the actual weather over a given area as accurately as the data permits.

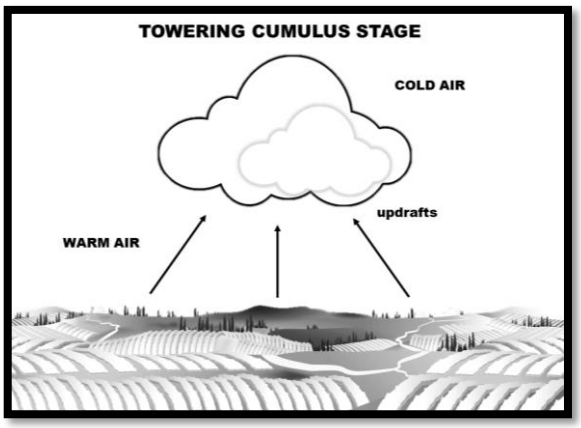
Department of Science and Technology, "**HOW A WEATHER FORECAST IS MADE**", December 2014, *http://bagong.pagasa.dost.gov.ph/learning-tools/how-weather-forecast-made*

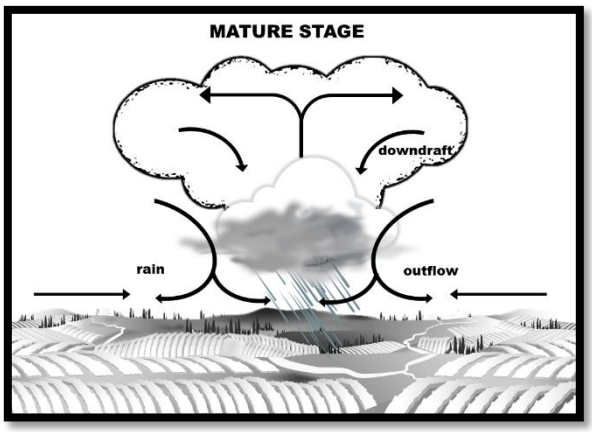
B. THUNDERSTORM

This is a powerful, short-lived weather disturbance, almost always associated with lightning, thunder, dense clouds, heavy rain or hail, and fast, roaring winds. Thunderstorms occur when layers of dry, moist air rise to cooler regions of the atmosphere in a broad, rapid updraft.

Thunderstorm forms through 3 stages known as **CUMULUS STAGE, MATURE STAGE and DISSIPATING STAGE.**

Cumulus Stage where the sun heats the Earth's surface during the day and warms the air around it.



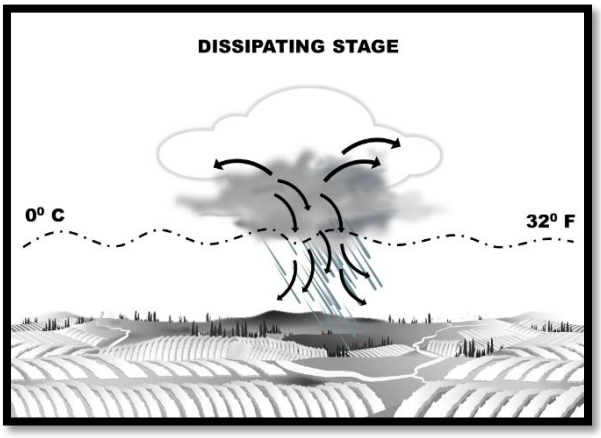


MATURE STAGE

A cumulus cloud becomes very large, where the water therein becomes large and heavy, and raindrops begin to fall through the cloud when the rising air can no longer hold them up.

DISSIPATING STAGE

After 30 minutes, thunderstorm begins to dissipate, this occurs when the downdrafts in the cloud begins to dominate over the updraft. Since warm moist air can no longer rise, cloud droplets can no longer form.



C. FLOOD & FLASHFLOOD

Flood is a high-water stage in which water overflows its natural or artificial banks onto normally dry land, such as a river inundating its floodplain. The effects of floods on human well-being range from unqualified blessings to catastrophes.

The Editors of Encyclopaedia Britannica, **"FLOOD"**, Encyclopædia Britannica, Inc, Encyclopædia Britannica, April 30, 2020, https://www.britannica.com/science/flood

Here are the main types of floods to look out for:

1. **Inland flooding** is the technical name for ordinary flooding that occurs in inland areas, hundreds of miles from the coast.
2. **Flash floods** are caused by heavy rain or the sudden release of water over a short period of time. The name "flash" refers to their fast occurrence and also to their raging torrents of water that move with great speed. **Flash floods** are also caused by heavy precipitation in a short period of time, usually less than 6 hours.
3. **River flooding** occurs when water levels in rivers, lakes, and streams rise and overflow onto the surrounding banks, shores, and neighboring land.
4. **Coastal flooding** is the inundation of land areas along the coast by seawater.
5. **Urban flooding** occurs when there is a lack of drainage in an urban (city) area.

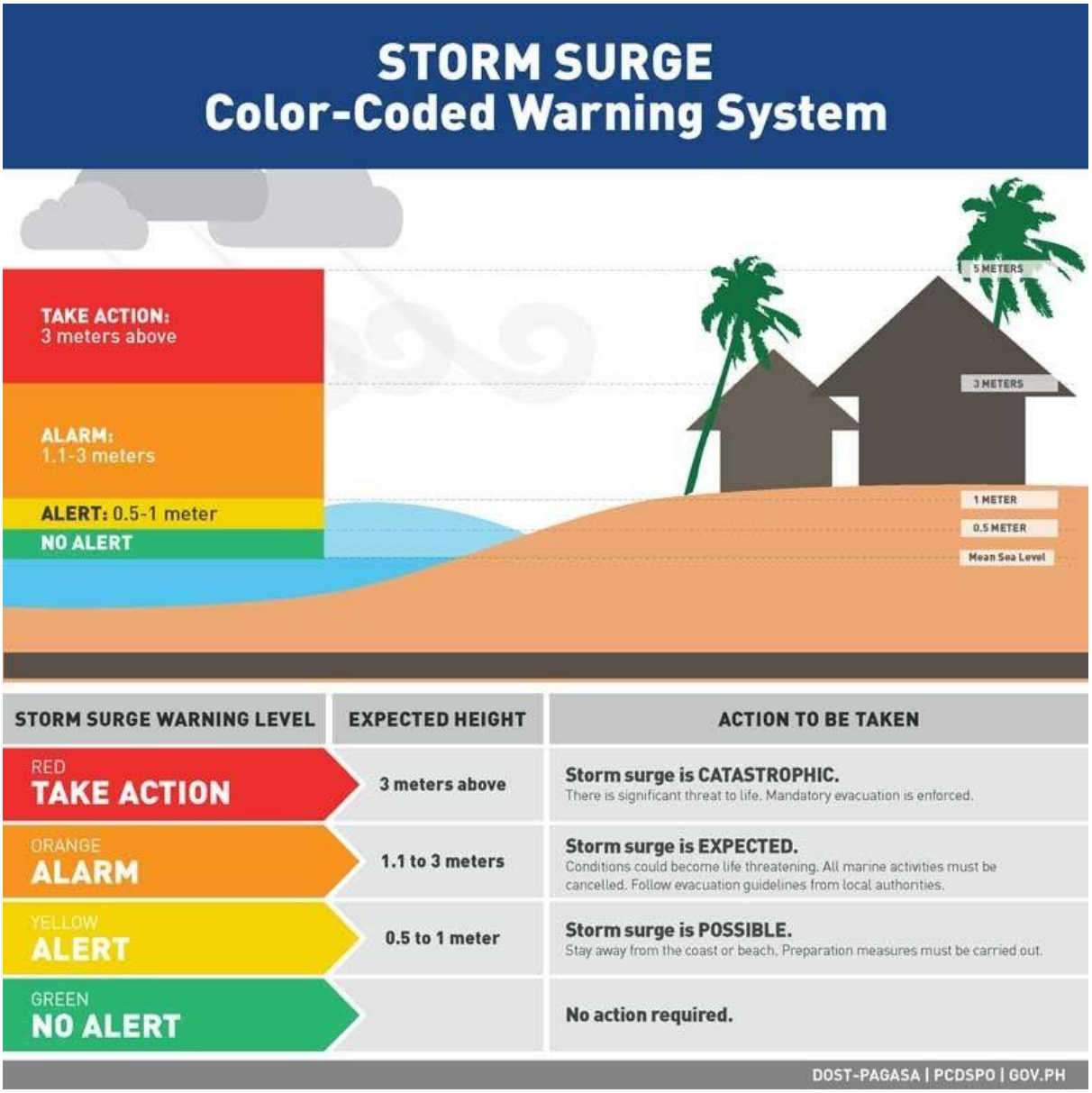
Means, Tiffany. "The Types of Flood Events and Their Causes." ThoughtCo, Feb. 11, 2020, thoughtco.com/the-types-of-flood-events-4059251

D. STORM SURGE

Storm surge or "Daluyong ng Bagyo" in the Philippine system where the irregular sea-level rise during tropical cyclone or "bagyo" occurs. When the tropical cyclone reaches the coast, powerful winds force the ocean water over the coastal low-lying areas, which can lead to flooding.

PAGASA takes many technological considerations into account when forecasting the negative impacts of a storm surge. For storm surge prone communities, the most important considerations are the strength of the tropical cyclone; the height of the surge, and the community located in the low-lying area.

The infographic below discusses the STORM SURGE WARNING LEVELS,



PAGASA (2019). Gen11 Storm Surge Warning System. https://media.philstar.com/photos/2019/06/17/gen11-storm-surge-warning-system_2019-06-17_23-15-34.jpg. Retrieved June 30, 2020.

E. EL NIÑO & LA NIÑA

EL NIÑO- means *The Little Boy*, or *Christ Child* in Spanish. El Niño was originally recognized by fishermen off the coast of South America in the 1600s, with the appearance of unusually warm water in the Pacific Ocean. The name was chosen based on the time of year (around December) during which these warm waters events tended to occur.

The term El Niño refers to the large-scale ocean-atmosphere climate interaction linked to a periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific.

LA NIÑA – means *The Little Girl* in Spanish. La Niña is also sometimes called *El Viejo*, *anti-El Niño*, or simply "*a cold event.*"

La Niña episodes represent periods of below-average sea surface temperatures across the east-central Equatorial Pacific. Global climate La Niña impacts tend to be opposite those of El Niño impacts. In the tropics, ocean temperature variations in La Niña also tend to be opposite those of El Niño.

Moravchik, Bruce, **"WHAT ARE EL NIÑO AND LA NIÑA?"**, National Oceanic and Atmospheric AdministrationU.S. Department of Commerce, October 2017, https://oceanservice.noaa.gov/facts/ninonina.html

El Niño and La Niña: What Are They?

Both El Niño and La Niña are opposite results of ENSO (El Niño Southern Oscillation), the same phenomenon. They are an oscillation in temperatures between the Eastern Equatorial Pacific region's atmosphere and ocean, roughly between the International Dateline and 20 degrees west. Building up between June and December, El Niño is caused by a change in wind patterns. Here, after Asia's summer monsoons, the Pacific Trade Winds struggle to replenish. The moist air contributes to an oscillation between the colder and warmer waters, resulting in warmer than average ocean temperatures.

Mason, Matthew, **"EL NIÑO AND LA NIÑA: THEIR IMPACT ON THE ENVIRONMENT"**, Environmental Science, April 2017, https://www.environmentalscience.org/el-nino-la-nina-impact-environment

El Niño & La Niña Affect Health Conditions

Extreme climatic conditions are characterized by the El Niño phenomenon; high temperature rises with a little rainfall, and extremely heavy rainfall occurs at the opposite end. According to the Philippines Department of Health, El Niño effects health such as

- Diseases related to water scarcity or shortage such as diarrhea and skin diseases
- Red Tide Blooms : Paralytic shellfish poisoning
- Disorders associated with high temperatures: heat cramps, heat exhaustion, exertional heat injury and heat stroke

Department of Health**, "EL NINO PHENOMENON"**, Department of Health.gov.ph, February 17, 2015, https://www.doh.gov.ph/Health-Advisory/El-Nino-phenomenon

La Niña is a weather phenomenon characterized by unusually cold ocean temperature in the Equatorial Pacific which causes increased numbers of tropical storms in the Pacific Ocean. According to the Philippines Department of Health, La Niña effects Health through Disease related to contaminated water due to flooding, such as acute gastroenteritis, typhoid fever, cholera and hepatitis A; Disease related to wading in floodwaters contaminated with urine of infected animals, such as leptospirosis; Disease brought by mosquitoes, such as dengue and malaria; Accidents and injuries such as contusions, lacerations, fractures, electrocution.

- Stronger winds along the equatorial region, especially in the Pacific,
- Decreased convection in the Pacific leading to a weaker jet stream temperatures are above average in the southeast and below average in the northwest,
- Conditions are more favourable for hurricanes in the Caribbean and central Atlantic area,
- Greater instances of tornados in those states of the US already vulnerable to them

Department of Health, **"LA NINA PHENOMENON"**, Department of Health.gov.ph, February 17, 2015, https://www.doh.gov.ph/Health-Advisory/La-Nina-phenomenon

What's More

Activity 1: Tell me!

Direction: Analyze the picture below and answer the questions that follows.

Penaredondo, Ernie (2009). FLOODS, photograph. *Global Water Partnership – a water secure world.* https://www.flickr.com/photos/globalwaterpartnership/4682586822/in/photostream/. Licensed under CC BY-NC-SA 2.0. https://creativecommons.org/licenses/by-nc-sa/2.0/?ref=ccsearch&atype=rich

Guide Questions:

1. What can you say about the picture? Describe it.
   _____
   _____
2. What situation have you noticed to be disastrous?
   _____
   _____
3. What hydrometeorological hazard was presented in the picture?
   _____
   _____
   _____
4. Based on what you have noticed and analyzed, what can you do to avoid this situation?
   _____

What I Have Learned

ACTIVITY 1 - <u>DEFINE HYDRO-METEOROLOGICAL HAZARDS</u>

Directions: Fill in the boxes with the correct words/phrases to complete the meaning of HYDRO-METEOROLOGICAL HAZARDS. Refer to the words and phrases in the box. The first word has been done for you.

HYDROMETEOROLOGICAL HAZARDS is…

a process phenomenon of

↓

↓

↓

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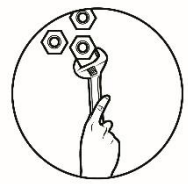
WORD HINT
health impacts
atmospheric
loss of livelihoods and services
hydrological
that may cause
loss of life
injury
property damage
social and economic disruption
oceanographic nature
environmental damage



What I Can Do

Activity 2: Be Prepared

Direction: Create a **Be Prepared Brochure** about the signs of hydro-meteorological hazard exposure. Visit a community using google map (you can choose your own community or barangay). Determine all the elements exposed to hydro-meteorological hazard in the locality. Use your resources to create a creative brochure. Be creative and include emergency hotlines as much as possible. You will be graded based on rubrics given.

The **Be Prepared Brochure** will be assessed based on the following rubric:

Assessment Criteria Dimensions	**VS - 5**	**S - 3**	**NI - 1**
1. Quality: Workmanship, Appearance			
2. Accuracy: Dimension;(optional) Accurate function of the elements			
3. Objectives: Specific **M**easurable **A**ttainable **R**ealistic & **T**ime-bound objectives			
4. Speed: Submission on time +1, before the expected time +2, after the expected time – 2			

Rating Scale:

VS – Very Satisfactory = 15 – 11
S – Satisfactory = 10 – 5
NI – Needs Improvement = 6 and below

DepEd PUBLIC TECHNICAL-VOCATIONAL HIGH SCHOOLS, **"COMPETENCY BASED-LEARNING MATERIALS"**, Department of Education 2008, First Published JUNE 2008, P.65

Assessment

Directions: Read each item carefully and choose the best answer that corresponds to your answer.

1. Which of the following hydro meteorological hazards represents periods of below-average sea surface temperatures across the east-central Equatorial Pacific?
   a. El Niño
   b. La Niña
   c. storm surge
   d. thunderstorm

2. Which of the following Hydro meteorological hazard is characterized by localized storm cloud that produces lightning and thunder, and often brings heavy rain shower and strong gusty winds?
   a. El Niño
   b. La Niña
   c. Storm Surge
   d. Thunderstorm

3. It is a predicting sign of a typhoon where a rotating wall cloud with a lowered cloud base is characteristic of a severe thunderstorm (supercell). It's the most obvious sign of a severe storm: twisting, rotating, and unusually quick-moving clouds.
   a. cloud color
   b. towering clouds
   c. arcing shelf clouds
   d. cloud location and sun rays

4. Which of the following hydro meteorological hazards has an overflow of water onto normally dry land in an existing waterway, such as a river, stream, or drainage ditch?
   a. El Niño
   b. Flood
   c. La Niña
   d. Storm Surge

5. Which of the following refers to the large-scale ocean-atmosphere climate interaction linked to a periodic warming in sea surface temperatures across the central and east-central Equatorial Pacific?
   a. El Niño
   b. Flood
   c. La Niña
   d. Storm Surge

6. It is a predicting sign of a typhoon where clouds are often seen as fluffy, fair-weather cotton balls in the sky.

a. cloud color
b. towering clouds
c. arcing shelf clouds
d. cloud location and sun rays

7. Which of the following is a violent, short-lived weather disturbance that is almost always associated with lightning, thunder, dense clouds, heavy rain or hail, and strong, gusty winds?

a. El Niño
b. Flood
c. La Niña
d. Storm Surge

8. It is the stage wherein the sun heats the Earth's surface during the day. The heat on the surface and warms the air around it.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

9. It is the stage when the cumulus cloud becomes very large, the water in it becomes large and heavy. Raindrops start to fall through the cloud when the rising air can no longer hold them up.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

10. It is the stage when the downdrafts in the cloud begins to dominate over the updraft. Since warm moist air can no longer rise, cloud droplets can no longer form.

a. cumulus stage
b. dissipating stage
c. immature stage
d. mature stage

11. Which of the following hydro-meteorological hazards is the abnormal sea level rise occurring during tropical cyclones or "bagyo" and is caused by the strong winds and low atmospheric pressures that tropical cyclones produce?

a. El Niño
b. Flood
c. La Niña
d. Storm Surge

12. It is a predicting sign of a typhoon where at first glance of this scene looks peaceful, with shafts of sunlight trickling through gaps in the clouds. A large number of smaller cumulus clouds in the foreground are beginning to build upward and are unusually dark.

a. cloud color
b. towering clouds
c. arcing shelf clouds
d. cloud location and sun rays

13. Which of the following is NOT a type of hydro-meteorological hazards?

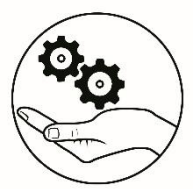
a. landslides
b. locust plagues
c. wildland fires
d. all of the above

14. Which of the following factors contribute to flooding?

a. El Niño
b. cloud movements
c. slow moving thunderstorms
d. rainfall intensity and duration

15. Which of the following is an atmospheric, hydrological or oceanographic nature that may cause loss of life?

a. acid rain
b. geological hazard
c. hydrometeorological hazard
d. storm surge



Additional Activities

Instructions:

As a student you should conduct a research for warning systems on your respective barangays. Describe the warning systems they had and analyze how would it help the community for public preparedness.

_____
_____
_____
_____
_____
_____

Answer Key

ASSESSMENT

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

What's New

Activity 2

1.TYPHOON

2. FLOOD

3. STORMSURGE

4. EL NIÑO

5. THUNDERSTORM

6. FLASHFLOOD

What's In

Picture Perfect

HAZARD	LETTER	CLASSIFICATION
1. Drought	I	GEO
2. Flood	D	HYDRO
3. Tsunami	C	GEO
4. Landslide	E	GEO
5. Bushfire	G	HYDRO
6. Earthquake	A	GEO
7. Tornado	H	HYDRO
8. Typhoon	B	HYDRO
9. Volcanic eruption	F	GEO

What I Know

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

What I Have Learned

ACTIVITY 1 - DEFINE HYDRO-METEOROLOGICAL HAZARDS

HYDROMETEOROLOGICAL Hazards is a process or phenomenon of atmospheric, hydrological or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

What's More

1.Thousands of Families Affected When Tropical Storm (Sendong) Hit Philippines

2.People are stranded in the flood during the storm hits the Philippines

3. Flooding and people stranded in the area.

4. Be prepared and listen and follow the given advice by the authority.

Activity 2.2

Jumbled Words

1.TYPHOON

2. FLOOD

3. La Nina

4. storm asurge

5.thunderstorm

6. El Nino

7. Flashflood

References:

Ochea, Carmela**, "DIFFERENT TYPES OF HYDROMETEOROLOGICAL HAZARDS",** Wordpress, Jan 24, 2018 https://carmelaochea.wordpress.com/2018/01/24/different-types-of-hydrometeorological-hazards/

Department of Science and Technology, "**HOW A WEATHER FORECAST IS MADE**", December 2014, *http://bagong.pagasa.dost.gov.ph/learning-tools/how-weather-forecast-made*

Department of Health**, "EL NINO PHENOMENON"**, Department of Health.gov.ph, February 17, 2015, https://www.doh.gov.ph/Health-Advisory/El-Nino-phenomenon

Department of Health, **"LA NINA PHENOMENON"**, Department of Health.gov.ph, February 17, 2015, https://www.doh.gov.ph/Health-Advisory/La-Nina-phenomenon

Department of Science and Technology, "**HOW A WEATHER FORECAST IS MADE**", December 2014, *http://bagong.pagasa.dost.gov.ph/learning-tools/how-weather-forecast-made*

Namria, https://www.namria.gov.ph/jdownloads/Others/PGM2016-_a_new_geoid_model_for_the_philippines_docx.pdf

Flores, Helen, **"PAGASA LAUNCHES UPGRADED STORM SURGE WARNING SYSTEM"**, Philippine Star, June 18, 2019 https://www.philstar.com/headlines/2019/06/18/1927465/pagasa-launches-upgraded-storm-surge-warning-system

Hatheway, Becca, ***"THUNDERSTORM FORMATION"****, Windows to the Universe, May 27, 2010* https://www.windows2universe.org/earth/Atmosphere/tstorm/tstorm_formation.html

Mason, Matthew, "EL NIÑO AND LA NIÑA: THEIR IMPACT ON THE ENVIRONMENT", Enviromental Science, April 2017, https://www.environmentalscience. org/el-nino-la-nina-impact-environment

Means, Tiffany. "**THE TYPES OF FLOOD EVENTS AND THEIR CAUSES.**" ThoughtCo, Feb. 11, 2020, thoughtco.com/the-types-of-flood-events-4059251

Moravchik, Bruce, **"WHAT ARE EL NIÑO AND LA NIÑA?"**, National Oceanic and Atmospheric AdministrationU.S. Department of Commerce, October 2017, https://oceanservice.noaa.gov/facts/ninonina.html

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