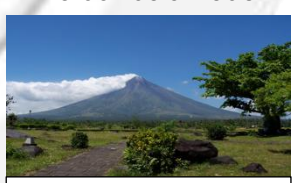
W1	Learning Area	Science	Grade Level	Grade 9
	Quarter	Third	Date	

I. LESSON TITLE	Volcanoes
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Describe the different types of volcanoes and volcanic eruption.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		This module was designed to help you master knowledge and concepts about Volcanoes. The scope of this module permits it to be used in many different learning situations. 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 describe the different types of volcanoes and volcanic eruption.
B. Development ***Pagpapaunlad***		What is a volcano? Volcanoes are similar to mountains; however, they have opening where the magma in Earth's mantle are pushed upward as lava. One of the famous volcanoes is the Mayon Volcano, also known as Mount Mayon, in the province of Albay. Volcanoes are evidence that earth is active. Volcanoes are a key part of the Earth system. Most of Earth's atmosphere, water, and crust were delivered by volcanoes, and volcanoes continue to recycle earth materials. Your journey in this module will greatly enhanced your knowledge about volcanoes in our country. From your previous discussions in grade 7, you have learned that the Philippines is found in the Pacific Ring of Fire. In grade you already learned about earthquakes, now it is time to move to another lesson which is related to what you have learned: Volcanoes. **Activity: Wonders in our Country** Philippines is home to about 300 volcanoes. Three of the magnificent volcanoes in our country are illustrated below. Carefully look at each illustration and let's try to describe and differentiate these volcanoes. Write your description of each volcano in the box below each image (Mayon, Taal & Batulao).  Source: "Mount Mayon" by Chris & Anya is licensed under CC BY 2.0  Source: "Taal Volcano" by reggiepen is licensed under CC BY 2.0  Source: "Mt. Batulao and the Stars" by Mike Penaranda is licensed under CC BY-NC-SA 2.0 Looking at the physical appearance of volcanoes, there are obvious differences among one another. Let's further analyze what volcanoes are by answering the questions below. What is a volcano? _____ What is/are the difference(s) among the three volcanoes above? _____

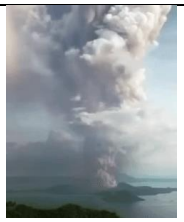
IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		What do you think is the cause of their difference(s)? _____ We humans are always impressed on things much bigger than us. Looking at a volcano will surely be mesmerized you in its height and depth. On the other the Taal volcano is very special on its much smaller size as compared to Mayon volcano. If it is not the size, then what characteristic distinguishes volcanoes from other landforms? Volcano is an opening in the Earth's surface where molten rocks, smoke, gases, and ashes are erupted. It is not necessarily that volcano should be high or steep. Some volcanoes, like Taal loses its height as it erupts which is also a characteristic of volcanoes. Molten rocks, called magma piles up inside a volcano until it cannot be held inside initiating an eruption. This can cause destruction of the actual structure of volcano resulting to new physical appearance. Volcanoes with recorded eruption within the last 600 years are classified as *active* volcanoes. Though, some landforms with evidence that also erupted prior to written history (up to 10,000 years ago) are also classified as active. On the other hand, those that still not erupt for the past 10,000 years are called *inactive* volcanoes.
C. Engagement ***Pakikipagpalihan***		Now that you have a learned that volcanoes are classified as active and inactive, we'll now proceed on the difference in their physical appearance. Though there are a lot of volcanoes in our country, it is seldom that we are able to see more than one volcano given that travelling is a bit expensive. Let's try to imagine other volcanoes given some of their features. Use the given characteristics below, try to and illustrate the three described volcanoes. Volcano 1 / Volcano 2 / Volcano 3 BIG ISLAND SIZE / SMALL SIZE / LARGE SIZE BROAD / STEEP SLOPE (almost vertical) / NEARLY PERFECT SLOPE (like triangle) SLIGHTLY DOMED / BOWL – SHAPED OPENING / ALMOST SYMMETRICAL Illustrate Volcano 1 here / Illustrate Volcano 2 here / Illustrate Volcano 3 here Do all your illustrations appear like a typical volcano in your mind? (Which one do? Which one do not?) Gazing on the images of Mt. Mayon in many of you as a child, you often associate volcanoes to tallness and having a perfect shape. Looking on Taal Volcano will let you think that eruptions destroy the great features of a volcano. On the other hand, volcanoes are not bounded to a certain physical features and shapes. Volcano 3 in the activity describes Mt. Mayon and all other *composite* volcanoes. This volcanic shape features high elevation with a slope like the sides of a triangle. Mt. Mayon is a wonder in the world because of its almost perfect cone shape and this is a very special case and not the shape to be expected for all volcanoes. Some volcanoes are naturally small with a very steep slope which is describe in Volcano 2. This type of volcanic shape is called *cinder* volcano. Even though Taal Volcano is a small volcano it doesn't necessarily classified as cinder volcano. Taal is a composite volcano like almost all other volcanoes found in the Philippines and the Pacific Ring of Fire. Features of Taal was destroyed after an inferred massive eruption before

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities

written history. Cinder volcanoes are formed in a short period of time with size and shape like a hill (try to recall the images of Chocolate Hills). These volcanoes are made out of lava that accumulated and solidified together. Lastly, Volcano 1 refers to a volcano which is much unlikely to our standards of a typical volcano. *Shield* volcanoes are extremely huge volcanoes as big as the islands of Hawaii. They are not high and have a very broad shape with almost no slope. To compare its size to other volcanoes, there are almost 100 hundred identified cinder volcanoes in Mt. Kilauea, a shield volcano in the island of Hawaii.

Volcanoes have different shapes because of the different ways on how they are formed. The explanation for this would be discussed on Grade 10. For now, let us continue on the different types of eruptions of these volcanoes.

Since you are already familiar with the types of volcanoes, this time we are going to explore the different types of volcanic eruptions. According to Philippine Institute of Volcanology and Seismology (PHIVOLCS), Philippines sits on an ideal place where volcanoes form. Our country has 300 named and unnamed volcanoes, 23 of which are considered to be active, 27 potentially active and the rest are inactive. Since you are already aware that our country has many volcanoes, it is time for us to be prepared. We can never tell when volcanic eruption will occur. What do you think will happen when volcanoes erupt? The types of volcanic eruptions are Phreatic or Hydrothermal, Phreatomagmatic, Strombolian, Vulcanian and Plinian. The type of volcanic eruption depends on the water content of the magma.

TYPE	***DESCRIPTION***	***EXAMPLE***
1. Phreatic or hydrothermal	*Steam-driven eruption as the hot rocks come in contact with water. It is short- lived, characterized by ash columns but may be an onset of a larger eruption.*	 "File:Phreatic eruption of Taal Volcano, 12 January 2020 (reduced).gif" byBuszmail is licensed under CC BY-SA 4.0
2. Phreatomagmatic	*Violent eruption due to the contact between water and magma. As a result, a large column of very fine ash and high-speed and sideway emission of pyroclastic called base surges are observed*	 https://www.swisseduc.ch/stromboli/perm/krakatau/ash-column-en.html
3. Strombolian	*Periodic weak to violent eruption characterized by fountain lava.*	 "Strombolian Eruptions at Stromboli" by robnunn is licensed under BB BY-NC 2.0
4. Vulcanian	*Tall eruption columns that reach up to 20 km high with pyroclastic flow and ash fall tephra*	 http://www.photovolcanica.com/VolcanoInfo/Stromboli/Stromboli.htmlen.html

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		5. *Plinian* — *Excessively explosive type of eruption of gas and pyroclastic* —  https://www.swisseduc.ch/stromboli/glossary/plinian-en.html
D. Assimilation ***Paglalapat***		Multiple Choice. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper. 1. How can you classify a volcano that have no recorded eruption but have evidence that erupted for the last 10,000 years? A) active C) old B) inactive D) young 2. Which of the following is the shape of a volcanic island? A) Shield C) Caldera B) Cinder D) Composite 3. Which of the following analogy is TRUE about the volcanic shape and its description? A) Shield: smallest C) Cinder: smallest B) Caldera: largest D) Composite: largest 4. Taal volcano erupted in the year 1965 due to contact of water and hot rocks. How can this volcanic eruption be classified? A) Phreatic C) Strombolian B) Vulcanian D) Phreatomagmatic 5. Which of the following analogy is correct about volcanic eruptions and its cause? A) phreatic: hot rock and magma B) phreatomagmatic: magma and water C) phreatic: hot rock and pressure D) phreatomagmatic: pressure and water
V. ASSESSMENT		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

Prepared by:	Lea C. del Pozo	**Checked by:**	Job S. Zape, Jr.

Personal Assessment on Learner's Level of Performance

Using the symbols below, choose one which best describes your experience in working on each given task. Draw it in the column for Level of Performance (LP). Be guided by the descriptions below.

☆ - I was able to do/perform the task without any difficulty. The task helped me in understanding the target content/lesson.

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Learning Task	LP	Learning Task	LP	Learning Task	LP	Learning Task	LP
Number 1		Number 3		Number 5		Number 7	
Number 2		Number 4		Number 6		Number 8	

W2	Learning Area	Science	Grade Level	Grade 9
	Quarter	Third	Date	

I. LESSON TITLE	Volcanoes
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Explain what happens when volcanoes erupt.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		This module was designed to help you master knowledge and concepts about Volcanoes. The scope of this module permits it to be used in many different learning situations. 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 explain what happens when volcanoes erupt.
B. Development ***Pagpapaunlad***		On January 12, 2020 shocked many Filipinos because of the Taal volcano eruption. Ashes were spewed from the main crater across Calabarzon, Metro Manila and some parts of Central Luzon and Ilocos Region resulting in the suspension of classes and work in the area. PHIVOLCS or Philippine Institute of Volcanology and Seismology issued an Alert Level 4 indicating that a hazardous explosive eruption is possible. The volcano erupted 43 years after its previous eruption in 1977. PHIVOLCS advised evacuation of the towns within the shores of Taal Lake. The National Disaster Risk Reduction and Management Council (NDRRMC) and the Philippine Institute of Volcanology and Seismology (PHIVOLCS) have reported a total of 2,484 earthquakes on the vicinity of the volcano since the eruption, 173 of which were felt. Volcanic eruption is common to our country since our location is along the Pacific Ring of Fire. In this module you will discover how volcanoes erupt. From your previous discussions in week 1, you have learned the different types of volcanoes and volcanic eruptions. What you have learned from the previous module will help you in understanding better what happens when there is volcanic eruption. Before we proceed to how volcanoes erupt, let us first answer the question: What triggers an eruption? Have you ever wondered why volcanoes erupt? Tectonic plates are the key. Moving tectonic plate can cause earthquakes, which then creates fissures that allows the magma to escape. These tectonic plates move towards, away or alongside one another which can also trigger volcanic eruption. ***Activity: What Happens When There is Volcanic Eruption?*** After understanding what causes volcanic eruption, let us analyze what happens when there is volcanic eruption. Using the pictures below, answer the questions that follows.  "Volcán Tungurahua" by Diario Crítico Venezuela is licensed under CC BY 2.0  "EP-140909584d" by Sparkle Motion is licensed under CC BY 2.0

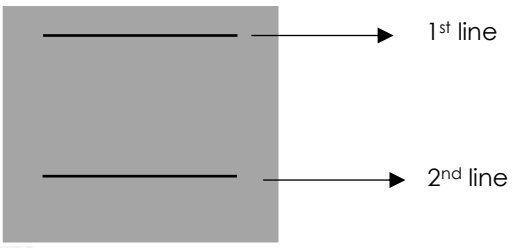
IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		What is volcanic eruption? _____ How can you differentiate the volcanic eruptions from the pictures? _____ What do you think is the cause of their difference? _____ Eruptions vary depending on the type of volcano and the different types of tectonic boundary they sit on. At destructive boundaries - where tectonic plates are moving towards each other - you'll find composite volcanoes. Composite volcanoes have very sticky and thick lava, which can make them very explosive when they erupt: gas bubbles that are trapped in the magma chamber find it hard to escape through the viscous rock. They can also spurt lots of hot ash and rocks into the air, making them extremely dangerous. Shield volcanoes on the other hand form at constructive tectonic boundaries (where the tectonic plates move away from each other) and have very thin, runny lava. This means that when a shield volcano erupts, the lava is extremely fast and can cover large areas very quickly. Some of the most famous examples of shield volcanoes make up the islands of Hawaii. One of them, Mauna Loa, is actually the largest volcano on the planet.
C. Engagement ***Pakikipagpalihan***		**More on Volcanic Eruptions** What determines the nature of eruption? There are primary factors affecting the volcanoes' eruptive style, namely: the *magma's temperature, its chemical composition, and the amount of dissolved gases* it contains. These factors can affect the magma's viscosity in different ways. Viscosity is the property of the material's resistance to flow. It is also described as the liquid's thickness and stickiness. The more viscous and thicker the material is, the greater is its resistance to flow. Example: syrup is more viscous that water **Temperature and Viscosity** The higher the temperature of magma is, the lower is its viscosity. As lava flows, it cools and begins to harden, its ability to flow decreases and eventually it stops. **Composition of Magma and Viscosity** Magma with high silica content is more viscous than those with low silica content. The magma with less silica is relatively fluid and travels far before solidifying. **Amount of Dissolved Gases and Viscosity** The amount of gas (mainly water vapor) dissolved in magma tends to increase its ability to flow. Therefore, in near-surface environments, the loss of gases makes magma more viscous, forming a dome or a columnar as shown in the figure below. To understand more about viscosity, do the following activity. **Activity: Viscosity Race** *Objectives:* ▪ Determine the viscosity of some liquids. ▪ Describe the flow of gas in different liquids. *Materials:* ▪ chopping board ▪ clear drinking glass ▪ drinking straw ▪ timer (cellphone stopwatch)

<table>
<tr><th>IV. LEARNING PHASES</th><th>Suggested Timeframe</th><th>Learning Activities</th></tr>
<tr><td></td><td></td><td>

water
syrup or honey
cooking oil
ketchup

Procedure:
Part A

Before doing the activity, predict which liquid (water, syrup, honey and cooking oil) takes the least amount of time to reach the tray. Which liquid will take the most amount of time?
Pour the liquids down the chopping board one at a time. (Use the same amount of liquid each time.)
Start the timer as the liquid passes over the first line and stop when it passes the second.
Repeat for all liquids and do it three times for each liquid.



chopping board
<table>
<tr><th rowspan="2">Liquid</th><th colspan="4">Travel Time</th></tr>
<tr><th>1st</th><th>2nd</th><th>3rd</th><th>Average</th></tr>
<tr><td>water</td><td></td><td></td><td></td><td></td></tr>
<tr><td>syrup/honey</td><td></td><td></td><td></td><td></td></tr>
<tr><td>cooking oil</td><td></td><td></td><td></td><td></td></tr>
<tr><td>ketchup</td><td></td><td></td><td></td><td></td></tr>
</table>
Guide Questions:

Is your prediction correct?
Which liquid is the most viscous? How do you know?
Which is the least viscous?
Compare how these liquids flow with how you think lava flows. Why does some lava travel faster than others?

Part B

Put 100 mL syrup in a clear glass.
Using a drinking straw, blow some air from the bottom of the liquid. Observe.
Repeat procedure 2 by blowing harder from the bottom of the liquid. Observe.

Guide Questions:

Compare the movement of the liquid as the bubbles move on the surface.
In this activity, you have observed that different liquids have different viscosities. If the liquid represents the magma, then its rate of flow depends on several factors.

</td></tr>
<tr><td>D. Assimilation
Paglalapat</td><td></td><td>Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.</td></tr>
</table>

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		1. Why volcanoes erupt? I. Because of moving tectonic plates II. Because of earthquakes III. Because of the movement of magma A. I B. II C. I and II D. I, II, and III 2. _____ volcanoes have very sticky and thick lava, which can make them very explosive when they erupt. A. composite B. cinder C. shield D. composite, cinder, and shield 3._____ volcanoes have a lava that is extremely fast and can cover large areas very quickly. A. composite B. cinder C. shield D. composite, cinder, and shield 4. Wat is/are the factor/s that affect/s volcanoes' eruptive style? I. magma's temperature, II. chemical compositio III. amount of dissolved gases A. I B. II C. I and II D. I, II, and III 5. The _____ temperature of the magma, the _____ is its viscosity. A. higher, higher B. lower, lower C. higher, lower D. lower, higher
V. ASSESSMENT		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

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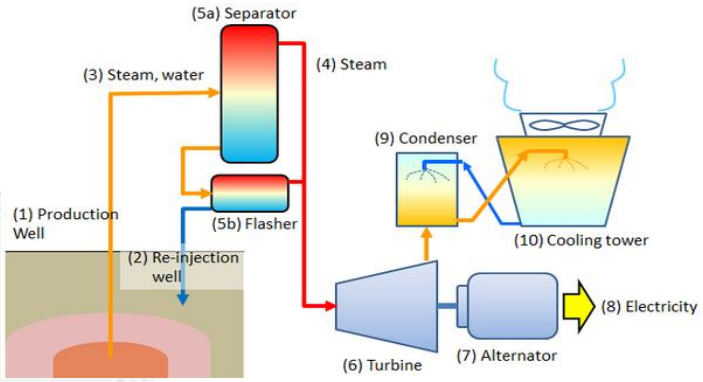
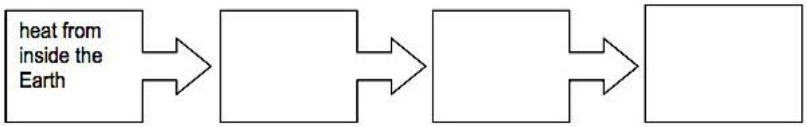
Learning Task	LP	Learning Task	LP	Learning Task	LP	Learning Task	LP
Number 1		Number 3		Number 5		Number 7	
Number 2		Number 4		Number 6		Number 8	

W3	Learning Area	Science	Grade Level	Grade 9
	Quarter	Third	Date	

I. LESSON TITLE	Volcanoes
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Illustrate how energy from volcanoes may be tapped for human use.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		This module was designed to help you master knowledge and concepts about Volcanoes. The scope of this module permits it to be used in many different learning situations. 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 illustrate how energy from volcanoes may be tapped for human use.
B. Development ***Pagpapaunlad***		Since our country is a home to more than a hundred of volcanoes, the question is can we use volcanoes to our advantage? The answer is yes! We can use volcanoes as a source of geothermal energy. Actually, the Philippines ranked second in the world's production of geothermal energy. This energy is used in powerplants to generate electricity. The production of electricity from geothermal energy is cheaper than the electricity produced using natural gas, coal and hydropower. From your previous discussions in week 2, you have learned that volcanic eruptions depend on the type of volcano and the different types of tectonic boundary they sit on. There are also factors that affect the volcanoes' eruptive style, namely: the magma's temperature, its chemical composition, and the amount of dissolved gases it contains. Whenever there is volcanic eruptions people are afraid because they know that very hot materials comes out. These materials that come out of the volcanoes are very hot because where they came from is very hot as well. The heat from deep inside the Earth is a source of energy which is called geothermal energy which can be harnessed to generate electricity. **Geothermal Power Plants** In geothermal power plants, the heat from deep inside the Earth is used to produce steam to generate electricity. To harness energy, deep holes are drilled in the earth until a significant geothermal heat source is found. When the heat source has been discovered, a pipe is attached deep down inside the hole which allows hot steam (vapor into which water is converted when heated) from deep within the earth's crust to rise up the surface.

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		Based on what you have learned about how geothermal energy is generated, answer the activity below. **Activity 1: Geothermal Energy Flow Chart** Complete the flowchart below which describes how energy is transformed to generate electricity in a geothermal power plant.  Mechanical energy in a turbine → Heat from inside the Earth → Electrical energy → Mechanical energy of a generator
C. Engagement ***Pakikipagpalihan***		In the Philippines, geothermal powerplants are used to generate electricity in Tiwi, Albay; Kidapawan, North Cotabato; Calaca, Laguna; Tongonan, Leyte, Bago City, Negros Occidental; Valencia, Negros Oriental, and Bacon, Sorsogon. Our country being a part of the Pacific Ring of Fire is not something that we will just consider a disadvantage but after studying this lesson we will realize that it has also an advantage because geothermal powerplants are built in an area that has a lot of hot springs, geysers or volcanic activity. **Activity 2: Geothermal Energy Campaign** Your barangay is chosen to be one of the locations where a Geothermal Power Plant will be built. You are asked to make a campaign material (multimedia presentation) by your barangay captain which will help the people in your barangay understand the benefits of having Geothermal Power Plant. Your output will be rated using the following criteria: ▪ Details and information - 10 points ▪ Method of presentation - 10 points ▪ Techniques and creativity - 10 points ▪ Accuracy - 10 points

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
D. Assimilation ***Paglalapat***		I. Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper. 1. Volcanic energy is related to which type of energy? A) hydroelectric energy C) nuclear energy B) geothermal energy D) solar energy 2. Which of the following can be used to harness volcanic energy? A) electricity C) steam B) kinetic energy D) wind 3. About 18% of the energy in the Philippines is harnessed using volcanic energy. Which of the following characteristics makes the country a good location in harnessing volcanic energy? A) it has a lot of rainforests C) it is near the Pacific Ocean B) it is near the equator D) it has a lot of volcanoes 4. Which of the following statements is true in harnessing volcanic energy? A) it is not a renewable source of energy B) it cannot be done in the Philippines C) it is expensive and dangerous D) it can be and has been used as a source of energy II. Complete the chart below to show how the heat from the Earth is tapped as a source of electricity in a power plant. 
V. ASSESSMENT		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

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Personal Assessment on Learner's Level of Performance

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Learning Task	LP	Learning Task	LP	Learning Task	LP	Learning Task	LP
Number 1		Number 3		Number 5		Number 7	
Number 2		Number 4		Number 6		Number 8	

W4	Learning Area	Science	Grade Level	Grade 9
	Quarter	Third	Date	

I. LESSON TITLE	Volcanoes
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Illustrate how energy from volcanoes may be tapped for human use.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		This module was designed to help you master knowledge and concepts about Volcanoes. The scope of this module permits it to be used in many different learning situations. 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 illustrate how energy from volcanoes may be tapped for human use.
B. Development ***Pagpapaunlad***		According to Oregon State University (OSU) volcanoes have done wonderful things for the Earth. They helped cool off the earth removing heat from its interior. Volcanic emissions have produced the atmosphere and the water of the oceans. Volcanoes make islands and add to the continents. These things are some of the advantages of volcanoes, but volcanic eruption is often associated with negative effects. It can cause loss of lives and properties. To give an example on the positive and negative effects of volcanic eruption, let's look back to the eruption of Pinatubo which has created spectacular scenery and people became creative in making earthenware out of the ashfall from the eruption. **Activity 1: Volcano: Advantage or Disadvantage?** Make a short essay about the statement: Volcano: Advantage or Disadvantage? To get 50 points, include the following words or phrases below in your essay and it must have a minimum of 200 words. - volcano - geothermal power plant - volcanic eruption - advantages - disadvantages - National Disaster Risk Reduction and Management Council (NDRRMC) - Philippine Institute of Volcanology and Seismology (PHIVOLCS) - geothermal energy - cost - steam
C. Engagement ***Pakikipagpalihan***		According to the Philippine Institute of Volcanology and Seismology (PHIVOLCS), the government agency tasked with monitoring earthquakes and volcanoes in the country, the following are commonly observed signs that a volcano is about to erupt. These may vary from one volcano to another. 1. Increase in the frequency of volcanic quakes with rumbling sounds; occurrence of volcanic tremors;

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		2. Increased steaming activity; change in color of steam emission from white to gray due to entrained ash; 3. Crater glow due to presence of magma at or near the crater; 4. Ground swells (or inflation), ground tilt and ground fissuring due to magma intrusion; 5. Localized landslides, rock falls and landslides from the summit area which not attributable to heavy rains; 6. Noticeable increase in the extent of drying up of vegetation around the volcano's upper slopes; 7. Increase in the temperature of hot springs, wells and crater lake (e.g. Taal(near the volcano); 8. Noticeable variation in the chemical content of springs, crater lakes within the vicinity of the volcano; 9. Drying up of springs/ wells around the volcano; and 10. Development of new thermal areas and/or reactivation of old ones; appearance of solfataras (a volcanic crater emitting only sulfurous and other gases). **Activity 2: Awareness Campaign** After knowing the signs that a volcano is about to erupt, you are now ready to make an awareness campaign (multimedia presentation, flyer, or brochure) for your barangay on what to do before, during and after a volcanic eruption. Your output will be rated using the following criteria: ▪ Details and information - 10 points ▪ Method of presentation - 10 points ▪ Techniques and creativity - 10 points ▪ Accuracy - 10 points
D. Assimilation ***Paglalapat***		Volcanic eruption is common to our country since we are located along the Pacific Ring of Fire. We need to be always ready if such event will occur. Identify the following statements if it is the things you need to do before, during or after a volcanic eruption. Write **B** if it is for Before, **D** for during and **A** for after. 1. Assembling an emergency preparedness kit. 2. Listen to a local station on a portable, battery-operated radio or television for updated emergency information and instructions. 3. Creating a household evacuation plan that includes your pets. 4. Continue listening to local news for updated information and instructions. 5. Keep handy a pair of goggles and a dust mask for each member of your household in case of ashfall. 6. Talk about volcanoes with your family so that everyone knows what to do in case of a volcanic eruption. Discussing ahead of time helps reduce fear, particularly for younger children. 7. Follow any evacuation orders issued by authorities and put your emergency plan into action. 8. If indoors, close all window, doors, and dampers to keep volcanic ash from entering. 9. Let friends and family know you're safe. 10. If evacuated, return only when authorities say it is safe to do so.
V. ASSESSMENT		

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
(Learning Activity Sheets for Enrichment, Remediation or Assessment to be given on Weeks 3 and 6)		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

Prepared by:	Lea C. del Pozo	**Checked by:**	Job S. Zape, Jr.

Personal Assessment on Learner's Level of Performance

Using the symbols below, choose one which best describes your experience in working on each given task. Draw it in the column for Level of Performance (LP). Be guided by the descriptions below.

☆ - I was able to do/perform the task without any difficulty. The task helped me in understanding the target content/lesson.

✓ - I was able to do/perform the task. It was quite challenging but it still helped me in understanding the target content/lesson.

? - I was not able to do/perform the task. It was extremely difficult. I need additional enrichment activities to be able to do/perform this task.

Learning Task	LP	Learning Task	LP	Learning Task	LP	Learning Task	LP
Number 1		Number 3		Number 5		Number 7	
Number 2		Number 4		Number 6		Number 8	

W5	Learning Area	Science	Grade Level	9
	Quarter	3rd	Date	

I. LESSON TITLE	Climate
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Explain how different factors affect the climate of an area.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction *Panimula*		What are the things you usually consider whenever you plan to have a picnic? Most probably, you will consider the time, place and most of all the weather. In this lesson, you will learn about the different factors affecting climate and why the climate of a place differs from the other. Have fun learning in this module!
B. Development *Pagpapaunlad*		What is Climate Change? Climate change refers to significant, long-term changes in the global climate. The global climate is the connected system of sun, earth and oceans, wind, rain and snow, forests, deserts and savannas, and everything people do, too. The climate of a place, say New York, can be described as its rainfall, changing temperatures during the year and so on. But the global climate is more than the "average" of the climates of specific places. A description of the global climate includes how, for example, the rising temperature of the Pacific feeds typhoons which blow harder, drop more rain and cause more damage, but also shifts global ocean currents that melt Antarctica ice which slowly makes sea level rise until New York will be under water. It is this systemic connectedness that makes global climate change so important and so complicated. ***(Source: US Environmental Protection Agency)*** **Climate** Climate is defined as the weather conditions prevailing in an area in general or over a long period (Weather and Climate, 2019). Climate can be rainy or sunny, if you are living in a tropical country, like in the Philippines. Though climate nowadays can be harsh and destructive because of the phenomena climate change caused by global warming. What is the extent of the changes occurring in our climate? To answer this, you must first understand what is the normal climate we should experience and why does this take place. **Weather** Given that climate is weather pattern for a long period of time, you need to understand how do different weather happens in an area. Weather

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities

is a temporary condition that results from the following factors: global wind current, global ocean current, the Coriolis force, and amount of solar heat (National Geographic, 2019). This factors causing the possibilities of different weather is not the same for different area. This make climate dependent on geographical location. The Philippines, being in equatorial region, receives greater amount of solar heat that results in a weather that sometimes, can be extremely devastating. There must be as well a factor that causes different strong typhoons like Ondo, Yolanda, Paeng, too often devastate in our country.

Factors Affecting Climate

There are some factors affecting the climate of a certain region. These factors can both influence temperature and precipitation on a specific area and these are:

Factor	Influence on Temperature	Influence on Precipitation
Latitude	Decreasing temperature when moving towards the polar regions.	Belts of low pressure at 0° and 60° N and S produce heavy precipitation. Belts of high pressure centered at 30° N and S produce dry climate, even deserts.
Proximity to landmasses	Locations near the center of large landmasses tend to have wide ranges in temperatures, both between day and night and seasonally.	Locations near the center of large landmasses tend to have drier climates.
Proximity to bodies of water.	Large bodies of water have a moderating effect on the temperatures of coastal areas, producing low ranges in temperature, both between day and night and seasonally.	Areas near large bodies of water tend to have higher than average precipitation.
Location relative to mountain ranges	Windward sides are cooled, while leeward sides are warmed.	Windward sides of mountains tend to receive higher than average precipitation; leeward sides tend to receive lower than average precipitation.
Elevation	As elevation increases, the average yearly temperature decreases.	
Ocean Currents	Ocean currents tend to warm temperature of eastern coastal areas and cool temperatures of western coastal areas.	

<table>
<tr><th>IV. LEARNING PHASES</th><th>Suggested Timeframe</th><th>Learning Activities</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>Prevailing wind direction</td><td></td><td>Wind direction determines the windward and leeward sides of both mountain ranges and large bodies of water.</td></tr>
</table>
</td></tr>
<tr><td>C. Engagement
Pakikipagpalihan</td><td></td><td>
Activity 1: Now that you have learned different factors affecting climate, let us try to connect it to the experiences that we have in our country. Try to explain the cause of the scenario base from the different factors affecting climate.
<table>
<tr><th>Scenario</th><th>Illustration</th><th>Explanation (Why do we have a climate like this?)</th></tr>
<tr><td>Very Hot Summer in the Philippines</td><td> 
http://www.thanhnien news.com/education-youth/the-strongest-el-nino-in-decades-is-</td><td></td></tr>
<tr><td>Cold Climate in Tagaytay</td><td> 
https://beautylyzwi thin.wordpress.com /</td><td></td></tr>
<tr><td>Devastating Rains Every Year</td><td> 
https://www.yahoo.com/ne ws/death-toll-climbs-more-floods-threaten-philippines-040230631.html</td><td></td></tr>
</table>
1. Climate is overall atmosphere condition of a place for a period of 30 years or more.
2. Climate is influenced by latitude, altitude, distance from bodies of water, ocean currents, and topography.
3. The closer the place is to the equator, the warmer the climate; the farther the place is from the equator the colder the climate.
</td></tr>
</table>

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		4. Air temperature decreases when altitude increases 5. Bodies of water help regulate the climate of a certain area. 6. Mountain ranges affect the information of precipitation. 7. Ocean Currents will either cool or warm the air above them. 8. Cold currents bring cold water while warm currents take along warm water. **Activity 2:** Create a tourism pamphlet about your community. Highlight the different climate features and figure out the factors affecting its climate.
D. Assimilation ***Paglalapat***		**Post Test** Multiple Choice: Choose the letter of the correct answer. 1. Long-term patterns or trends of meteorological conditions in a given area refer to it's _____. A. weather B. variability C. forecast D. climate 2. The meteorological conditions in a given place on a given day refer to it's _____. A. climate B. weather C. habitat D. ecosystem 3. A shift of only a few degrees Fahrenheit in the average global temperature will likely result in more frequent and extreme heat waves. Which of the following choices best describes this phenomenon? A. habitat destruction C. climate change B. weather change D. ozone formation 4. The actual temperature on any given day is the _____, while the range of expected values, based on location and time of year, is the _____. A. climate; weather C. weather; climate B. albedo; radiative forcer D. prediction; weather 5. Which of the following is NOT an aspect of climate? A. long-term patterns or trends B. useful for predicting weather C. timing of seasonal shifts D. a few warmer days here and there
V. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

Prepared by:	Miguel G. Alavata III	Checked by:	Rosziel S. Rosales EPS-San Pablo City

W6	Learning Area	Science	Grade Level	9
	Quarter	3rd	Date	

I. LESSON TITLE	Climate
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Describe certain climatic phenomena that occur on a global level.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		In the previous lesson, you learned how different factors affect the climate of an area. In this lesson, you will learn about certain climatic phenomena that occur on a global level. Have fun learning in this module! **Climate Change** Climate change is a phenomenon that is considered as one of the current worldwide issues. Experts say that the Earth go through the periods of cooling and warming. The increase of Earth's temperature is a natural occurrence caused by natural processes. However, it can be enhanced rapidly through other factors like human activities. Global warming caused the gradual heating of Earth's climate system. This has impacted the environment in different circumstances such as experiencing severe weather disturbances whether heavy rainfalls or droughts. Reports in the polar regions says the sea level continues to rise due to the melting of ice caps and glaciers. Habitat loss and species extinction continues to happen. But what causes these changes in our environment? **Greenhouse Effect** The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected to space and the rest is absorbed and re-radiated by greenhouse gases. These gases include water vapor, carbon dioxide, methane, nitrous oxide, ozone, and some artificial chemicals such as chlorofluorocarbons (CFCs). The absorbed energy warms the atmosphere and the surface of the Earth. This process maintains the Earth's temperature at around 33 degrees Celsius warmer than it would otherwise be, allowing life on Earth to exist. **Enhanced Greenhouse Effect** Human activities such as burning fossil fuels (coal, oil, and natural gas) and agriculture and land clearing contributes to the increase in concentration of greenhouse gases in the atmosphere. This further warms the Earth's climate system. **Impacts of Climate Change** • The life cycles of plants and animals have changed. There are some species of plants that bloom earlier than expected. Animal adaptations such as migration and hibernation have changed as well. There are some animals that supposedly still hibernating but are already up. There is an earlier migration of birds and arriving to their nesting ground and others appeared to be later. Sometimes some animals and birds tend to stay in their local territory because the climate is already suitable for them. • The sea level continues to rise due to the melting of ice caps and glaciers in polar regions. If sea level increase by 50 cm, sea turtles may lose their nesting areas. People and animals that live in near shorelines may be forced to move out. Animals moving out of their natural habitat face challenges that could lead to the extinction of their species.

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		• Droughts occur in land areas which dry out trees and vegetation. This fuels wildfires which deteriorates air quality, kills animals, and destroy their habitat, and causes property loss. • Heavy rainfalls and strong typhoons are experienced even in the Philippines. Changes in rainfall patterns and distribution lead to floods, submersions of residential areas, and destruction of agricultural crops. One incident is the Typhoon Yolanda which brought the strongest wind ever encountered by people in Visayas region leaving great destruction and loss of lives. These are only some of the impacts of climate change that can be observed and felt in the present time. We should start to take actions to lessen the effect of climate change.
B. Development ***Pagpapaunlad***		Read the news article below and answer the questions that follow. **A third of Antarctic ice shelves risk collapsing due to climate change** By Adam Vaughan | April 8, 2021 Around a third of the ice shelves holding back huge glaciers in Antarctica are at risk of collapse if the world fails to take sufficient action on climate change, new projections have found. The ice shelves circling the continent are vulnerable to meltwater on their surface causing the ice to crack and disintegrate, a process known as hydrofracturing. Computer modelling by Ella Gilbert at the University of Reading, UK, and Christoph Kittel at the University of Liege, Belgium, showed that if the world warms by 4°C since pre-industrial levels, then 34 per cent of the continent's ice shelves will have meltwater on their surface, a sign they are at risk of collapse. However, the figure falls to 18 per cent if temperature rises are checked at 2°C. The world is currently on track for a 2.9°C rise but, if implemented, climate plans and net zero goals would cut that to 2.1°C. "Warming to 2°C means half the ice shelf area is at risk of collapsing. That is the message: the less the warming the better," says Gilbert. She and Kittel used a much higher resolution climate model than previous research, with grid squares 35 kilometres across rather than hundreds of kilometres across. It also more accurately represents cloud physics, which is vital as estimates of the area at risk of collapse hinge on how much ice loss is replaced by snowfall. The big difference between the 2°C and 4°C rise scenarios stems from melting outweighing increased snowfall in a 4°C warmer world. The Larsen C ice shelf on the east of the Antarctic Peninsula, where a huge iceberg broke off in 2017, was found to be one of the areas most at risk. "This study shows melting at the ice shelves' surface will spreads southwards to parts of the continent where huge reservoirs of inland ice may lose their protective barrier. If that happens, we can expect rapid increases in sea level rise along every coastline of our planet," says Andrew Shepherd at the University of Leeds, UK, who wasn't involved with the paper. The research doesn't put a figure on how much sea level rise could occur if ice shelves collapsed and released the glaciers behind them. However,

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		Gilbert says: "My gut feeling is for 4°C it could potentially contribute tens of centimetres if they did collapse." Avoiding 10 centimetres of sea level rise should expose 10 million fewer people globally to flooding risks. Helene Seroussi at NASA's Jet Propulsion Lab, who wasn't part of the research team, says the study's big advance is using a higher resolution model. While the research identifies ice shelves that could be hydrofractured, Seroussi says further analysis of how individual ice shelves move – the "dynamical stress regime" – is needed to work out which ones will actually collapse. **Reference:** Vaughan, A. (2021). *A third of Antarctic ice shelves risk collapsing due to climate change*. https://www.newscientist.com/article/2273910-a-third-of-antarctic-ice-shelves-risk-collapsing-due-to-climate-change/ **Questions:** 1. What impact of climate change is presented in the given article? 2. According to the computer model made by Gilbert and Kittel, what will happen if the world warms by 4°C? 3. How will you elaborate the statement made by Gilbert, "the less the warming, the better"? 4. What are the possible impacts to the environment and mankind if the ice shelves collapse? 5. In your opinion, how may the people help to lessen the effect of climate change?
C. Engagement ***Pakikipagpalihan***		After learning the different impacts of climate change in the environment, you can now answer the given questions. You may opt to the present your answer in varied ways. 1. What is climate change? 2. What are the negative effects of climate change? 3. How can we lessen the bad effects of global warming? This rubric will be used to evaluate your answer:

Indicator	3 points	2 points	1 point
Main idea	The main idea is evidently seen in the response.	The main idea is somewhat seen in the response.	The main idea is not clear.
Details and evidence	At least 3 examples and evidence are stated to support the idea of the response.	1 to 2 examples and evidence are stated to support the idea of the response.	No examples nor evidence are stated to support the response.
Mechanics (Organization, Grammar, Punctuation)	The ideas are very organized. Proper grammar and punctuations are used effectively.	The ideas are somewhat organized. Grammar and punctions are used with less errors.	Response needs coherence. Too many errors are seen in the use of grammar and punctions.

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
D. Assimilation *Paglalapat*		**Posttest** **Multiple Choice:** Choose the letter of the correct answer. 1. Which of the following might happen due to global warming? A. melting polar ice caps B. strong waves in the ocean C. lower sea levels D. decrease in Earth's surface temperature 2. How are humans making greenhouse gases of our own? A. burning fossil fuels in our cars B. burning forests C. with large-scale agriculture D. all of the above 3. How does the warming of ocean affect the adaptation patterns of marine life? A. They eat food less since they are not hungry when it's hot. B. Warmer water makes them sleepy. C. Their migratory patterns are changing. Summer seems longer so fish are schooling less. 4. Which of the following is considered an impact of climate change? A. droughts and wildfires B. change in animal adaptations C. heavier rainfalls and intense typhoons C. all of the above 5. How does climate change alter precipitation distribution? A. Increasing extreme precipitation everywhere. B. Increasing length of droughts everywhere. C. Increase in both wet and dry extremes. D. Climate change does not alter precipitation
V. ASSESSMENT (Learning Activity Sheets for Enrichment, Remediation or Assessment to be given on Weeks 3 and 6)		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

Prepared by:	Miguel G. Alavata III	Checked by:	Rosziel S. Rosales EPS-San Pablo City

W7	Learning Area	Science	Grade Level	9
	Quarter	Third	Date	

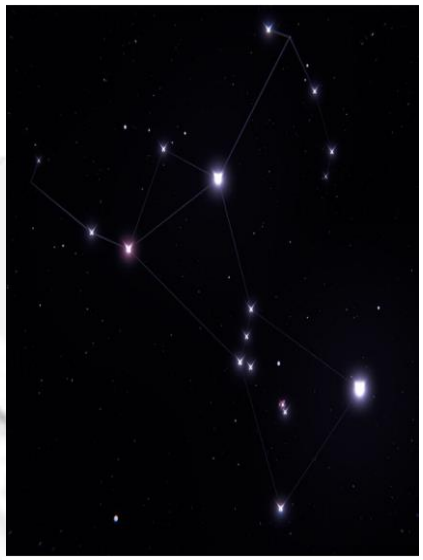
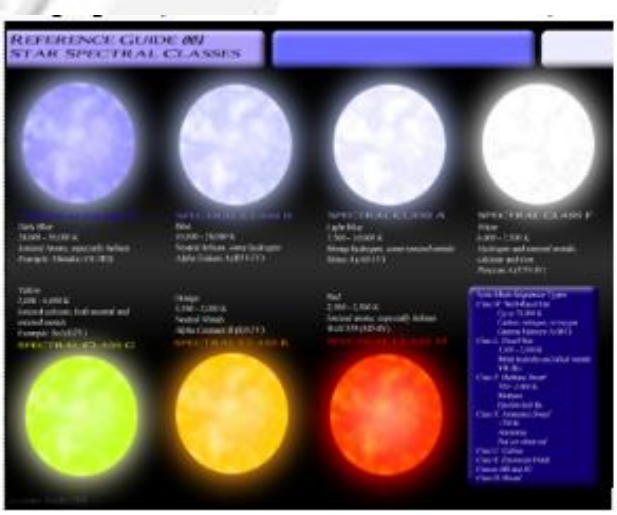
I. LESSON TITLE	CONSTELLATIONS
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Show which constellations may be observed at different times of the year using models.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction *Panimula*		As we look at the night sky, we see thousands of dazzling stars that resembles different patterns called constellation. We can use our imagination to see what pattern they look like; some resemble different animals, shapes, and other objects. They even tell a story of how these star patterns are connected to each other but, they are light years away from each other. These stars have distinct properties such as size, brightness and color. **Constellations:** • Constellations are group of stars that appear to form a pattern in the sky. • There are 88 constellations recognized by the International Astronomy Union (IAU). • Many constellations have names that can be traced back to early Babylonian and Greek civilizations. • Most cultures have different names for the constellations. **Do you know your Zodiac sign?** Capricorn: Jan. 20 - Feb. 16. Aquarius: Feb. 16 - March 11. Pisces: March 11 - April 18. Aries: April 18 - May 13. Taurus: May 13 - June 21. Gemini: June 21 - July 20. Cancer: July 20 - Aug. 10. Leo: Aug. 10 - Sept. 16. Virgo: Sept. 16 - Oct. 30. Libra: Oct. 30 - Nov. 23. Scorpio: Nov. 23 - 29. **Ophiuchus: Nov. 29 - Dec. 17.** Sagittarius: Dec. 17 - Jan. 20. Zodiacs are the 12 constellations. For Example, the constellation behind the sun from August 10 to September 16 is Leo. During this period, the constellation is not visible in the night sky because it is behind the Sun. This gives us the idea that Constellations may be present or not in the night sky depending on the position of the earth with respect to the sun. Some Constellations appear and disappear in in the night sky throughout the year due to the revolution of the earth. **Movement of the Stars due to Earth's Movements** The Sun is a star, and it does not move. Stars do not move but when we observe carefully during nighttime, stars seem to move. Let us find out more by doing the next activity. As the sun moves across the sky throughout the day, so does the stars all through the night. This is because the earth continuously rotates on its axis. The stars will appear to move from EAST to WEST like the sun.
B. Development *Pagpapaunlad*		**Activity #1**: **Apparent Movement of the Stars through the Night** Objectives: After performing this activity, you should be able to; Describe the apparent motions of stars at night. **Procedure:** 1. On a clear night, look at the sky from 7 pm to 11 pm.

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		2. Focus on one or two constellations like the Taurus and Orion. Both are can be seen in our country the Philippines. 3. Observe the stars every hour of the night, from 7 pm to 11 pm. **Questions: Write your answers on a separate paper.** Q1. Compare the positions of the stars seen at 7, 9 and 11 pm. What do you notice? _____. Q2. Are the stars visible at 7 pm still visible at 11 pm in their original position? Why is this so? _____. Q3. How do the stars move? Describe the movement of the stars in the night sky. _____. Q4. How is the motion of the stars similar to the motions of the sun? _____. REFLECTION: What have you learned from this activity? _____ _____ Constellations are seen in different forms thus constellation names differ depending on the observer's culture. We have our own locally recognized constellation names such as Malihe, Malara and Buwaya. Constellations also serve as a time signal for some indigenous tribe. These constellations are mostly observed at exact time/month/date every year. Since they have no calendar before, the constellations serve like a calendar that gives signal for different activities.
C. Engagement ***Pakikipagpalihan***		**Activity #2: WORD HUNT PUZZLE** The puzzle contains some Local names of Constellations. Locate and match the local names to their English names by writing it in the first column. Happy hunting! Some Local Constellation names used by Farmers in Bukidnon

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

Local Names	English	Month of the Year	Uses/Indications
1.	Taurus	December -February	Clearing/Preparation
2.	Pleiades	January	Planning of crops to be planted
3.	Orions belt	February	Start of planning
4.		March	Planting of rice, corn vegetables
5.	Gemini	April-May	End of planting
6.		May	Stop planting
7.	Aquila	Late May	Cleaning and Harvesting
8.		June	Rainy Season

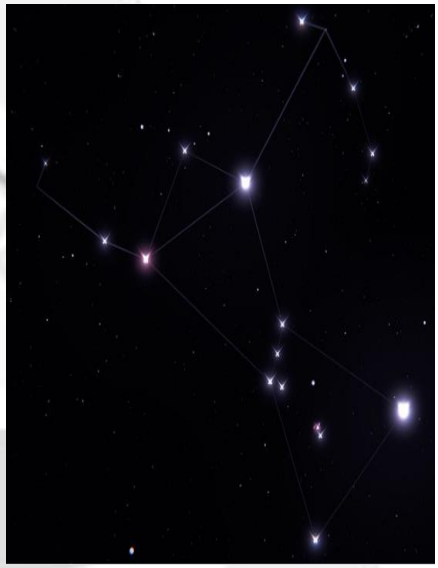
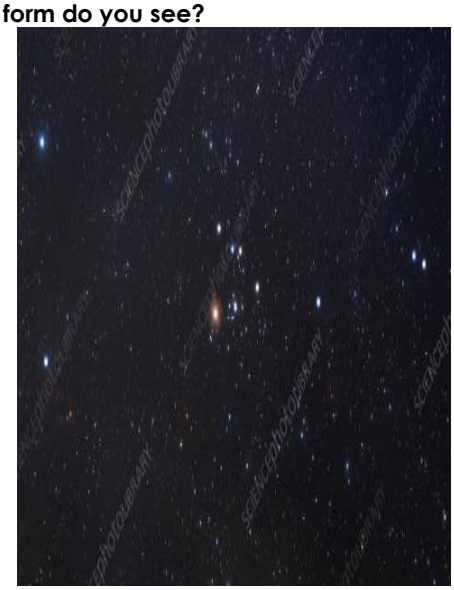
IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		The table also indicate that the constellations serve as a time signal for some indigenous tribe in the performance of agricultural activities. **STAR PATTERNS IN THE SKY!** What form do you see?   ORION: THE HUNTER TAURUS: THE BULL **Why are stars different colors?** As we look up to the heavens, stars show a multitude of colors including red, orange, yellow, blue and white. Star temperatures matches the range of colors. Look at the images below and relate stars' color to its temperature The coolest star in the sky glow red. As surface temperature rise, colors change through orange and yellow. The hottest stars glow a lighter blue and the very hottest are a darker blue color.  Task: Arrange the colors of the star from coolest to hottest: 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____
D. Assimilation ***Paglalapat***		Stars and constellations before were able to help our ancestors in many ways, entertainment (by seeing things and making stories), time signal, and even direction guide. Things around us can help us in many ways. Do we really need to seek continuous development and advancement? Why?

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
V. ASSESSMENT (Learning Activity Sheets for Enrichment, Remediation or Assessment to be given on Weeks 3 and 6)		
VI. REFLECTION		• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card. • The learner, in their notebook, will write their personal insights about the lesson using the prompts below. I understand that _____. I realize that _____. I need to learn more about _____.

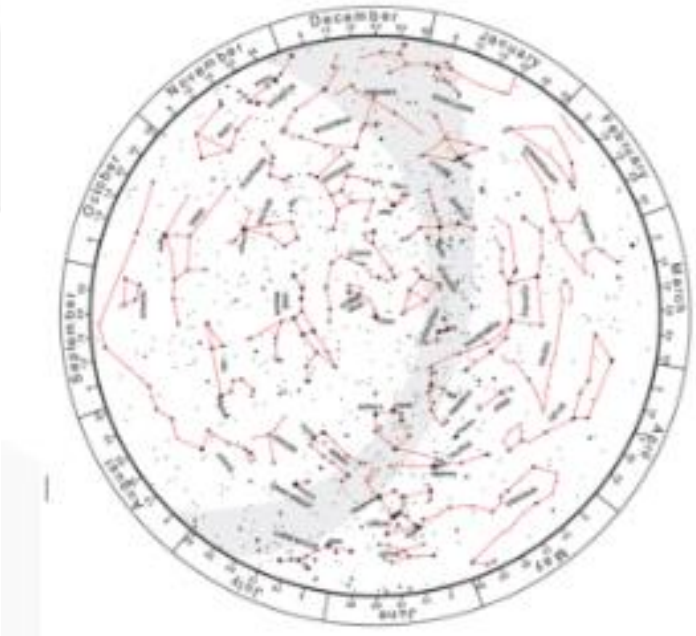
Prepared by:	GARCIA, VIVIAN B.	Checked by:	Rosziel S. Rosales

W8	Learning Area	SCIENCE	Grade Level	9
	Quarter	Third	Date	

I. LESSON TITLE	CONSTELLATION
II. MOST ESSENTIAL LEARNING COMPETENCIES (MELCs)	Show which constellation may be observed at different times of the year using models.
III. CONTENT/CORE CONTENT	

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
A. Introduction ***Panimula***		Previously, we learned that constellations are groups of stars that form patterns in the sky. There are many identified constellations; amongst them are the Orion, Taurus. Ursa Minor, Ursa Major, Pegasus and many more. In addition to these are locally named constellations inspired by the locals' own culture and belief. **Let us do this! Connect the dots. What form do you see?**  
B. Development ***Pagpapaunlad***		**Uses of Constellations** Constellations are useful because they can help people to recognize stars in the sky. By looking for patterns, the stars and locations can be much easier to see. To remember the patterns, the ancient people became creative by giving these patterns names accompanied by certain stories. The constellations were used in ancient times. We used the stars as calendar to mark certain events. This was very important so that people knew when to clear the land, plant and harvest crops. Constellations was also used for navigation. When you find Ursa Minor (Little Dipper), the North Star (Polaris) becomes easy to spot for it is the brightest in this constellation. Using the height of the North Star in the sky, navigators could figure out their latitude helping ships to sail across the oceans. We had different names and stories for constellations. Dr. Dante L. Ambrosio , considered the "Father of Philippine Ethnoastronomy" , wrote about the different ways in which early ethnolinguistic groups around the Philippines interpreted celestial bodies and their movements. In "Balatik: Katutubong Bituin ng mga Pilipino," he writes that the constellation Orion — the hunter with a sword and shield raised — is one of two prominent star groups in our skies. Groups like the Tagalog, Maguindanao, Bikol, Antique and the Bagobo, called it "Balatik", for the balatik was a hunting trap, which they thought, resembled the cluster. For the Teduray, another group from Mindanao, Orion was called "Seretar," whom they also believed to be a hunter. The group saw Seretar's body in Orion's belt, his right hand in Betelgeuse, and his left hand in Rigel. Orion's Sword was interpreted as Seretar's itak. For the Sama, a seafaring group from Tawi-Tawi, the Big Dipper was referred to as "Bubu," for it resembled the bubu, a cage-like fish trap that they used.

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
C. Engagement ***Pakikipagpalihan***		**Activity # 1: Movement of Constellations** **Objectives: a.** use a planisphere to locate stars and constellations for any Date and time of the year. b. explain how the night sky changes through the seasons (different months). **Unlocking of Terms**: *Horizon* - The horizon or skyline is the apparent line that separates earth from sky, the line that divides all visible directions into two categories: those that intersect the Earth's surface, and those that do not. *Zenith* - The zenith is an imaginary point directly "above" a particular location, on the imaginary celestial sphere. **Procedure:** 1. Cut the planisphere on the next page. Cut around the outside of planisphere and cut out the white inner oval to make a hole in the middle. Fold the grey area on the dotted lines shown. (cut the planisphere before proceeding. 2. Cut around the outside of star map. (look at page after the planisphere). 3. Place the star map into the planisphere pocket. Swivel the star map around to line up the date and the time to the day you are outside. 4.Identify where North and South are on the planisphere. Stand facing South (real South: as a guide, sun rises from the East or use compass to locate South), looking down at the planisphere so that North is at the top facing away from you. Lift the planisphere above your head and the white disk area will show you the stars in the night sky. **Guide Questions**: Write your answers on a separate paper. 1. Find the horizon on the planisphere. Describe its position._____. 2. Rotate the planisphere until today's date (example: today is March 30). Align the time 9 pm to today's date. Find North, South, East and West. Name a constellation found on the: a. Northern horizon _____ c. Southern horizon_____ b. Eastern Horizon _____ d. Western horizon _____ 3. Where is your Zenith? _____ What constellation is at your Zenith tonight at 9 pm? _____ 4. Rotate your planisphere so that stars travel from East to West. Name 5 constellations that do not go below the horizon. These are the circumpolar constellations: a._____ b._____ c._____d._____ e. _____ 5. Locate Orion on the planisphere. What time will it rise tonight? _____ When will it be in the southern sky? _____When will it set tonight.? ___

IV. LEARNING PHASES	Suggested Timeframe	Learning Activities
		PLANISPHERE  **STAR MAP** 

<table>
<tr><th>IV. LEARNING PHASES</th><th>Suggested Timeframe</th><th>Learning Activities</th></tr>
<tr><td>D. Assimilation
Paglalapat</td><td></td><td>
Creative Presentation
Show the importance of stars in determining the right time to farm. Present your work in the most creative way! Your output will be graded by the following rubric:
<table>
<tr><th></th><th>Excellent (15 pts)</th><th>Good (10pts)</th><th>Fair 5 pts</th></tr>
<tr><td>Delivery</td><td>Student was very clear and well-spoken during presentation</td><td>Student was clear and well-spoken during presentation</td><td>Student was somewhat clear and well-spoken during presentation</td></tr>
<tr><td>Organization</td><td>Presentation flows with ease due to proper preparation.</td><td>Presentation of report flows due to proper preparation.</td><td>Presentation of report lacks a flow due to lack of proper preparation.</td></tr>
<tr><td>Visual Props/Knowledge</td><td>Student used appropriate visuals aiding class understanding and interest. Student was able to answer all questions asked</td><td>Student used visuals that made sense with the rest of the presentation. Student was able to answer most questions asked</td><td>Student used visual example, did not fit the rest of the presentation. Student was only able to answer a question asked.</td></tr>
</table>
Stars are also creations of the Lord God and we can see them easily during a clear night in the vast sky. These tiny glittering diamonds are reminders to us that we can never get lost, for there is that one God who is constantly watching and guiding us. In these times, where the unseen enemy called COVID-19 affects us all, our faith in the Lord is tested once again. In times of doubt, look towards the stars in the sky and remember, the Lord is watching and keeping us all safe. Never waver, BELIEVE!
</td></tr>
<tr><td>V. ASSESSMENT (Learning Activity Sheets for Enrichment, Remediation or Assessment to be given on Weeks 3 and 6)</td><td></td><td>
Choose the letter of the best answer. Write your answer on a separate sheet of paper.
1. What do we call a group of stars that look like patterns in the sky?
A. Constellation B. Galaxy C. Revolution D. Superstars
2. Once, there were no clocks to tell time. People relied on constellations. Which is NOT a help that constellation can give?
A. Farmers studied constellations to mark seasons
B. Sailors used constellations to steer their ships at night
C. People used constellations to tell the time of the day
D. Construction workers used constellations for balance
3. How do stars like the Sun appear to move in the night sky?
A. From East to West C. From West to East
B. From North to South D. From South to North
4. Which color of star is hottest?
A. Blue B. Red C. Yellow D. White
5. Why do stars appear to move in the sky? Because
A. of the revolution of the earth
B. the Earth is rotating on its axis
C. our galaxy is moving
D. the sky is moving
</td></tr>
<tr><td>VI. REFLECTION</td><td></td><td>
• The learner communicates the explanation of their personal assessment as indicated in the Learner's Assessment Card.
• The learner, in their notebook, will write their personal insights about the lesson using the prompts below.
I understand that _____.
I realize that _____.
I need to learn more about _____.
</td></tr>
</table>

Prepared by:	GARCIA, VIVIAN B.	Checked by:	Rosziel S. Rosales