SCIENCE

Structuring Competencies in a Definitive Budget of Work

Grade	**NINE**
Science Discipline/Component	**EARTH AND SPACE**
Grade Level Standard	At the end of Grade 9, learners have gained a deeper understanding of the digestive, respiratory, and circulatory systems to promote overall health. They have become familiar with some technologies that introduce desired traits in economically important plants and animals. Learners can explain how new materials are formed when atoms are rearranged. They recognize that a wide variety of useful compounds may arise from such rearrangements. **Learners can identify volcanoes and distinguish between active and inactive ones. They can explain how energy from volcanoes may be tapped for human use. They are familiar with climatic phenomena that occur on a global scale. They can explain why certain constellations can be seen only at certain times of the year.** Learners can predict the outcomes of interactions among objects in real life applying the laws of conservation of energy and momentum.
Domain	**Geology -** Being located along the Ring of Fire, the Philippines is home to many volcanoes. Using models, learners will explain what happens when volcanoes erupt. They will describe the different types of volcanoes and differentiate active volcanoes from inactive ones. They will also explain how energy from volcanoes may be tapped for human use.
	Meteorology - In this grade level, learners will distinguish between weather and climate. They will explain how different factors affect the climate of an area. They will also be introduced to climatic phenomena that occur over a wide area (e.g., El Niño and global warming).

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Domain	**Astronomy** - Learners will now leave the Solar System and learn about the stars beyond. They will infer the characteristics of stars based on the characteristics of the Sun. Using models, learners will show that constellations move in the course of a night because of Earth's rotation, while different constellations are observed in the course of a year because of the Earth's revolution.
Performance Standard	The learners shall be able to: 1. participate in activities that reduce risks and lessen effects of climate change. 2. discuss whether or not popular beliefs and practices with regard to constellations and astrology have scientific basis
Content Standard	The learners demonstrate an understanding of: 1. volcanoes found in the Philippines; 2. factors that affect climate, and the effects of changing climate and how to adapt accordingly; 3. relationship between the visible constellations in the sky and Earth's position along its orbit

CONTENT	LEARNING COMPETENCIES	CODE	NO. OF DAY/S TAUGHT	REMARKS
1. Volcanoes **1.1 Types of volcanoes**	**1. Describe the different types of volcanoes**	**S9ES -IIIa25**		
	1.1. Describe volcano and its parts.	S9ES -IIIa25.1.1	1	
	1.2. Describe the types of volcano based on structure and activity	S9ES -IIIa25.1.2	1	
	2. Differentiate between active and inactive volcanoes	**S9ES -IIIa26**		

	2.1. Differentiate between active and inactive volcanoes.	S9ES -IIIa26.2.1	1	
	2.2. Give examples of inactive and active volcanoes found in the Philippines.	S9ES -IIIa26.2.2	1	
1.2 Volcanic Eruptions	**3. Explain what happens when volcanoes erupt**	**S9ES -IIIb27**		
	3.1. Describe how magma is formed.	S9ES -IIIb27.3.1	1	
	3.2. Identify the composition of magma.	S9ES -IIIb27.3.2		
	3.3. Explain the effect of temperature and composition on the viscosity of the magma.	S9ES -IIIb27.3.3	1	
	3.4. Relate the characteristics of magma with the type of volcanic eruption.	S9ES -IIIb27.3.4	1	
	3.5. Explain the process of volcanic eruption.	S9ES -IIIb27.3.5	1	
	3.6. Describe the different types of volcanic eruption.	S9ES -IIIb27.3.6	1	
	3.7. Enumerate the material emissions of volcanoes.	S9ES -IIIb27.3.7	1	
	3.8. Describe the effects of material emissions from volcanoes to humans and other living things.	S9ES -IIIb27.3.8		
1.3 Energy from Volcanoes	**4. Illustrate how energy from volcanoes may be tapped for human use;**	**S9ES –IIIcd-28**		

	4.1. Identify the type of energy from volcanoes.	S9ES –IIIcd-28.4.1	1	
	4.2. Recall the types of volcanoes which can be good sources of geothermal energy.	S9ES –IIIcd-28.4.2		
	4.3 Identify volcanoes in the Philippines which are sources of geothermal energy.	S9ES –IIIcd-28.4.3	1	
	4.4. Create a diagrammatic representation of geothermal energy flow in a geothermal power plant.	S9ES –IIIcd-28.4.4	1	
	4.5. Explain how a geothermal energy is transformed into electrical energy.	S9ES –IIIcd-28.4.5		
	4.6 Identify the advantages and disadvantages of using geothermal energy.	S9ES –IIIcd-28.4.6	1	
	4.7. Enumerate the signs of an impending volcanic eruption.	S9ES –IIIcd-28.4.7	1	
	Suggested Performance Task: Create an information ad to describe ways on how to minimize the harmful effects of volcanic		1	
	Summative Assessmentfor Competencies a-d		1	
2.Climate **2.1. Factors affecting climate**	**5. Explain how different factors affect the climate of an area**	**S9ES-IIIe29**		
	5.1. Differentiate climate from weather.	S9ES-IIIe29.5.1	1	
	5.2. Identify factors that affect climate.	S9ES-IIIe29.5.2		

	5.3. Explain how altitude affects the climate.	S9ES-IIIe29.5.3	1	
	5.4. Explain how land topography affects the climate.	S9ES-IIIe29.5.4	1	
	5.5. Explain how ocean surface and circulation directly affect the pattern of climate around the world.	S9ES-IIIe29.5.5	1	
	5.6. Enumerate and explain how different factors that affect climate of an area.	S9ES-IIIe29.5.6	1	
2.2. Global Climate phenomena	**6. Describe certain climatic phenomena that occur on a global level**	**S9ES-IIIf30**		
	6.1 Identify climatic phenomena thaat occur on a global level.	S9ES-IIIf30.6.1	1	
	6.2. Describe a greenhouse.	S9ES-IIIf30.6.2	1	
	6.3. Explain the role of increased carbon dioxide on earth's temperature.	S9ES-IIIf30.6.3		
	6.4. Differentiate greenhouse effect from global warming.	S9ES-IIIf30.6.4	1	
	6.5. Identify the sources of greenhouse gases.	S9ES-IIIf30.6.5		
	6.6. Relate global warming and climate change.	S9ES-IIIf30.6.6	1	
	6.7. Differentiate El Niño and La Niña phenomena.	S9ES-IIIf30.6.7		

	6.8. Explain the effects of El Nino and La Nina Phenomena on global climate.	S9ES-IIIf30.6.8	1	
	Suggested Performance Task: Create a 15-minute infommercial on the mitigation of the effects of climate change to be posted on social media.		1	
	Summative Assessment for Competencies e-f		1	
3. Constellations	**7. Infer the characteristics of stars**	**S9ES-IIIg31**		
3.1 Characteristics of Stars	7.1. Describe a star.	S9ES-IIIg31.7.1	1	
	7.2. Give the major characteristics of stars based on what is observed about the Sun.	S9ES-IIIg31.7.2		
	7.3. Relate the color of a star with its age and temperature.	S9ES-IIIg31.7.3	1	
	7.4. Identify stars based on their age and temperature	S9ES-IIIg31.7.4	1	
	7.5. Explain the life cycle of stars.	S9ES-IIIg31.7.5	1	
3.2 Arrangement of Stars in a group	**8. Infer that the arrangement of stars in a group (constellation) does not change**	**S9ES-IIIh32**		
	8.1. Describe a constellation and its origin.	S9ES-IIIh32.8.1	1	
	8.2. Identify some constellations observed in the northern and southern hemisphere.	S9ES-IIIh32.8.2	1	

	8.3. Locate some star clusters and identify some bright stars in the constellations.	S9ES-IIIh32.8.3	1	
3.3 Changing position of constellation during the night and at different times of the year	**9. Observe that the position of a constellation changes in the course of a night**	**S9ES-IIIi33**		
	9.1. Describe the apparent movement of the stars in the sky.	S9ES-IIIi33.9.1	1	
	9.2. Describe the position of a constellation in the course of a night.	S9ES-IIIi33.9.2	2	
	9.3. Explain why some constellations are not seen at certain months.	S9ES-IIIi33.9.3	1	
	10. Show which constellations may be observed at different times of the year using models.	**S9ES-IIIj34**		
	10.1. Construct a constellation model seen in the Philippine night sky.	S9ES-IIIj34.10.1	1	
	10.2. Identify the constellations seen at different times of the year.	S9ES-IIIj34.10.2	1	
3.4 Beliefs and Practices about constellations and astrology	*Suggested Performance Task: Present a debate to explain whether some Filipino beliefs and practices in connection with constellation have scientific basis or simply superstitions.*		1	

	Summative Assessment for Competencies e-f	1	
	Quarterly Summative Test	1	
	SUBTOTAL	**45**	