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Structuring Competencies in a Definitive Budget of Work

Grade	**TEN**
Science Discipline/Component	**Force and Energy**
Grade Level Standard	At the end of Grade 10, learners realize that volcanoes and earthquakes occur in the same places in the world and that these are related to plate boundaries. They can demonstrate ways to ensure safety and reduce damage during earthquakes, tsunamis, and volcanic eruptions. **Learners can explain the factors affecting the balance and stability of an object to help them practice appropriate positions and movements to achieve efficiency and safety such as in sports and dancing. They can analyze situations in which energy is harnessed for human use whereby heat is released, affecting the physical and biological components of the environment.** Learners will have completed the study of the entire organism with their deeper study of the excretory and reproductive systems. They can explain in greater detail how genetic information is passed from parents to offspring, and how diversity of species increases the probability of adaptation and survival in changing environments. Learners can explain the importance of controlling the conditions under which a chemical reaction occurs. They recognize that cells and tissues of the human body are made up of water, a few kinds of ions, and biomolecules. These biomolecules may also be found in the food they eat.
Domain	**ENERGY** From learning the basics of forces in Grade 8, learners extend their understanding of forces by describing how balanced and unbalanced forces, either by solids or liquids, affect the movement, balance, and stability of objects.
Performance Standard	The learners shall be able to perform one of the folowing tasks: 1. Create a storyboard on how the technology in the field of telecommunications, medicines, etc. uses EM radiations in order for them to function or work. 2. Design a poster on the dangers of EM radiation. 3. Write an essay on the importance of electromagnetic waves and its effects on living things and the environment. 4. Perform an EM on trial forum.

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Content Standard	The learners demonstrate an understanding of the different regions of the electromagnetic spectrum.			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**
1. Electromagnetic Spectrum				
1.1 Regions of Electromagnetic Spectrum and their Properties	**1. Compare the relative wavelengths of different forms of electromagnetic waves**	**S10FE-IIa-b-47**		
1.1.1 Electromagnetic Waves	1.1 Trace the development of electromagnetic wave theory.	S10FE-IIa-b-47.1	1	
	1.2 Define electromagnetic waves.	S10FE-IIa-b-47.2	1	
	1.3 Describe the transmission and propagation of electromagnetic waves.	S10FE-IIa-b-47.3	1	
	1.4 Discuss the properties of EM waves.	S10FE-IIa-b-47.4	1	
	1.5 Solve problems involving wavelength, frequency, and energy of an EM waves.	S10FE-IIa-b-47.5	1	
1.1.2 Regions of Electromagnetic Spectrum	1.6 Compare the relative wavelengths, frequencies, and energies of the different	S10FE-IIa-b-47.6	1	
	Suggested Performance Task: Electromagnetic Jeopardy		1	
	In this suggested performance task, learners will participate in a staged game show in which the questions will all be about EM waves.			
	Summative Assessment for S10FE-IIa-b-47		1	

1.2 Applications of the Different Regions of EM Waves	**2. Cite examples of practical applications of the different regions of EM waves, such as the use of radio waves in**	**S10FE-IIcd-48**		
	2.1 Explain how radio waves are generated, transmitted, and received in television and radio communication.	S10FE-IIcd-48.1	1	
	2.2 Discuss how microwaves are used in cooking, radar and satellite communications.	S10FE-IIcd-48.2	1	
	2.3 Explain how infrared are used in electronic appliances, night vision goggles, medical diagnosis and communication	S10FE-IIcd-48.3	1	
	2.4 Discuss how lasers and fiber optics have improved telecommunication.	S10FE-IIcd-48.4	1	
	2.5 Discuss the practical application of UV radiation in identifying counterfeit bills,	S10FE-IIcd-48.5	1	
	2.6 Discuss the application of x-ray on medical diagnosis and engineering	S10FE-IIcd-48.6	1	
	2.7 Cite applications of gamma radiation in radiotherapy, sterilization, etc.	S10FE-IIcd-48.7	1	
	Suggested Performance Task: Storyboard on the Different Applications of EM Radiation		1	
	In this suggested performance task, learners will create and present a storyboard that shows how EM waves help facilitate innovations in telecommunications, medicine, etc.			

1.3 Effects of the Different Regions of EM Waves on Living Things and the Environment	**3. Explain the effects of EM radiation on living things and the environment.**	**S10FE-IIe-49**		
	3.1 Classify EM waves as ionizing and non-ionizing radiation using the energy levels	S10FE-IIe-49.1	1	
	3.2 Explain the effects of EM waves applications on living things and the environment.	S10FE-IIe-49.2		
	3.3 Evaluate the risks and benefits derived from the applications of EM waves	S10FE-IIe-49.3	1	
	3.4 Explain the principle of EM radiation safety and its importance in society.	S10FE-IIe-49.4	1	
	Suggested Performance Task: Poster-Making on the Dangers of EM Radiation		1	
	In this suggested performance task, learners will make a poster that shows the dangers of different EM radiation.			
	Summative Assessment for S10FE-IIcd-48 and S10FE-IIe-49		1	
Domain	***ENERGY***			
	Learners acquire more knowledge about the properties of light as applied in optical instruments.			
Performance Standard	The learners shall be able to make an improvised optical device.			
Content Standard	The learners demonstrate an understanding of the images formed by the different types of mirrors and lenses.			

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CONTENT	LEARNING COMPETENCIES	CODE	NO. OF DAYS TAUGHT	REMARKS
2. Light				
2.1 Reflection of Light in Mirrors	**4. Predict the qualitative characteristics**	**S10FE-IIf-50**		
	4.1. Investigate the reflection properties of light using plane mirrors.	S10FE-IIf-50.1	1	
	4.2. Distinguish between converging and diverging mirrors.	S10FE-IIf-50.2	1	
	4.3. Apply ray diagramming technique in describing images formed by mirrors	S10FE-IIf-50.3	1	
	4.4. Derive and use mirror equations in predicting the characteristics and position of an image formed by mirrors.	S10FE-IIf-50.4	1	
2.2 Refraction of Light in Lenses	**5. Apply ray diagramming techniques in describing the characteristics and positions of images formed by lenses.**	**S10FE-IIg-51**		
	5.1. Investigate the refraction properties of light using concave and convex lenses	S10FE-IIg-51.1	1	
	5.2. Distinguish between converging and diverging lenses.	S10FE-IIg-51.2	1	
	5.3. Apply ray diagramming technique in describing images formed by lenses.	S10FE-IIg-51.3	1	
	5.4. Derive and use lens equations in predicting the characteristics and position of an image formed by lenses.	S10FE-IIg-51.4	1	

2.3 Optical Instruments	**6. Identify ways in which the properties of mirrors and lenses determine their use in optical instruments (e.g., cameras and binoculars);**	**S10FE-IIh-52**		
	6.1 Explain the use of mirrors and lenses in cameras and microscopes	S10FE-IIh-52.1	1	
	6.2 Explain the use of mirrors and lenses in telescopes and binoculars	S10FE-IIh-52.2	1	
	Suggested Performance Task: Improvised Optical Device		2	
	In this suggested performance task, learners will make an improvised optical device from indigenous and recycled materials. Their improvised devices will be presented to the class.			
	Summative Assessment on S10FE-IIf-50, S10FE-IIg-51, and S10FE-IIh-52		1	
Domain	***ENERGY***			
Performance Standard	The learners shall be able to plan, perform, and record an audio-visul presentation using devices that apply both electricity and magnetism			
Content Standard	The learners demonstrate an understanding of the relationship between electricity and magnetism in electric motors and generators.			

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CONTENT	LEARNING COMPETENCIES	CODE	NO. OF DAYS TAUGHT	REMARKS
3. Electricity and Magnetism				
3.1 Electromagnetic effects	**7. Demonstrate the generation of electricity by movement of a magnet through a coil.**	**S10FE-IIi- 53**		
3.1.1 Electromagnetic Field	7.1. Define magnetic field, magnetic force, electric field and electric force.	S10FE-IIi-53.1	1	
3.1.2 Electromagnetic Induction	7.2. Perform an activity and observe the effect of magnetic field in a current carrying coil.	S10FE-IIi-53.2	1	
	7.3. Define electromagnetic induction.	S10FE-IIi-53.3	1	
	7.4. Identify the different factors that affect the magnetic force in a current carrying coil.	S10FE-IIi-53.4	1	
3.2 Electric Motor vs. Electric Generator	**8. Explain the operation of a simple electric motor and generator.**	**S10FE-IIj- 54**		
	8.1. Differentiate electric motor from electric generator.	S10FE-IIj-54.1	1	
	8.2. Explain the working principle of simple electric motor.	S10FE-IIj-54.2	1	
	8.2. Explain how electromagnetic induction is applied to electric generator.	S10FE-IIj-54.3	1	

	Suggested Performance Task: Audio-Visual Presentation using Devices that apply Electromagnetic concepts In this suggested performance task, learners will present an		1	
	Second Quarter Summative Test		**2**	
		TOTAL	**44**	