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Structuring Competencies in a Definitive Budget of Work

Grade	**EIGHT**			
Science Discipline/Component	**Force, Motion and Energy**			
Grade Level Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	**Force and Motion**			
	This time, learners study the concept of force and its relationship to motion. They use Newton's Laws of Motion to explain why objects move (or do not move) the way they do (as described in Grade 7). They also realize that if force is applied on a body, work can be done and may cause a change in the energy of the body.			
Performance Standard	The learners shall be able to develop a written plan and implement a "Newton's Olympics."			
Content Standard	The learners demonstrate an understanding of Newton's three laws of motion and uniform circular motion			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**
1. Laws of Motion	**1. The learners should be able to investigate the relationship between the amount of force applied and the mass of the object to the amount of change in the object's motion.**	**S8FE-Ia-15**		
1.1 Law of Inertia	1.1 define inertia	S8FE-Ia-15.1	1	
	1.2 relate inertia to mass	S8FE-Ia-15.2		
	1.3 explain the Law of Inertia	S8FE-Ia-15.3		

	1.4 relate inertia to stopping forces like friction	S8FE-Ia-15.4		
	1.5 cite situations where the law of inertia applies	S8FE-Ia-15.5		
1.2 Law of Acceleration	1.6 show the effect of force and mass on acceleration	S8FE-Ia-15.6	1	
	1.7 State Newton's Second law of Motion-The Law of Acceleration	S8FE-Ia-15.7		
	1.8 Solve problems involving the Law of	S8FE-Ia-15.8		
1.3 Law of Interaction	**2. The learners should be able to infer that when a body exerts a force on another, an equal amount of force is**	**S8FE-Ia-16**		
	2.1 explain newton's third law of motion as a law of interaction	S8FE-Ib-16.1	1	
	2.2 explain why action and reaction forces do not cancel each other	S8FE-Ib-16.2		
	2.3 apply the law of interaction to falling bodies and to activities like walking and swimming as well as to jet and rocket	S8FE-Ib-16.3		
	3. The learners should be able to demonstrate how a body responds to changes in motion.	**S8FE-Ib-17**	**1**	

	4. The learners should be able to relate the laws of motion to bodies in uniform circular motion.	**S8FE-Ib-18**		
	4.1 demonstrate and explain the concept of uniform circular motion applying Newton's	S8FE-Ib-18.1	1	
	5. infer that circular motion requires the application of constant force directed	**S8FE-Ib-19**	**1**	
	Suggested Performance Task: Physics Minute to Win It *In this suggested performance task, learners will present a Minute to Win It game that illustrates one of the three laws of*		**1**	
	Summative Assessment on S8FE-Ia-15, S8FE-Ia-16, S8FE-Ib-17, S8FE-Ib-18, and S8FE-Ib-19		**1**	
Science Discpline/ Component	**Force, Motion, and Energy**			
GradeLevel Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	**Energy** This time, learners Learners realize that transferred energy may cause changes in the properties of the object. They relate the observable changes in temperature, amount of current, and speed of sound to the changes in energy of the particles.			
Performance Standard	The learners shall be able to develop a written plan and implement a "Newton's Olympics."			
Content Standard	The learners demonstrate an understanding of work using constant force, power, gravitational potential energy, kinetic energy, and elastic potential energy.			

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CONTENT	LEARNING COMPETENCIES	CODE	NO. OF DAY/S TAUGHT	REMARKS
2. Work Power and Energy	**6. The learners should be able to identify situations in which work is done and in which no work is done.**	**S8FE-Ic-20**		
	6.1 differentiate between the scientific and layman's definition of work	S8FE-Ic-20.1	1	
	6.2 identify the factors affecting the work done	S8FE-Ic-20.2		
	6.3 calculate the work done in a given situation	S8FE-Ic-20.3		
	7. The learners should be able to describe how work is related to power and energy.	**S8FE-Ic-21**		
	7.1 define power	S8FE-Ic-21.1	1	
	7.2 calculate power expended in a given situation	S8FE-Ic-21.2		
	7.3 relate energy to work	S8FE-Ic-21.3	1	
	7.4 solve problems on work, power, and energy	S8FE-Ic-21.4		
	8. The learners should be able to differentiate potential and kinetic energy.	**S8FE-Id-22**		

	8.1 define gravitational potential energy	S8FE-Id-22.1	1	
	8.2 determine the factors that affect the gravitational potential energy gained by an object	S8FE-Id-22.2		
	8.3 calculate the potential energy of an object	S8FE-Id-22.3		
	8.4 define kinetic energy	S8FE-Id-22.4	1	
	8.5 determine the factors that affect the kinetic energy of an object	S8FE-Id-22.5		
	8.6 calculate the kinetic energy of an object	S8FE-Id-22.6		
	8.7 differentiate gravitational potential energy from kinetic energy	S8FE-Id-22.7		
	9. The learners should be able to relate speed and position of object to the amount of energy possessed by a body.	**S8FE-Id-23**		
	9.1 discuss how KE is related to mass and velocity and GPE to mass and height	S8FE-Id-23.1	1	
	9.2 solve problems on gravitational potential energy and kinetic energy	S8FE-Id-23.2	1	

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	Suggested Performance Task: Newton's Olympics In this performance task, learners in their groups will develop a plan for and implement a Newton's Olympics in which teams will play games that demonstrate the Newton's Laws, work done, gravitational potential energy, and kinetic energy.		**2**	
	Summative Assessment on S8FE-Ic-20, S8FE-Ic-21, S8FE-Id-22, and S8FE-Id-23		**1**	
Science Discpline/ Component	**Force, Motion, and Energy**			
GradeLevel Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	**Energy**			
	This time, learners realize that transferred energy may cause changes in the properties of the object. They relate the observable changes in temperature, amount of current, and speed of sound to the changes in energy of the particles.			
Performance Standard	The learners represent how the movement of particles			
Content Standard	The learners demonstrate an understanding of the propagation of sound through solid, liquid, and gas.			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**

3. Sound	**10. The learners should be able to infer how the movement of particles of an object affects the speed of sound through it.**	**S8FE-Ie-24**		
	10.1 differentiate the media used for sound to travel -solid, liquid, gas in terms of the movement of particles as sound passes through	S8FE-Ie-24.1	1	
	10.2 compare the speed of sound in these media	S8FE-Ie-24.2	1	
	10.3 use a diagram to explain how the speed of sound varies in different media	S8FE-Ie-24.3		
	11. The learners should be able to investigate the effect of temperature to speed of sound through fair testing;	**S8FE-Ie-25**		
	11.1 determine the effect of temperatute on the speed of sound	S8FE-Ie-25.1	1	
	11.2 compute the speed of sound in air at different temperature	S8FE-Ie-25.2		
	Suggested Performance Task: Illustrating How Speed of Sound Varies with Movement of Molecules		2	
	In this suggested performance task, learners will use a diagram, graph, graphic organizer, etc. to explain how the speed of sound varies with the movement of molecules.			
Science Discpline/ Component	**Force and Energy**			

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Grade Level Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	**Energy** This time, learners realize that transferred energy may cause changes in the properties of the object. They relate the observable changes in temperature, amount of current, and speed of sound to the changes in energy of the particles.			
Performance Standard	The learners present a report on phenomena such as blue sky, rainbow, and red sunset using the concept of wavelength and frequency of visible light.			
Content Standard	The learners demonstrate an understanding of some properties and characteristics of visible light.			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**
4. Light	**12. The learners should be able to demonstrate the existence of the color components of visible light using a prism or diffraction grating;**	**S8FE-If-26**	**1**	
	12.1 discuss what happens to light as it interacts with matter	S8FE-If-26.1	1	
	12.2 investigate the colors of sunlight	S8FE-If-26.2		
	12.3 explain how colors of objects are perceived by the eye	S8FE-If-26.3		

	13. The learners should be able to explain the hierarchy of colors in relation to energy.	**S8FE-If-27**		
	13.1 relate wavelength, frequency, and velocity of colors to energy that it carries	S8FE-If-27.1	1	
	13.2 explain the heirarchy of colors in relation to energy	S8FE-If-27.2		
	14. The learners should be able to explain that red is the least bent and violet the most bent according to their wavelengths or frequencies.	**S8FE-If-28**		
	14.1 explain refraction of light	S8FE-If-28.1	1	
	14.2 show through diagram why red is the least bent and violet the most bent according to their wavelengths of frequencies	S8FE-If-28.2		
	14.3 apply the concept of refraction of visible light to explain why the sky is blue	S8FE-If-28.3	1	
	14.4 apply the concept of refraction of visible light to explain why sunsets are red	S8FE-If-28.4		
	14.5 apply the concept of refraction of visible light to explain why clouds are white	S8FE-If-28.5		

	Suggested Performance Task: Talkshow on Colors in the			
	In this suggested performance task, learners will stage a talkshow in which the different applications of refraction of light in the sky are discussed and presented. Rainbows, blue sky, white clouds, and red sunsets will be discussed and presented.		1	
	Summative Assessment on S8FE-If-26, S8FE-If-27, and S8FE-28		**1**	
Science Discpline/ Component	***Force, Motion, and Energy***			
Grade Level Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	***Energy***			
	This time, learners Learners realize that transferred energy may cause changes in the properties of the object. They relate the observable changes in temperature, amount of current, and speed of sound to the changes in energy of the particles.			
Performance Standard	The learners solve problems on specific heat capacity.			
Content Standard	The learners demonstrate an understanding of heat and temperature, and the effects of heat on the body			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**
5. Heat	**15. The learners should be able to differentiate between heat and temperature at the molecular level.**	**S8FE-Ig-29**		

	15.1 define heat	S8FE-Ig-29.1	1	
	15.2 define temperature	S8FE-Ig-29.2		
	15.3 differentiate between heat and temperature at the molecular level	S8FE-Ig-29.3	1	
	15.4 explain the effects of heat on a body	S8FE-Ig-29.4		
	15.5 relate heat to mass and temperature through the concept of specific heat capacity	S8FE-Ig-29.5	1	
	15.6 calculate the heat absorbed or released to raise or decrease the temperature of a substance	S8FE-Ig-29.6		
	Suggested Performance Task: Problem Solving on Specific Heat Capacity		**1**	
	In this suggested performance task, learners will solve contextualized problems on specific heat capacity.			
Science Discpline/ Component	***Force, Motion, and Energy***			
GradeLevel Standard	At the end of Grade 8, learners can describe the factors that affect the motion of an object based on the Laws of Motion. They can differentiate the concept of work as used in science and in layman's language. They know the factors that affect the transfer of energy, such as temperature difference, and the type (solid, liquid, or gas) of the medium.			
Domain	***Energy***			
	This time, learners Learners realize that transferred energy may cause changes in the properties of the object. They relate the observable changes in temperature, amount of current, and speed of sound to the changes in energy of the particles.			
Performance Standard	The learners present a diagram of a their household wiring system.			

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Content Standard	The learners demonstrate an understanding of current- voltage-resistance relationship, electric power, electric energy, and home circuitry.			
CONTENT	**LEARNING COMPETENCIES**	**CODE**	**NO. OF DAY/S TAUGHT**	**REMARKS**
6. Electricity	**16. The learners should be able to infer the relationship between current and charge;** (I=Q/t)	**S8FE-Ih-30**		
	16.1 define electric charge	S8FE-Ih-30.1	1	
	16.2 differentiate between static electricity and current electricity	S8FE-Ih-30.2		
	16.3 infer the relationship between current and charge	S8FE-Ih-30.3	1	
	16.4 define current, voltage, and resistance	S8FE-Ih-30.4		
	16.5 discuss the relationship of current to voltage and resistance in an electrical circuit	S8FE-Ih-30.5	1	
	16.6 solve problems involving Ohm's Law	S8FE-Ih-30.6		
	17. The learners should be able to explain the advantages and disadvantages of series and parallel connections in homes.	**S8FE-Ii-31**		

	17.1 illustrate series and parallel connections through schematic diagrams	S8FE-Ii-31.1	1	
	17.2 differentiate series and parallel connections in terms of voltage, current, and resistance.	S8FE-Ii-31.2		
	17.3 explain the advantages and disadvantages of series and paralllel connections in homes	S8FE-Ii-31.3	1	
	18. The learners should be able to differentiate electrical power and electrical energy.	**S8FE-Ii-32**		
	18.1 define electrical power	S8FE-Ii-32.1	1	
	18.2 relate electrical power to current, voltage, and resistance	S8FE-Ii-32.2		
	18.3 define electrical energy	S8FE-Ii-32.3	1	
	18.4 differentitate between electrical power and electrical energy	S8FE-Ii-32.4		
	19. The learners should be able to explain the functions of circuit breakers, fuses, earthing, double insulation, and other safety devices in the home.	**S8FE-Ii-33**		

	Suggested Performance Task: Diagram of a Household Wiring System	**1**	
	In this suggested performance, learners will present a diagram of their household wiring system showing series and parallel connections and location of fuses, circuit breakers and other safety devices.		
	Summative Assessment for S8FE-Ih-30, S8FE-Ii-31, S8FE-Ii-32, and S8FE-Ii-33	**1**	
	First Quarter Summative Test	**2**	
	TOTAL	**45**	