Snapshot – Physical Science

Catholic Schools DIOCESE of DALLAS

Catholic Identity Standards		
PS.1	**Catholic identity standards.** The student understands and integrates the content of what is learned into their faith and daily life.*	
Ways to Grow	PS.1A	recognize that every human life is sacred because each person is created and loved by God*
	PS.1B	describe ways to take part in/be responsible to the community by discerning and using our God-given gifts*
	PS.1C	recognize and oppose unjust social structures and work toward justice for all*
	PS.1D	see God at work in all things and as expressed in the sacraments*
	PS.1E	connect scripture, tradition, and the models of Mary and the saints to guide, grow, and deepen faith*

Learning Process Standards			
PS.2	**Learning process standards.** The student uses scientific practices during laboratory and scientific investigations and uses critical thinking and scientific problem solving to make informed decisions. The student will explain how science limits its focus to "how" things physically exist and is not designed to answer issues of meaning, the value of things, or the mysteries of the human person.*		
Tools to Know		**Ways to Show**	
PS.2A	plan and conduct investigations	PS.2C	record and organize data and observations
PS.2B	collect information using appropriate scientific tools	PS.2D	communicate observations about investigations
		PS.2E	represent the natural world using models

Properties of Atoms, Elements, and Compounds			
PS.3	**Matter and energy.** The student knows that matter is composed of atoms and can differentiate elements and compounds. The student will explain what it means to say that God created the world and all matter out of nothing at a certain point in time; how it manifests His wisdom, glory, and purpose; and how He holds everything in existence according to His plan.*		
Applied Standards		**Supporting Standards**	
PS.3A	describe the structure of atoms, including the masses, electrical charges, and locations, of protons and neutrons in the nucleus and electrons in the electron cloud	PS.3A.1	identify that protons determine an element's identity and valence electrons determine its chemical properties, including reactivity
PS.3B	interpret the arrangement of the Periodic Table, including groups and periods, to explain how properties are used to classify elements	PS.3B.1	know that an element is a pure substance represented by a chemical symbol and that a compound is a pure substance represented by a chemical formula
PS.3C	develop models to describe the atomic composition of simple molecules and extended structures		

Chemical Formulas, Equations, and Reactions			
PS.3	**Matter and energy.** The student knows that matter has chemical and physical properties.		
PS.3D	recognize that chemical formulas are used to identify substances and determine the number of atoms of each element in chemical formulas containing subscripts		
PS.3E	investigate how evidence of chemical reactions indicates that new substances with different properties are formed and how that relates to the law of conservation of mass	PS.3E.1	distinguish between physical and chemical changes in matter
		PS.3E.2	identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change
		PS.3E.3	develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved
PS.3F	develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed		

Snapshot – Physical Science

Force, Motion, and Energy			
PS.4	**Force, motion, and energy.** The student knows that there is a relationship between force, motion, and energy.		
PS.4A	investigate and describe applications of Newton's three laws of motion	PS.4A.1	compare and contrast potential and kinetic energy
PS.4B	plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object	PS.4B.1 PS.4B.2 PS.4B.3 PS.4B.4 PS.4B.5	demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion differentiate between speed, velocity, and acceleration calculate average speed using distance and time measurements measure and graph changes in motion investigate how inclined planes can be used to change the amount of force to move an object
PS.4C	apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects	PS.4C.1	identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces
PS.4D	ask questions about data to determine the factors that affect the strength of electric and magnetic forces	PS.4D.1	conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact

Law of Conservation of Energy			
PS.4	**Force, motion, and energy.** The student knows that the Law of Conservation of Energy states that energy can neither be created nor destroyed, it just changes form.		
PS.4E	develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system	PS.4E.1	construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object
PS.4F	apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer	PS.4F.1 PS.4F.2 PS.4F.3	investigate methods of thermal energy transfer, including conduction, convection, and radiation verify through investigations that thermal energy moves in a predictable pattern from warmer to cooler until all the substances attain the same temperature such as an ice cube melting demonstrate energy transformations such as energy in a flashlight battery changing from chemical energy to electrical energy to light energy
PS.4G	construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object		

Waves and their Application			
PS.4	**Force, motion, and energy.** The student knows the characteristics and behavior of waves.		
PS.4H	use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave	PS.4H.1	develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials