

Properties of Atoms, Elements, and Compounds	Unit	CHECKPOINT		
		1	2	3
<p>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.*</p>				

Catholic Identity Standards (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 (Tools to Know)	Unit	CHECKPOINT		
		1	2	3
PS.2A plan and conduct investigations				
PS.2B collect information using appropriate scientific tools				

Content	Unit	CHECKPOINT		
		1	2	3
Structure of Atoms				
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				
Periodic Table				
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				
Atomic Composition of Molecules				
PS.3C develop models to describe the atomic composition of simple molecules and extended structures				

Learning Process Standards (Ways to Show)	Unit	CHECKPOINT		
		1	2	3
PS.2C record and organize data and observations				
PS.2D communicate observations about investigations				
PS.2E represent the natural world using models				

Chemical Formulas, Equations, and Reactions	Unit	CHECKPOINT		
		1	2	3
PS.3 Matter and energy. The student knows that matter has chemical and physical properties.				

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		1	2	3
Chemical Formulas				
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				

Chemical Reactions				
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				

Change in Particle Motion				
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				

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Force, Motion, and Energy	Unit	CHECKPOINT		
		1	2	3
PS.4 Force, motion, and energy. The student knows that there is a relationship between force, motion, and energy.				

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Content	Unit	CHECKPOINT		
		1	2	3
Motion				
PS.4A investigate and describe applications of Newton’s three laws of motion				
PS.4A.1 compare and contrast potential and kinetic energy				
Force				
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 demonstrate and calculate how unbalanced forces change the speed or direction of an object’s motion				
PS.4B.2 differentiate between speed, velocity, and acceleration				
PS.4B.3 calculate average speed using distance and time measurements				
PS.4B.4 measure and graph changes in motion				
PS.4B.5 investigate how inclined planes can be used to change the amount of force to move an object				
Newton’s Third Law				
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				
Electric and Magnetic 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				

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Law of Conservation of Energy	Unit	CHECKPOINT		
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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.				

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Potential and Kinetic Energy				
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				

Transfer of Energy				
PS.4F apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer				
PS.4F.1 investigate methods of thermal energy transfer, including conduction, convection, and radiation				
PS.4F.2 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				
PS.4F.3 demonstrate energy transformations such as energy in a flashlight battery changing from chemical energy to electrical energy to light energy				

Changes in Kinetic 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				

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Waves and their Application	Unit	CHECKPOINT		
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PS.4 Force, motion, and energy. The student knows the characteristics and behavior of waves.				

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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				

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