Introductory Physical Science (7th and 8th editions) & *Force, Motion, and Energy* – Alignment with Virginia Physical Science Standards of Learning

Standard of Learning	Performance Standard	IPS7 IPS8 Ch. 1	IPS7 IPS8 Ch. 2	IPS7 IPS8 Ch. 3	IPS7 IPS8 Ch. 4	IPS7 IPS8 Ch. 5	IPS7 IPS8 Ch. 6	IPS7 IPS8 Ch. 7	IPS7 IPS8 Ch. 8	IPS7 IPS8 Ch. 9	IPS7 IPS8 Ch. 10	IPS7 Ch. 11	IPS7 Ch. 12	FM &E Ch. 1	FM &E Ch. 2	FM &E Ch. 3	FM &E Ch. 4	FM &E Ch. 5	FM &E Ch. 6	FM &E Ch. 7
PS. 1 The student will plan and conduct investigations in which:	* length, mass, volume, density, temperature, weight, and force are accurately measured and reported using the International System of Units (SI - metric);	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and spring scales are used to gather data;	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* data from experiments are recorded and interpreted from bar, line, and circle graphs;	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* research skills are utilized using a variety of resources;	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* independent and dependent variables, constants, controls, and repeated trials are identified;	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* valid conclusions are made after analyzing data;	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* research methods are used to investigate practical problems and questions; and	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
	* experimental results are presented in appropriate written form.	X X	X X	X X	X X	X X	X X	X X	X X	X X	X	X	X	X	X	X	X	X	X	X
PS.2 The student will investigate and understand the basic nature of matter. Key concepts include:	* the particle theory of matter;								X X	X X		X	X							

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	* elements, compounds, mixtures, acids, bases, salts, organic, inorganic, solids, liquids, and gases;					X X	X X	X X	X X											
	* characteristics of types of matter based on physical and chemical properties;			X X	X X	X X	X X		X X											
	* physical properties (shape, density, solubility, odor, melting point, boiling point, color); and			X X	X X	X X														
	* chemical properties (acidity, basicity, combustibility, reactivity).																			
PS.3 The student will investigate and understand various models of atomic structure including:	* Bohr Model																			
	* Cloud (quantum) model																			
PS.4 The student will investigate and understand how to use the periodic table of elements to obtain information. Key concepts include:	* symbols, atomic numbers, atomic mass, chemical families, periods, valence numbers, metals, metal-loids, and nonmetals; and								X X		X	X								
	* binary compounds (chemical activity, physical properties, formulas, and nature of bonding).										X									
PS.5 The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include:	* physical changes (effect of temperature on state, particle size on solubility, and temperature on solubility);			X X	X X	X X													X	

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	* nuclear reactions (products of fusion and fission and their effects on human beings and the environment); and							X X												
	* chemical changes (types of reactions, reactants and products, and balanced equations).		X X	X X	X X	X X	X X													
PS.6 The student will investigate and understand states and forms of energy and how energy is trans-ferred and transformed. Key concepts include:	* potential and kinetic energy;																			X
	* mechanical, chemical, and electrical energy; and																			X
	* heat, light, and sound.																	X	X	
PS.7 The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include:	* absolute zero, phase change, freezing point, melting point, boiling point, conduction, convection, radiation, vaporization, and condensation; and																		X	
	* applications of heat transfer (heat engines, thermostats, and refrigeration).																		X	
PS.8 The student will investigate and understand characteristics of sound and technological applications of sound waves. Key concepts include:	* wave length, frequency, amplitude, interference; and																	X		
	* technological applications of sound.																	X		

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PS.9 The student will investigate and understand the nature and technological applications of light. Key concepts include:	* reflection, refraction, particle theory, wave theory; and																			
	* electromagnetic spectrum.																			
PS.10 The student will investigate and understand scientific principles and technological applications of work, force, and motion. Key concepts include:	* work, force, mechanical advantage, efficiency, power, horsepower, gravitational force, speed/velocity, mass/weight, Newton's three laws of motion, acceleration; and													X		X				X
	* applications (simple machines, compound machines, powered vehicles, rockets, restraining devices, projectiles).																			
PS.11 The student will investigate and understand basic principles of electricity and magnetism. Key concepts include:	* static, current, circuits; and												X							
	* magnetic fields and electromagnets.													X						