

**Introductory Physical Science (7th and 8th editions) & Force, Motion, and Energy – Alignment with Maryland Science Content Standards
Grades 6-8: Skills and Processes, Chemistry, Physics**

Standard	Indicator	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 IPS8 Ch. 11	IPS7 IPS8 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
1.0 Skills and Processes: Scientific Inquiry	1.8.1 access and process information from readings, investigations, and/or oral communications. (MLO 1.1.1)	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	X X	X X	X X	X X	X X
	1.8.2 formulate questions, which lead to the development of a testable hypothesis. (MLO 1.1.2)	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	X X	X X	X X	X X	X X
	1.8.3 use observations, research, and select appropriate scientific information to form predictions and hypotheses. (MLO 1.1.3)	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	X X	X X	X X	X X	X X
	1.8.4 recognize/develop well-designed procedures that identify the independent and dependent variables, the need for control when testing a factor, the importance of multiple trials, the selection of appropriate materials/equipment, and the development of clear, logical directions within an investigation. (MLO 1.1.4)	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	X X	X X	X X	X X	X X
	1.8.5 demonstrate safety when conducting an investigation.	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	X X	X X	X X	X X	X X
	1.8.6 use appropriate instruments and metric units when making measurements and collecting data. (MLO 1.1.5)	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	X X	X X	X X	X X	X X
	1.8.7 collect, organize, and display data in ways others can verify (i.e. numbers, statistics, tables, graphs, drawings, charts, diagrams) using appropriate instruments (e.g., calculators, spreadsheets, databases, and graphing programs). (MLO 1.1.6)	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	X X	X X	X X	X X	X X
	1.8.8 analyze and summarize data to identify trends and form a logical argument about a cause and effect relationship or a sequence of events. (MLO 1.1.7)	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	X X	X X	X X	X X	X X

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		Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6	Ch. 7	Ch. 8	Ch. 9	Ch. 10	Ch. 11	Ch. 12	Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6	Ch. 7
	1.8.9 interpret and communicate findings (i.e., <i>speaking</i> , writing, and drawing) in a form suited to the purpose and audience, using developmentally appropriate methods including technology tools and telecommunications. (MLO 1.1.8)	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	X	X	X
	1.8.10 describe similarities and differences of objects, materials, concepts, and actions. (MLO 1.2.1)	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	X	X	X
	1.8.11 construct and use classification systems for grouping objects, materials, concepts, actions, and organisms, etc. (MLO 1.2.2)	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	X	X	X
	<i>1.8.12 critique scientific information and identify possible sources of bias.</i>	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	X	X	X
1.0 Skills and Processes: Critical Thinking	1.8.13 analyze the adequacy of the supporting evidence used to form conclusions, devise a plan, or solve a practical problem. (MLO 1.2.3)	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	X	X	X
	1.8.14 provide supporting evidence when forming conclusions, devising a plan or solving a practical problem. (MLO 1.2.4)	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	X	X	X
	1.8.15 analyze and extend patterns. (MLO 1.2.5)	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	X	X	X
	1.8.16 modify ideas based on new information from developmentally appropriate readings, data, and the ideas of others. (MLO 1.2.6)	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	X	X	X
	1.8.17 describe to others how scientific information was used. (MLO 1.2.7)	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	X	X	X
1.0 Skills and Processes: Applications of Science	1.8.18 apply scientific principles and/or concepts to understand a new situation. (MLO 1.3.1)	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	X	X	X
	1.8.20 apply concepts and processes of science to take and defend a position relative to an issue. (MLO1.3.2)																			
	1.8.21 use the knowledge of science and available scientific equipment to devise a plan to solve a global problem. (MLO 1.3.3)				X X		X X	X X												

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	1.8.22 explain that a model has advantages and disadvantages and may need to be changed for different purposes. (MLO 1.4.1)		X X				X X				X									
	1.8.23 demonstrate and explain that tools are essential to scientific investigation for such purposes as to observe, estimate, measure, compute, collect, and communicate scientific data and information (i.e., size, distance, motion). (MLO 1.4.2)	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
	1.8.24 design, plan, and construct things in response to a particular need or problem (e.g., instruments, machines, structures, and systems).																			
	1.8.25 evaluate and modify designs and products, when demonstrating that a solution to one problem can result in other problems and taking into account various constraints (e.g., gravity, property of materials, economic, political, social, ethical, and aesthetic issues).																			
	1.8.26 explain that science and technology have strongly influenced life under different technological circumstances in the past and continue to do so today.																			
1.0 Skills and Processes: History of Science	1.8.27 explain how people from different cultures and times have made important contributions to the advancement of science, mathematics, and technology in different cultures at different times.																			
	1.8.28 explain that scientists are employed in various fields that are located in diverse places ranging from laboratories to natural field settings and their findings become available to everyone in the world.																			
4.0 Chemistry: Structure of Matter	4.8.1 distinguish one substance from another based on observable and measurable properties (i.e., density, boiling point, melting point). (MLO 4.1)			X X	X X	X X	X X		X X											

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	<i>4.8.2 describe the development of the atomic theory from Democritus to Bohr (Grade 8 only).</i>																				
4.0 Chemistry: Chemical or Physical Changes	4.8.3 distinguish between chemical and physical changes based on observable properties. (MLO 4.2)																				
4.0 Chemistry: Classification of Matter	<i>4.8.4 describe that elements combine in whole number ratios to form other substances called compounds (e.g., H₂O, CO₂, CO).</i>						X X														
	4.8.5 use groupings (i.e., simple periodic table, metals/non-metals, reactive/non-reactive) of matter to predict reactions. (MLO 4.3)																				
	4.8.6 explain that matter and energy cannot be created or destroyed but instead can be changed from one form into another. (MLO 4.4)		X X				X X		X X												X
4.0 Chemistry: Conservation of Matter and Energy	<i>4.8.7 distinguish between mass and weight.</i>														X						
	<i>4.8.8 explain that atoms and molecules are in constant motion and that an increase in temperature will increase that motion.</i>																				
5.0 Physics: Mechanics	5.8.2 explain that matter and energy cannot be created or destroyed but instead can be changed from one form into another. (MLO 5.1)		X X				X X		X X												X
	5.8.2 apply Newton's Laws of Motion (inertia, F= ma, action/reaction) to everyday situations. (MLO 5.2)													X		X					
	<i>5.8.3 distinguish between mass and weight.</i>														X						
	<i>5.8.4 measure and describe characteristics (i.e., speed, distance, mass, force) of moving objects and their interactions (i.e., force, velocity, acceleration, potential energy, kinetic energy) within a system.</i>													X	X	X	X	X			X

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	5.8.5 explain the fundamental concepts that underlie motions and forces and the relationships among them (e.g. inertia, $F=ma$, action/reaction, equilibrium).													X	X	X				
	5.8.6 explain that every object exerts gravitational force on every other object. (MLO 5.3)																			
	5.8.7 explain that heat energy is a product of energy transformations (i.e., a runner, simple machines, complex machines). (MLO 5.4)																			X
	5.8.8 explain that heat energy can be transferred through materials by conduction, convection and radiation.																		X	
	5.8.9 explain how energy moves from warmer objects to cooler ones until equilibrium is reached.																		X	
5.0 Physics: Electricity and Magnetism	5.8.10 identify and describe how various types of electric circuits (i.e., series and parallel) provide a means of transferring and using electrical energy to produce heat, light, sound, as well as chemical changes. (MLO 5.5)										X	X	X							
	5.8.11 compare different ways of obtaining, transforming, and distributing energy from various sources (e.g. fossil fuels, sun, water, radioisotopes) and their impact on the environment.																			
	5.8.12 explain that the strength of the magnetic force depends on the distance between the magnets and the object.													X						
	5.8.13 describe the magnetic effects of current (i.e., electro-magnet) and the electric effects of magnets (i.e., motors). (MLO 5.6)																			
5.0 Physics: Wave Interactions	5.8.14 describe behaviors (i.e., reflection, refraction and absorption) and properties (i.e., wave length, frequency, amplitude, velocity) of different kinds of waves. (MLO 5.7)																	X		

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	<i>5.8.16 explain that for an object to be “seen,” light reflected or emitted by an object must enter the eye.</i>																				
	<i>5.8.17 explain that white light is a mixture of many different colors and that colored light is a mixture of some of these colors.</i>																				
	<i>5.8.18 explain how the interaction of white light with an object produces the perceived color of the object.</i>																				
5.0 Physics: Nuclear Energy	<i>5.8.19 identify that nuclear fission and fusion are alternate forms of energy.</i>																				

Regular type is used when an indicator, or part of an indicator, is specifically included in the Maryland Learning Outcomes (MLO) for Science. These indicators are also cross-referenced by number with the Maryland Learning Outcomes. *Italicized* type is used when an indicator is not assessed as part of the High School Assessment – Science Core Learning Goals.