ELEMENTS OF BASIC INTEGRATED PHYSICS AND CHEMISTRY
PHYSICAL SCIENCE

	Student Text	Practice Book	Teacher Resource Edition Activities & Projects
1. Use the periodic table as a model to predict the relative properties and trends (e.g., reactivity of metals; types of bonds formed, including ionic, covalent, and polar covalent; numbers of bonds formed; reactions with oxygen) of main group elements based on the patterns of valence electrons in atoms.	22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52	27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53	Ch6, Ch7, Ch8, Ch9, Ch10, Ch16
2. Plan and carry out investigations (e.g., squeezing a balloon, placing a balloon on ice) to identify the relationships that exist among the pressure, volume, density, and temperature of a confined gas.	11	11	
3. Analyze and interpret data from a simple chemical reaction or combustion reaction involving main group elements.	84, 85, 86, 87, 88	84, 85, 86, 87, 88	Ch4
4. Analyze and interpret data using acid-base indicators (e.g., color-changing markers, pH paper) to distinguish between acids and bases, including comparisons between strong and weak acids and bases.	87, 88	87, 88	Ch14, Ch16
5. Use mathematical representations to support and verify the claim that atoms, and therefore mass, are conserved during a simple chemical reaction.	10, 24, 25, 26, 27, 28, 45, 46, 47, 61, 62, 168	10, 24, 25, 26, 27, 28, 45, 46, 47, 61, 62, 168	Ch23

6. Develop models to illustrate the concept of half-life for radioactive decay.	168	168	Ch23
a. Research and communicate information about types of naturally occurring radiation and their properties.	168, 169	168, 169	Ch27
b. Develop arguments for and against nuclear power generation compared to other types of power generation.	170, 171	170, 171	Ch23
7. Analyze and interpret data for one- and two-dimensional motion applying basic concepts of distance, displacement, speed, velocity, and acceleration (e.g., velocity versus time graphs, displacement versus time graphs, acceleration versus time graphs).	89, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124	89, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124	Ch25, Ch26, Ch27
8. Apply Newton's laws to predict the resulting motion of a system by constructing force diagrams that identify the external forces acting on the system, including friction (e.g., a book on a table, an object being pushed across a floor, an accelerating car).	89, 113	89, 113	Ch20, Ch23
9. Use mathematical equations (e.g., (m1v1 + m2v2) before = (m1v1 + m2v2) after) and diagrams to explain that the total momentum of a system of objects is conserved when there is no net external force on the system.	126	126	
a. Use the laws of conservation of mechanical energy and momentum to predict the result of one-dimensional elastic collisions.	112, 160, 165	112, 160, 165	

10. Construct simple series and parallel circuits containing resistors and batteries and apply Ohm's law to solve typical problems demonstrating the effect of changing values of resistors and voltages. Energy	156, 157, 158, 159, 160, 161	157, 158, 159, 160	Ch31
11. Design and conduct investigations to verify the law of conservation of energy, including transformations of potential energy, kinetic energy, thermal energy, and the effect of any work performed on or by the system.	126	126	Ch25
12. Design, build, and test the ability of a device (e.g., Rube Goldberg devices, wind turbines, solar cells, solar ovens) to convert one form of energy into another form of energy.			Ch35
13. Use mathematical representations to demonstrate the relationships among wavelength, frequency, and speed of waves (e.g., the relation $v = \lambda f$) traveling in various media (e.g., electromagnetic radiation traveling in a vacuum and glass, sound waves traveling through air and water, seismic waves traveling through Earth).	125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145	126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143	Ch27
14. Propose and defend a hypothesis based on information gathered from published materials (e.g., trade books, magazines, Internet resources, videos) for and against various claims for the safety of electromagnetic radiation.	136, 137, 138, 139, 140, 141	136, 137, 138, 139, 140	Ch27

15. Obtain and communicate information from published materials to explain how transmitting and receiving devices (e.g., cellular telephones, medical-imaging technology, solar cells, wireless Internet, scanners, Sound Navigation and Ranging [SONAR]) use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	135	135	Ch27