ELEMENTS OF BASIC INTEGRATED PHYSICS & CHEMISTRY

	Student Text	Practice Book	Teacher Resource Edition Activities & Projects
Strand - Scientific and engineering practices			
Knowledge & Skill Statement - IPC.1: The student, for at least 40% of instructional time, asks questions, identifies problems, and plans and safely conducts classroom, laboratory, and field investigations to answer questions, explain phenomena, or design solutions using appropriate tools and models. The student is expected to:			

IPC.1A: Ask questions and define problems based on observations or information from text, phenomena, models, or investigations.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 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, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 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, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 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, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 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, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	Ch1, Ch2, Ch3, Ch4, Ch5, Ch6, Ch7, Ch8, Ch9, Ch10, Ch11, Ch12, Ch13, Ch14, Ch15, Ch16, Ch17, Ch18, Ch19, Ch20, Ch21, Ch22, Ch23, Ch24, Ch25, Ch26, Ch27, Ch28, Ch29, Ch30, Ch31, Ch32, Ch33, Ch34, Ch35, Ch36
IPC.1B: Apply scientific practices to plan and conduct descriptive, comparative, and experimental investigations and use engineering practices to design solutions to problems.	6, 7, 8, 9, 10, 11, 19, 20, 33, 54, 61, 62, 74, 84, 90, 91, 92, 93, 96, 99, 103, 111, 112, 115, 117, 131, 151, 152, 153, 154, 155, 161, 162	6, 7, 8, 9, 10, 11, 19, 20, 74, 90, 91, 92, 93, 94, 151, 152, 153, 154, 155, 156	Ch2, Ch4, Ch14, Ch15, Ch19, Ch28, Ch29, Ch30, Ch32

IPC.1C: Use appropriate safety equipment and practices during laboratory, classroom, and field investigations as outlined in Texas Education Agency-approved safety standards.	18, 152, 175	152, 175	Ch17
IPC.1D: Use appropriate tools such as data-collecting probes, software applications, the internet, standard laboratory glassware, metric rulers, meter sticks, spring scales, multimeters, Gauss meters, wires, batteries, light bulbs, switches, magnets, electronic balances, mass sets, Celsius thermometers, hot plates, an adequate supply of consumable chemicals, lab notebooks or journals, timing devices, models, and diagrams.	18, 84, 88, 93, 96, 118, 135, 136, 137, 138, 139, 147, 148, 152, 153, 154, 155, 157, 159, 161, 162, 163, 184, 185, 186	88, 124, 143, 159	Ch14, Ch15, Ch17, Ch18, Ch19, Ch28, Ch29, Ch30, Ch31, Ch32
IPC.1E: Collect quantitative data using the International System of Units (SI) and qualitative data as evidence.	59, 60, 61, 62, 90, 91, 92, 93, 153, 154, 155	59, 60, 61, 62, 90, 91, 92, 93, 153, 154, 155, 158	
IPC.1F: Organize quantitative and qualitative data using labeled drawings and diagrams, graphic organizers, charts, tables, and graphs.	6, 7, 8, 9, 10, 11, 19, 20, 33, 54, 61, 62, 74, 84, 90, 91, 92, 93, 96, 99, 103, 111, 112, 115, 117, 131, 151, 152, 153, 154, 155, 161, 162	11	Ch1, Ch2, Ch3, Ch4, Ch5, Ch6, Ch7, Ch8, Ch9, Ch10, Ch11, Ch12, Ch13, Ch14, Ch15, Ch16, Ch17, Ch18, Ch19, Ch20, Ch21, Ch22, Ch23, Ch24, Ch25, Ch26, Ch27, Ch28, Ch29, Ch30, Ch31, Ch32, Ch33, Ch34, Ch35, Ch36

IPC.1G: Develop and use models to represent phenomena, systems, processes, or solutions to engineering problems.	10, 11, 23, 25, 27, 28, 29, 30, 31, 34, 45, 46, 47, 59, 60, 61, 62, 67, 83, 84, 88, 90, 91, 92, 93, 104, 105, 106, 107, 118, 121, 122, 123, 126, 128, 129, 132, 134, 135, 137, 139, 142, 143, 145, 147, 151, 152, 153, 154, 155, 159, 161, 162, 163, 165, 168, 175, 177, 178, 179, 180, 181	27, 28, 29, 30, 31, 32, 45, 46, 47, 48, 67, 91, 124, 125, 129, 134, 137, 143, 145, 151, 159, 172	Ch1, Ch2, Ch3, Ch4, Ch5, Ch6, Ch7, Ch8, Ch9, Ch10, Ch11, Ch12, Ch13, Ch14, Ch15, Ch16, Ch17, Ch18, Ch19, Ch20, Ch21, Ch22, Ch23, Ch24, Ch25, Ch26, Ch27, Ch28, Ch29, Ch30, Ch31, Ch32, Ch33, Ch34, Ch35, Ch36
IPC.1H: Distinguish between scientific hypotheses, theories, and laws.	11		Ch14, Ch15
Knowledge & Skill Statement - IPC.2: The student analyzes and interprets data to derive meaning, identify features and patterns, and discover relationships or correlations to develop evidence-based arguments or evaluate designs. The student is expected to:			
IPC.2A: Identify advantages and limitations of models such as their size, scale, properties, and materials.	9, 10, 11, 61, 91, 92, 93, 112, 152	8, 10, 11, 61, 91, 92, 93, 94, 95, 96, 97, 98, 99	Ch4, Ch6, Ch7, Ch9, Ch10, Ch14, Ch15, Ch16, Ch28, Ch33
IPC.2B: Analyze data by identifying significant statistical features, patterns, sources of error, and limitations.	10, 58, 59, 60, 61, 62, 83, 85, 88, 90, 91, 92, 93, 99, 112, 117, 120, 121, 122, 123, 124, 151, 153, 154, 155, 156, 161	10, 58, 59, 60, 61, 62, 63, 83, 85, 90, 91, 92, 93, 94, 99, 117, 121, 122, 123, 124, 151, 152, 153, 154, 155, 156	Ch4, Ch12, Ch14, Ch15, Ch18, Ch19, Ch23, Ch30
IPC.2C: Use mathematical calculations to assess quantitative relationships in data.	10, 58, 59, 60, 61, 62, 83, 85, 88, 90, 91, 92, 93, 99, 112, 117, 120, 121, 122, 123, 124, 151, 153, 154, 155, 156, 161	10, 58, 59, 60, 61, 62, 63, 83, 85, 90, 91, 92, 93, 94, 99, 117, 121, 122, 123, 124, 151, 152, 153, 154, 155, 156	Ch4, Ch12, Ch14, Ch15, Ch18, Ch19, Ch23, Ch30

IPC.2D: Evaluate experimental and engineering designs.	6, 7, 8, 9, 10, 11, 19, 20, 33, 54, 61, 62, 74, 84, 90, 91, 92, 93, 96, 99, 103, 111, 112, 115, 117, 131, 151, 152, 153, 154, 155, 161, 162	6, 7, 8, 9, 10, 11, 19, 20, 74, 90, 91, 92, 93, 94, 151, 152, 153, 154, 155, 156	Ch2, Ch4, Ch14, Ch15, Ch19, Ch28, Ch29, Ch30, Ch32
Knowledge & Skill Statement - IPC.3: The student develops evidence-based explanations and communicates findings, conclusions, and proposed solutions. The student is expected to:			
IPC.3A: Develop explanations and propose solutions supported by data and models and consistent with scientific ideas, principles, and theories.	9, 10, 11, 61, 91, 92, 93, 112, 152	8, 10, 11, 61, 91, 92, 93, 94, 95, 96, 97, 98, 99	Ch4, Ch6, Ch7, Ch9, Ch10, Ch14, Ch15, Ch16, Ch28, Ch33
IPC.3B: Communicate explanations and solutions individually and collaboratively in a variety of settings and formats.	9, 10, 11, 61, 91, 92, 93, 112, 152	8, 10, 11, 61, 91, 92, 93, 94, 95, 96, 97, 98, 99	Ch4, Ch6, Ch7, Ch9, Ch10, Ch14, Ch15, Ch16, Ch28, Ch33
IPC.3C: Engage respectfully in scientific argumentation using applied scientific explanations and empirical evidence.	4		
Knowledge & Skill Statement - IPC.4: The student knows the contributions of scientists and recognizes the importance of scientific research and innovation on society. The student is expected to:			
IPC.4A: Analyze, evaluate, and critique scientific explanations and solutions by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student.	6, 7, 8, 9, 10, 11, 19, 20, 33, 54, 61, 62, 74, 84, 90, 91, 92, 93, 96, 99, 103, 111, 112, 115, 117, 131, 151, 152, 153, 154, 155, 161, 162	6, 7, 8, 9, 10, 11, 19, 20, 74, 90, 91, 92, 93, 94, 151, 152, 153, 154, 155, 156	Ch2, Ch4, Ch14, Ch15, Ch19, Ch28, Ch29, Ch30, Ch32

IPC.4B: Relate the impact of past and current research on scientific thought and society, including research methodology, costbenefit analysis, and contributions of diverse scientists as related to the content.	5, 9, 10, 13, 15, 16, 27, 56, 84, 107, 113, 116	5, 9, 10, 13, 15, 16, 27, 56, 84, 107, 113, 116	Ch1, Ch20
IPC.4C: Research and explore resources such as museums, libraries, professional organizations, private companies, online platforms, and mentors employed in a science, technology, engineering, and mathematics (STEM) field in order to investigate STEM careers.	2, 3, 38, 133	2, 3, 38, 133	Ch1
Strand - Science concepts			
Knowledge & Skill Statement - IPC.5: The student knows the relationship between force and motion in everyday life. The student is expected to:			
IPC.5A: Investigate, analyze, and model motion in terms of position, velocity, acceleration, and time using tables, graphs, and mathematical relationships.	11, 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	11, 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	Ch19, Ch20, Ch23
IPC.5B: Analyze data to explain the relationship between mass and acceleration in terms of the net force on an object in one dimension using force diagrams, tables, and graphs.	11, 89, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116	11, 89, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116	Ch12, Ch23

IPC.5C: Apply the concepts of momentum and impulse to design, evaluate, and refine a device to minimize the net force on objects during collisions such as those that occur during vehicular accidents, sports activities, or the dropping of personal electronic devices.	11, 89, 112, 113	11, 89, 112, 113	Ch19
IPC.5D: Describe the nature of the four fundamental forces: gravitation; electromagnetic; the strong and weak nuclear forces, including fission and fusion; and mass-energy equivalency.	11, 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, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 170, 171	11, 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, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 170, 171	Ch23
IPC.5E: Construct and communicate an explanation based on evidence for how changes in mass, charge, and distance affect the strength of gravitational and electrical forces between two objects.	6, 7, 9, 10, 15, 23, 24, 25, 26, 27, 28, 33, 45, 46, 47, 61, 62, 66, 67, 68, 71, 80, 84, 89, 92, 105, 106, 107, 110, 113, 115, 116, 117, 118, 119, 135, 153, 157, 158, 168	6, 7, 9, 10, 15, 23, 24, 25, 26, 27, 28, 33, 45, 46, 47, 61, 62, 66, 67, 68, 71, 80, 84, 89, 92, 105, 106, 107, 110, 113, 115, 116, 117, 118, 119, 135, 153, 157, 158, 168	Ch12, Ch19, Ch20, Ch23
Knowledge & Skill Statement - IPC.6: The student knows the impact of energy transfer and energy conservation in everyday life. The student is expected to:			
IPC.6A: Design and construct series and parallel circuits that model real-world circuits such as in-home wiring, automobile wiring, and simple electrical devices to evaluate the transfer of electrical energy.	157, 158, 159, 160, 161	158, 159	Ch31

IPC.6B: Design, evaluate, and refine a device that generates electrical energy through the interaction of electric charges and magnetic fields.	166	158, 159	Ch31
IPC.6C: Plan and conduct an investigation to provide evidence that energy is conserved within a closed system.	166, 159	159	Ch31
IPC.6D: Investigate and demonstrate the movement of thermal energy through solids, liquids, and gases by convection, conduction, and radiation such as weather, living, and mechanical systems.	33, 35, 43, 48, 139	33, 35, 43, 48, 139	Ch31
IPC.6E: Plan and conduct an investigation to evaluate the transfer of energy or information through different materials by different types of waves such as wireless signals, ultraviolet radiation, and microwaves.	125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 166	125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 166	Ch27
IPC.6F: Construct and communicate an evidence-based explanation for how wave interference, reflection, and refraction are used in technology such as medicine, communication, and scientific research.	125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150	125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150	
IPC.6G: Evaluate evidence from multiple sources to critique the advantages and disadvantages of various renewable and nonrenewable energy sources and their impact on society and the environment.	167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	Ch36

Knowledge & Skill Statement - IPC.7: The student knows that relationships exist between the structure and properties of matter. The student is expected to:			
IPC.7A: Model basic atomic structure and relate an element's atomic structure to its bonding, reactivity, and placement on the Periodic Table.	6, 14, 15, 16, 18, 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, 54, 64, 65, 66, 67, 68, 69, 70, 71, 72, 79, 80, 81, 82, 83, 137, 140, 141, 157, 158, 164, 167, 168, 170, 171	6, 14, 15, 16, 18, 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, 54, 64, 65, 66, 67, 68, 69, 70, 71, 72, 79, 80, 81, 82, 83, 137, 140, 141, 157, 158, 164, 167, 168, 170, 171	Ch5, Ch6, Ch16, Ch33
IPC.7B: Use patterns within the Periodic Table to predict the relative physical and chemical properties of elements.	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	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	Ch6, Ch7
IPC.7C: Explain how physical and chemical properties of substances are related to their usage in everyday life such as in sunscreen, cookware, industrial applications, and fuels.	26, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52	26, 33, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 46, 47, 48, 49, 50, 51, 52	Ch2, Ch9, Ch10
IPC.7D: Explain how electrons can transition from a high energy level to a low energy state, emitting photons at different frequencies for different energy transitions.	23, 24, 25, 26, 34, 66, 67, 68, 80, 81, 82, 157, 158	23, 24, 25, 26, 34, 66, 67, 68, 80, 81, 82, 157, 158	
IPC.7E: Explain how atomic energy levels and emission spectra present evidence for the wave particle duality.	127, 128, 133, 141	127, 128, 133, 141	Ch25, Ch26, Ch27

IPC.7F: Plan and conduct an investigation to provide evidence that the rate of reaction or dissolving is affected by multiple factors such as particle size, stirring, temperature, and concentration.	20, 21, 35, 42, 69, 70, 71, 72, 73, 86, 87	20, 21, 35, 42, 69, 70, 71, 72, 73, 86, 87	Ch4
Knowledge & Skill Statement - IPC.8: The student knows that changes in matter affect everyday life. The student is expected to:			
IPC.8A: Investigate how changes in properties are indicative of chemical reactions such as hydrochloric acid with a metal, oxidation of metal, combustion, and neutralizing an acid with a base.	33, 35, 38, 41, 42, 50, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 83, 84, 85, 86, 87, 88	33, 35, 38, 41, 42, 50, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 83, 84, 85, 86, 87, 88	Ch14, Ch16, Ch17
IPC.8B: Develop and use models to balance chemical equations and support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	82, 83, 85	82, 83, 85	Ch17
IPC.8C: Research and communicate the uses, advantages, and disadvantages of nuclear reactions in current technologies.	167, 168, 169, 170, 171	167, 168, 169, 170, 171	Ch33
IPC.8D: Construct and communicate an evidence-based explanation of the environmental impact of the end-products of chemical reactions such as those that may result in degradation of water, soil, air quality, and global climate change.	78, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	78, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186	Ch26, Ch33, Ch34, Ch35, Ch36