



SCOPE AND SEQUENCE 2019-2020

SCIENCE- INTERGRATED PHYSICS AND CHEMISTRY (IPC)

Texas Essential Knowledge and Skills/Student Expectations (TEKS/SEs)

S. ARRONIZ

CYCLE 1: 29 DAYS.AUG. 27- OCT. 4, 2019

UNIT 1: Structure and Properties of Matter- students investigate, describe and differentiate between physical and chemical properties of elements and compounds including density, viscosity, buoyancy, boiling point, freezing point, conductivity and reactivity.

Science Process Standards:

IPC.1A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers.

IPC.1B Know specific hazards of chemical substances such as flammability, corrosiveness, and radioactivity as summarized on the Safety Data Sheets (SDS).

IPC.1C Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.

IPC.2A Know the definition of science and understand that it has limitations.

IPC.2B Plan and safely implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

Science Content Standards:

IPC.6A Examine differences in physical properties of solids, liquids, and gases as explained by the arrangement and motion of atoms or molecules.

IPC.6C Analyze physical and chemical properties of elements and compounds such as color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.

UNIT 2: Solutions- Students investigate the properties of solutions and factors such as temperature, pressure, pH, and concentration that effect solubility.

Science Process Standards:

IPC.2B Plan and safely implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

Science Content Standards:

IPC.6E Relate the structure of water to its function as a solvent.

IPC.6F Investigate the properties of water solutions and factors affecting solid solubility, including nature of solute, temperature, and concentration.

CYCLE 2: 24 DAYS OCT. 7- NOV. 8, 2019

UNIT 3: Structure of the periodic table: The focus of this unit is on the periodic table and how the placement of the elements in the periodic table is related to the chemical behavior of an element. Students investigate the structure of the periodic table and identify and compare the properties of metals and nonmetals.

Science Process Standards:

IPC.1A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers.

IPC.2B Plan and implement investigative processes including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

IPC.3A Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing.

IPC.3F Research and describe the history of physics and chemistry and contributions of scientists.

Science Content Standards:

IPC.6D Relate the placement of an element of the Periodic Table to its physical and chemical behavior, including bonding and classification.

IPC.6B Relate chemical properties of substances to the arrangement of their atoms.

UNIT 4: Bonding and periodic table: Describe chemical bonds and distinguish between ionic and covalent bonds. Students describe, interpret, write, construct and name chemical formulas.

Science Process Standards:

IPC.1A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers.

IPC.2B Plan and implement investigative processes including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

IPC.3A Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing.

IPC.3E Describe connections between physics and chemistry and future careers.

Science Content Standards:

IPC.6D Relate the placement of an element of the Periodic Table to its physical and chemical behavior, including bonding and classification.

IPC.6B Relate chemical properties of substances to the arrangement of their atoms.

CYCLE 3: 24 DAYS NOV. 11-DEC 19, 2019

UNIT 5: Changes in Matter: Students investigate physical and chemical changes in matter and analyze chemical reactions by applying the Law of conservation of mass to balanced chemical equations.

Science Process Standards:

IPC.2B Plan and safely implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

IPC.3A Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing.

Science Content Standards:

IPC.7A Investigate changes of state as it relates to the arrangement of particles of matter and energy transfer.

IPC.7B Recognize that chemical changes can occur when substances react to form different substances and that these interactions are largely determined by the valence electrons.

IPC.7C Demonstrate that mass is conserved when substances undergo chemical change and that the number and kind of atoms are the same in the reactants and products.

IPC.7D Classify energy changes that accompany chemical reactions such as those occurring in heat packs, cold packs, and glow sticks as exothermic or endothermic reactions.

IPC.7F Research and describe the environmental and economic impact of the end-products of chemical reactions such as those that may result in acid rain, degradation of water and air quality, and ozone depletion.

UNIT 6: Nuclear chemistry: The focus of this unit is on nuclear reactions such as fission and fusion their roles in applications such as medicine and energy.

Science Process Standards:

IPC.1A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles, and fire extinguishers.

IPC.2A Know the definition of science and understand that it has limitations.

IPC.2B Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2E Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.

IPC.3D Evaluate the impact of research on scientific thought, society, and the environment.

Science Content Standards:

IPC.7E Describe types of nuclear reactions such as fission and fusion and their roles in applications such as medicine and energy production

CYCLE 4: 29 DAYS JAN 6- FEB 14. 2020

UNIT 7: Force and Motion STEM Project: These lessons focus on fundamental concepts of force and motion. Students gain an understanding of the laws of motion and how forces related to motion affect the physical world. Students implement STEM-based project related to force and motion.

Science Process Standards:

IPC.2B Plan and implement investigative procedures, including asking questions, formulating testable hypotheses, identifying variables, conducting multiple trials, and selecting course-specific, content-embedded equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

IPC.2E Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports, and technology-based reports.

Science Content Standards:

IPC.4A Describe and calculate an object's motion in terms of position, displacement, speed, and acceleration.

IPC.4B Measure and graph distance and speed as a function of time.

IPC.4C Investigate how an object's motion changes only when a net force is applied, including activities and equipment such as toy cars, vehicle restraints, sports activities, and classroom objects.

IPC.4D Describe and calculate the relationship between force, mass, and acceleration using equipment such as dynamic carts, moving toys, vehicles, and falling objects.

IPC.4E Explain the concept of conservation of momentum using action and reaction forces.

UNIT 8: GRAVITATIONAL AND ELECTRIC FORCES: The focus for this unit is to introduce the concepts of gravitational and electric forces

Science Process Standards:

Ⓢ**IPC.2B** Plan and implement investigative procedures, including asking questions, formulating testable hypotheses, identifying variables, conducting multiple trials, and selecting course-specific, content-embedded equipment and technology.

Ⓢ**IPC.2C** Collect data and make measurements with accuracy and precision.

Ⓢ**IPC.3D** Evaluate the impact of research on scientific thought, society, and the environment.

Science Content Standards:

IPC.4F Describe the gravitational attraction between objects of different masses at different distances.

IPC.4G Examine electrical force as a universal force between any two charged objects.

CYCLE 5: 29 DAYS FEB 17 TO APR 3, 2020

UNIT 9: ENERGY: The focus of this unit is on energy. Its multiple forms, the impact of energy transfer and energy, and energy transfer, and energy conservation in everyday life.

Science Process Standards:

IPC.3C Draw inferences based on data related to promotional materials for products and services.

Science Content Standards:

IPC.5A Recognize and demonstrate that objects and substances in motion have kinetic energy such as vibration of atoms, water flowing down a stream moving pebbles, and bowling balls knocking down pins.

IPC.5B Recognize and demonstrate common forms of potential energy, including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs, and batteries.

IPC.5D Investigate the law of conservation of energy.

IPC.5H Analyze energy transformations of renewable and nonrenewable resources.

IPC.5I Critique the advantages and disadvantages of various energy sources and their impact on society and the environment.

UNIT 10: HEAT: Students focus on explaining the difference between heat and temperature and investigating heat transfer through solids, liquids and gases by convection, conduction, and radiation. In addition, students measure the thermal conductivity of various materials and explain the results.

Science Process Standards:

IPC.2B Plan and implement investigative procedures, including asking questions, formulating testable hypotheses, identifying variables, conducting multiple trials, and selecting course-specific, content-embedded equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

Science Content Standards:

IPC.5E Investigate and demonstrate the movement of thermal energy through solids, liquids, and gases by convection, conduction, and radiation, such as in weather, living, and mechanical systems.

CYCLE 6: 38 DAYS APR. 6 TO MAY 29, 2020

UNIT 11: Electricity and Magnetism: Students focus on the investigation and comparison of series and parallel circuits and measure electrical conductivity of various materials and explain the results. Students solve mathematical problems on voltage, resistance and electrical current using Ohm's Law. In addition, students analyze the relationship between an electrical current and the strength of its magnetic field using simple electromagnets.

Science Process Standards:

IPC.2B Plan and implement investigative procedures, including asking questions, formulating testable hypotheses, identifying variables, conducting multiple trials, and selecting course-specific, content-embedded equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.3B Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.

Science Content Standards:

IPC.5C Demonstrate that moving electric charges produce magnetic forces and moving magnets produce electric forces.

IPC.5F Evaluate the transfer of electrical energy in series and parallel circuits, and conductive materials.

UNIT 12: Sound and waves: Students investigate sound waves and the demonstration of wave types and their characteristics and wave interactions.

Science Process Standards:

IPC.2B Plan and implement investigative procedures, including asking questions, formulating testable hypotheses, identifying variables, conducting multiple trials, and selecting course-specific, content-embedded equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

Science Content Standards:

IPC.5G Explore the characteristics and behaviors of energy transferred by waves including acoustic, seismic, light and waves on water as they reflect, refract, diffract, interfere with one another, and are absorbed by materials.

UNIT 13: Light: Students describe the components of white light and the phenomenon of color. They describe how light can be polarized, reflected, refracted and explain its mechanisms and uses.

Science Process Standards:

IPC.2B Plan and safely implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.

IPC.2C Collect data and make measurements with accuracy and precision.

IPC.2D Organize, analyze, evaluate, make inferences, and predict trends from data.

IPC.3A Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning and experimental and observational testing.

Science Content Standards:

IPC.5G Explore the characteristics and behaviors of energy transferred by waves including acoustic, seismic, light and waves on water as they reflect, refract, diffract, interfere with one another, and are absorbed by materials.