Alignment to Texas Essential Knowledge and Skills

Here Comes the Sun
Lesson focuses on solar panel design, and its application in the standard calculator. It explores how both solar panels and calculators operate and explores simple circuits using solar power.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	IPC	Physics
Strand: Scientific Investigation and Reasoning							
1.A Demonstrate safe practices as described in the Texas Safety Standards during classroom and outdoor investigations including observing a schoolyard habitat.	1.A Demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations.	1.A Demonstrate safe practices and the use of safety equipment as described in the Texas Safety Standards during classroom and outdoor investigations.	1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards.	1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards.	1.A Demonstrate safe practices during laboratory and field investigations as outlined in the Texas Safety Standards.	1.A Demonstrate safe practices during laboratory and field investigations.	1.A Demonstrate safe practices during laboratory and field investigations.
1.B Make informed choices in the use and conservation of natural resources by recycling or reusing materials such as paper, aluminum cans, and plastics.	1.B Make informed choices in the use and conservation of natural resources and reusing and recycling of materials such as paper, aluminum, glass, cans and plastic.	1.B Make informed choices in the conservation, disposal, and recycling of materials.	1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	1.B Practice appropriate use and conservation of resources including disposal, reuse, or recycling of materials.	1.B Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	1.B Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.
2.A Plan and implement descriptive investigations including asking and answering questions, making inferences, and selecting and using equipment or technology needed to solve a specific problem in the natural world.	2.A Plan and implement descriptive investigations, including asking well-defined questions, making inferences, and selecting and using appropriate equipment or technology to answer his/her questions.	2.A Describe, plan and implement simple experimental investigations testing one variable.	2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions, and using appropriate equipment and technology.	2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions and using appropriate equipment and technology.	2.A Plan and implement comparative and descriptive investigations by making observations, asking well- defined questions, and selecting and using appropriate equipment and technology.	2.B Plan and implement investigate procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology.	2.E Design and implement investigative procedures including making observations, asking well-defined questions, formulating testable hypotheses, identifying variables, selecting appropriate equipment and technology, and evaluating numerical answers for reasonableness.
		2.B Ask well-defined questions, formulate testable hypotheses, and	2.B Design and implement experimental investigations by	2.B Design and implement experimental investigations by	2.B Design and implement comparative and experimental		

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		select and use appropriate equipment and technology.	making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	investigations by making observations, asking well-defined questions, formulating testable hypotheses and selecting and using appropriate equipment and technology.		
2.B Collect data by observing and measuring using the metric system and recognize differences between observed and measured data.	2.B Collect and record data by observing and measuring, using the metric system, and using descriptive words and numerals, such as labeled drawings, writing, and concept maps.	2.C Collect information by detailed observations and accurate measuring.	2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	2.C Collect data and make measurements with precision.	
2.C Construct maps, graphic organizers, simple tables, charts, and bar graphs using tools and current technology to organize, examine, and evaluate measured data.	2.C Construct simple tables, charts, bar graphs, and maps using tools and current technology to organize, examine, and evaluate data.	2.G Construct appropriate simple graphs, tables, maps, and charts using technology including computers to organize, examine, and evaluate information.	2.D Construct tables, using repeated trials and means to organize data and identify patterns.	2.D Construct tables and graphs, using repeated trials and means to organize data and identify patterns.	2.D Construct tables and graphs, using repeated trials and means, to organize data and identify patterns.		
2.D Analyze and interpret patterns in data to construct reasonable explanations based on evidence from investigations.	2.D Analyze data and interpret patterns to construct reasonable explanations from data that can be observed and measured.	2.D Analyze and interpret information to construct reasonable explanations from direct (observable) and indirect (inferred) evidence.	2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	2.E Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends.	2.D Organize, analyze, evaluate, make inferences, and predict trends from data.	
2.E Demonstrate that repeated investigations may increase the reliability of results.	2.E Perform repeated investigations to increase the reliability of results.	2.E Demonstrate that repeated investigations may increase the reliability of results.					
2.F Communicate valid conclusions supported by data in writing, by drawing	2.F Communicate valid, oral and written results supported by data.	2.F Communicate valid conclusions in both written and verbal forms.				2.E Communicate valid conclusions.	2.K Communicate valid conclusions supported by the data through various

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pictures, and through verbal discussion.							methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports.
		3.C Draw or develop a model that represents how something works or looks that cannot be seen such as how a soda dispensing machine works.	3.B Use models to represent aspects of the natural world such as a model of Earth's layers.	3.B Use models to represent aspects of the natural world such as human body systems, and plant and animal cells.	3.B Use models to represent aspects of the natural world such as an atom, a molecule, space or a geologic feature.		
							3.B Communicate and apply scientific information extracted from various sources such as current events, news reports, published journal articles and marketing materials.
3.D Connect grade level appropriate science concepts with the history of science, science careers and contributions of scientists.	3.D Connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.	3.D Connect grade-level appropriate science concepts with the history of science, science careers, and contributions of scientists.	3.D Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content.	3.D Relate the impact of research on scientific thought and society, including history of science and contributions of scientists as related to the content.	3.D Relate the impact of research on scientific thought and society including the history of science and contributions of scientists as related to the content.	3.D Evaluate the impact of research on scientific thought, society, and the environment.	3.D Explain the impacts of the scientific contributions of a variety of historical and contemporary scientists on scientific thought and society.
						3.E Describe connections between physics and chemistry and future careers.	3.E Research and describe the connections between physics and future careers.
Strand: Matter and Energy							
	5.B Predict the changes caused by heating and cooling, such as ice becoming liquid	5.A Classify matter based on physical properties including: mass, magnetism,	5.A Know that an element is a pure substance represented by chemical symbols.			6.B Relate chemical properties of substances to the arrangement of their atoms or molecules.	8.A Describe the photoelectric effect and the dual nature of light.

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	water and condensation forming on the outside of a glass of ice water	physical state (solid, liquid, and gas), relative density (sinking and floating), and solubility in water, and the ability to conduct or insulate thermal energy or electric energy.					
	5.A Measure, compare, and contrast physical properties of matter including size, mass, volume, states (solid, liquid, gas), temperature, magnetism, and the ability to sink or float.		5.C Differentiate between elements and compounds on the most basic level.			6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.	
			7.A Research and debate the advantages and disadvantages of using coal, oil, natural gas, nuclear power, biomass, wind, hydropower, geothermal, and solar resources.			6.D Relate the physical and chemical behavior of an element including bonding and classification to its placement on the Periodic Table.	
			7.B Design a logical plan to manage energy resources in the home, school or community.				
Strand: Force, Motion and Energy							
6.A Explore different forms of energy including mechanical, light, sound, and heat/thermal in everyday life.	6.A Differentiate among forms of energy including mechanical, sound, electrical, light, and heat/thermal.	6.A Explore the uses of energy including mechanical, light, thermal, electrical, and sound energy.	8.A Compare and contrast potential and kinetic energy.			5.A 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	5.C Describe and calculate how the magnitude of the electrical force between two objects depends on their charges and the distance between them.

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						bowling balls knocking down pins.	
	6.B Differentiate between conductors and insulators.	6.B Demonstrate that the flow of electricity in circuits requires a complete path through which an electric current can pass and can produce light, heat, and sound.	9.A Investigate methods of thermal energy transfer including conduction, convection, and radiation.			5.B Demonstrate common forms of potential energy including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs and batteries.	5.D Identify examples of electric and magnetic forces in everyday life.
	6.C Demonstrate that electricity travels in a closed path, creating an electrical circuit, and explore an electromagnetic field.	6.C Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another and demonstrate that light can be reflected such as the use of mirrors or other shiny surfaces, and refracted such as the appearance of an object when observed through water.	9.B Verify through investigations that thermal energy moves in a predictable pattern from warmer to cooler until all the substances attain the same temperature such as an ice cube melting.			5.E 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.	5.E Characterize materials as conductors or insulators based on their electrical properties.
			9.C Demonstrate energy transformations such as the energy in a flashlight battery changes from chemical energy to electrical energy to light energy.			5.F Evaluate the transfer of electrical energy in series and parallel circuits, and conductive materials.	6.B Investigate examples of kinetic and potential energy and their transformations.
						5.G Explore the characteristics and behaviors of energy transferred by waves including acoustic, seismic, light and waves on water as they superpose on one another, bend around corners,	6.E Describe how the macroscopic properties of a thermodynamic system such as temperature, specific heat, and pressure are related to the molecular level of matter including

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						reflect off surfaces, are absorbed by materials and change direction when entering new materials.	kinetic or potential energy of atoms.
						5.H Analyze energy conversions such as those from radiant, nuclear, and geothermal sources, fossil fuels such as coal, gas, oil, and the movement of water or wind.	6.F Contrast and give examples of different processes of thermal energy transfer including conduction, convection, and radiation.
						5.I Critique the advantages and disadvantages of various energy sources and their impact on society and the environment.	6.G Analyze and explain everyday examples that illustrate the laws of thermodynamics, including the law of conservation of energy and the law of entropy.
							7.A Examine and describe oscillatory motion and wave propagation in various types of media.
							7.B Investigate and analyze characteristics of waves including velocity, frequency, amplitude, and wavelength and calculate using the relationship between wavespeed, frequency, and wavelength.
							7.D Investigate behaviors of waves including reflection, refraction, diffraction, interference,

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							resonance, and the Doppler effect.
							7.F Describe the role of wave characteristics and behaviors in medical and industrial applications.
Strand: Earth and Space Science							
8.B Describe and illustrate the Sun as a star composed of gases that provides light and heat energy for the water cycle.	7.C Identify and classify the Earth's renewable resources including air, plants, water, and animals, and nonrenewable resources including coal, oil, natural gas; and the importance of conservation.	7.C Identify alternative energy resources such as wind, solar, hydroelectric, geothermal, and biofuels.	11.A Describe the physical properties, locations, and movements of the Sun, planets, Galilean moons, meteors, asteroids, and comets.	9.A Analyze the characteristics of objects in our solar system that allow life to exist such as the proximity of the Sun, presence of water, and composition of the atmosphere.	7.A Model and illustrate how the tilted Earth rotates on its axis, causing day and night, and revolves around the sun causing changes in seasons.		
		8.C Demonstrate that Earth rotates on its axis once approximately every 24 hours causing the day/night cycle and the apparent movement of the Sun across the sky.			8.B Recognize that the Sun is a medium-sized star near the edge of a disc-shaped galaxy of stars and that the Sun is many thousands of times closer to Earth than any other star.		
					10.A Recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds and ocean currents.		