

## Alignment to Texas Essential Knowledge and Skills

### Keep It Cool

Lesson focuses on the engineering behind keeping food and other items cool. Students work in teams to develop a system to make an insulated liquid container that will keep chilled water as cool as possible for an hour using everyday items. Students will need to devise a way to have a thermometer rest in the water and be able to read the temperature throughout the hour. They plan their design, execute and test their system and share their experiences with the class.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 8	IPC	Chemistry	Physics
<b>Strand: Scientific Investigation and Reasoning</b>							
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.	1.A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles and fire extinguishers.	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 Demonstrate an understanding of the use and conservation of resources and the proper disposal or recycling of materials.	1.C 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.B Ask well-defined questions, formulate testable hypotheses, and select and use appropriate equipment and technology.	2.B Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	2.B Design and implement experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses, and using appropriate equipment and technology.	2.B Design and implement comparative and experimental investigations by making observations, asking well-defined questions, formulating testable hypotheses and selecting and using appropriate equipment and technology.	2.E Plan and implement investigative 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 Collect data by observing and	2.B Collect and record data by	2.C Collect information by	2.C Collect and record data using the	2.C Collect and record data using the	2.C Collect data and make measurements	2.F Collect data and make	2.H Make measurements with

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measuring using the metric system and recognize differences between observed and measured data.	observing and measuring, using the metric system, and using descriptive words and numerals, such as labeled drawings, writing, and concept maps.	detailed observations and accurate measuring.	International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	with precision.	measurements with accuracy and precision.	accuracy and precision and record data using scientific notation and International System (SI) units.
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.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 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.D Organize, analyze, evaluate, make inferences, and predict trends from data.	2.H Organize, analyze, evaluate, make inferences, and predict trends from data.	2.J Organize and evaluate data and make inferences from data including the use of tables, charts, and graphs.
2.F Communicate valid conclusions supported by data in writing, by drawing pictures, and through verbal discussion.	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.I Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphs, journals, summaries, oral reports and technology-based reports.	2.K Communicate valid conclusions supported by the data through various 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 an atom, a molecule, space or a geologic feature.			

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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 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 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.
<b>Strand: Matter and Energy</b>							
5.A Measure, test, and record physical properties of matter including temperature, mass, magnetism, and the ability to sink or float.	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.A Classify matter based on physical properties including: mass, magnetism, physical state, relative density (sinking and floating), and solubility in water, and the ability to conduct or insulate thermal energy or electric energy.			6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.		
5.C Predict, observe and record changes in the state of matter caused by heating or cooling.	5.B Predict the changes caused by heating and cooling, such as ice becoming liquid water and condensation forming on the outside of a glass of ice water.						
<b>Strand: Force, Motion and Energy</b>							
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.B Demonstrate common forms of potential energy including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs and batteries.	11. A Understand energy and its forms including kinetic, potential, chemical and thermal energies.	
	6.B Differentiate between conductors and		9.A Investigate methods of thermal energy transfer	10.A Recognize that the Sun provides the energy that drives	5.E Investigate and demonstrate the movement of thermal	11.B Understand the law of conservation of	6.F Contrast and give examples of different processes

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	insulators.		including conduction, convection, and radiation.	convection within the atmosphere and oceans, producing winds and ocean currents.	energy through solids, liquids, and gases by convection, conduction and radiation, such as in weather, living and mechanical systems.	energy and the processes of heat transfer.	of thermal energy transfer including conduction, convection, and radiation.
						11.D Perform calculations involving heat, mass, temperature change and specific heat.	
			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.				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 kinetic or potential energy of atoms.