

Alignment to Texas Essential Knowledge and Skills

Oil Spill Solutions

Lesson focuses on how engineers use various techniques to provide speedy solutions to oil spills or other threats to natural water resources. Through this lesson, students work in teams to analyze an "oil spill" in the classroom, then design, build, and test a system to first contain, and then remove the oil from the water. Students select from everyday items to build their oil containment and clean-up systems, evaluate the effectiveness of their solution and those of other teams, and present their findings to the class.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	IPC	Biology	Chemistry
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.A Demonstrate safe practices during laboratory and field investigations, including the appropriate use of safety showers, eyewash fountains, safety goggles and fire extinguishers.
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.	1.C 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 Plan and implement descriptive, comparative and experimental investigations, including asking questions, formulating testable hypotheses, and selecting equipment and technology.	2.E Plan and implement investigative procedures including asking questions, formulating testable hypotheses, and selecting equipment and technology; including graphing calculators, computers and

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								probes, sufficient scientific glassware such as beakers, Erlenmeyer flasks, pipettes, graduated cylinders, volumetric flasks, safety goggles, burettes, electronic balances and an adequate supply of consumable chemicals.
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.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.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.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.F Collect data and make measurements with accuracy and precision.
2.D Analyze and interpret patterns in data to construct reasonable	2.D Analyze data and interpret patterns to construct reasonable	2.D Analyze and interpret information to construct reasonable	2.D Construct tables, using repeated trials and means to organize data and	2.D Construct tables and graphs, using repeated trials and means to organize data	2.D Construct tables and graphs, using repeated trials and means, to			

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explanations based on evidence from investigations.	explanations from data that can be observed and measured.	explanations from direct (observable) and indirect (inferred) evidence.	identify patterns.	and identify patterns.	organize data and identify patterns.			
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.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.G Analyze, evaluate, make inferences, and predict trends from data.	2.H Organize, analyze, evaluate, make inferences, and predict trends from data.
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.H Communicate valid conclusions supported by the data through methods such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology based reports.	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.
3.C Represent the natural world using models such as volcanoes or Sun, Earth, and Moon system, and identify their limitations including size, properties, and materials.	3.C Represent the natural world using models such as rivers, stream tables or fossils and identify their limitations, including accuracy and size.	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.E Evaluate models according to their limitations in representing biological objects or events.	
						3.B Communicate and apply scientific information extracted from various sources such as current		



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						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 Evaluate the impact of scientific research on society and the environment.	3.D Evaluate the impact of research on scientific thought, society, and the environment.
						3.E Describe connections between physics and chemistry and future careers.		3.E Describe the connection between chemistry and future careers.
						3.F Research describes the history of physics, chemistry and contributions of scientists.	3.F Research and describe the history of biology and contributions of scientists.	3.F Research and describe the history of chemistry and contributions of scientists.
Strand: Matter and Energy								
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 (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.D Identify the formation of a new substance by using the evidence of a possible chemical change such as production of a gas, change in temperature, production of a precipitate, or color change.	6.A Identify that organic compounds contain carbon and other elements such as hydrogen, oxygen, phosphorus, nitrogen or sulfur.	5.E Investigate how evidence of chemical reactions indicate that new substances with different properties are formed.	6.A Examine differences in physical properties of solids, liquids and gases as explained by the arrangement and motion of atoms, ions or molecules of the substances and the strength of the forces of attraction between those particles.	9.A Compare the structures and functions of different types of biomolecules including carbohydrates, lipids, proteins, and nucleic acids.	4.A Differentiate between physical and chemical changes and properties.

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5.B Describe and classify samples of matter as solids, liquids, and gases and demonstrate that solids have a definite shape and that liquids and gases take the shape of their container.	5.C Compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water.	5.C Demonstrate that some mixtures maintain physical properties of their ingredients such as iron filings and sand.		6.C Recognize how large molecules are broken down into smaller molecules, such as carbohydrates can be broken down into sugars.		6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.		4.C Compare solids, liquids, and gases in terms of compressibility, structure, shape, and volume.
5.D Explore and recognize that a mixture is created when two materials are combined, such as gravel and sand and metal and plastic paper clips.		5.D Identify changes that can occur in the physical properties of the ingredients of solutions such as dissolving salt in water or adding lemon juice to water.						4.D Classify matter as pure substances or mixtures through investigation of their properties.
								10.F Investigate factors that influence solubilities and rates of dissolution such as temperature, agitation, and surface area.
Strand: Force, Motion and Energy								
6.B Demonstrate and observe how position and motion can be changed by pushing and pulling objects to show work being done such as swings, balls, pulleys, and wagons.	6.D Design an experiment to test the effect of force on an object such as a push or a pull, gravity, friction, or magnetism.	6.D Design an experiment that tests the effect of force on an object.	8.B Identify and describe the changes in position, direction, and speed of an object when acted upon by unbalanced forces.	7.C Demonstrate and illustrate forces that affect motion in everyday life, such as emergence of seedlings, turgor pressure, and geotropism.	6.A Demonstrate and calculate how unbalanced forces change the speed or direction of an object's motion.	4.A Describe and calculate an object's motion in terms of position, displacement, speed and acceleration.		

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			8.D Measure and graph changes in motion.					
Strand: Earth and Space Science								
7.D Explore the characteristics of natural resources that make them useful in products and materials such as clothing and furniture, and how resources may be conserved.	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.			8.C Model the effects of human activity on ground water and surface water in a watershed.	11.D Recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.			
Strand: Organisms and Environments								
9.C Describe environmental changes such as floods and droughts where some organisms thrive and others perish or move to new locations.		9.C Predict the effects of changes in ecosystems caused by living organisms, including humans, such as the overpopulation of grazers or the building of highways.		13.A Investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight.	11.D Recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.		11.B Investigate and analyze how organisms, populations, and communities respond to external factors.	10.A Describe the unique role of water in chemical and biological systems.
							11.C Summarize the role of microorganisms in both maintaining and disrupting the health of both organisms and ecosystems.	
							12.F Describe how environmental change can impact ecosystem stability.	