

Alignment to Texas Essential Knowledge and Skills

Irrigation Ideas

Lesson focuses on how through the centuries man has had the need to move water from one place to another. Engineered irrigation has proved critical throughout the world. Through this lesson, students work in teams to design and build a system to move water from one source to two different delivery areas. The challenge is to move two cups of water for at least three feet and distribute it evenly in two separate containers. They work with everyday items, develop a plan, build their "irrigation" system, and test their system. Students then evaluate the effectiveness of their own irrigation systems 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	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 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 and record data using the	2.C 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.	International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers.	measurements with 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.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.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.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.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.D Connect grade level appropriate	3.D Connect grade-level	3.D Connect grade-level	3.D Relate the impact of research on	3.D Relate the impact of research on	3.D Relate the impact of research on	3.D Evaluate the impact of research	3.D Explain the impacts of the

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science concepts with the history of science, science careers and contributions of scientists.	appropriate science concepts with the history of science, science careers, and contributions of scientists.	appropriate science concepts with the history of science, science careers, and contributions of scientists.	scientific thought and society including the history of science and contributions of scientists as related to the content.	scientific thought and society, including history of science and contributions of scientists as related to the content.	scientific thought and society including the history of science and contributions of scientists as related to the content.	on scientific thought, society, and the environment.	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: Force, Motion and Energy							
6.C Observe forces such as magnetism and gravity acting on objects.	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.C 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.	4.D Calculate the effect of forces on objects including the law of inertia, the relationship between force and acceleration, and the nature of force pairs between objects.
			8.D Measure and graph changes in motion.				4.F Identify and describe motion relative to different frames of reference.
			8.E Investigate how inclined planes and pulleys can be used to change the amount of force to move an object.				
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	7.B Recognize how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice.		8.C Model the effects of human activity on ground water and surface water in a watershed.			

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	importance of conservation.						
	8.B Describe and illustrate the continuous movement of water above and on the surface of the Earth through the water cycle, and explain the role of the Sun as a major source of energy in this process.						
Strand: Organisms and Environments							
8.A Observe and describe the physical characteristics of environments and how they support populations and communities within an ecosystem.	9.A Investigate that most producers need sunlight, water, and carbon dioxide to make their own food, while consumers are dependent on other organisms for food.	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.		10.A Observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms.	11.B Investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of temperatures, or soil composition.		
9.C Describe environmental changes such as floods and droughts where some organisms thrive and others perish or move to new locations.				13.A Investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight.			

