Alignment to Texas Essential Knowledge and Skills

Sugar Crystal Challenge

Lesson Focus: Lesson focuses on surface area and how the shape of sugar crystals may differ as they are grown from sugars of different grades of coarseness. Students explore surface area, nanostructures, work in teams and participate in hands-on activities.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
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.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.
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 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.B Collect data by observing and measuring using the metric system and recognize differences between observed and	2.B Collect and record data by observing and measuring, using the metric system, and using descriptive words and	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,	2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing,	2.C Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing,

Alignment to Texas Essential Knowledge and Skills

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
measured data.	numerals, such as labeled drawings, writing, and concept maps.		and graphic organizers.	and graphic organizers.	and graphic organizers.
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.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 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.			
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.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.
4.A Collect, record, and analyze information using tools, including microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, wind vanes,	4.A Collect, record, and analyze information using tools, including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, mirrors,	4.A Collect and analyze information using tools including calculators, microscopes, cameras, computers, hand lenses, metric rulers, Celsius thermometers, prisms,	4.A Use appropriate tools to collect, record, and analyze information including: journals/ notebooks, beakers, Petri dishes, meter sticks, graduated cylinders, hot	4.A Use appropriate tools to collect, record, and analyze information including: life science models, hand lens, stereoscopes, microscopes, beakers,	4.A Use appropriate tools to collect, record, and analyze information including: lab journals/notebooks, beakers, meter sticks, graduated cylinders,

Alignment to Texas Essential Knowledge and Skills

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
rain gauges, pan balances, graduated cylinders, beakers, spring scales, hot plates, meter sticks, compasses, magnets, collecting nets, notebooks, sound recorders, Sun, Earth, and Moon system models; timing devices, including clocks and stopwatches; and materials to support observation of habitats of organisms such as terrariums and aquariums.	spring scales, pan balances, triple beam balances, graduated cylinders, beakers, hotplates, meter sticks, compasses, magnets, collecting nets, and notebooks; timing devices, including clocks and stopwatches; and materials to support observation of habitats of organisms such as terrariums and aquariums.	mirrors, pan balances, triple beam balances, spring scales, graduated cylinders, beakers, hot plates, meter sticks, timing devices including clocks and stopwatches, magnets, collecting nets, notebooks and materials to support observations of habitats or organisms such as terrariums and aquariums.	plates, test tubes, triple beam balances, microscopes, thermometers, calculators, computers, timing devices, and other equipment as needed to teach the curriculum.	Petri dishes, microscope slides, graduated cylinders, test tubes, meter sticks, metric rulers, metric tape measures, timing devices, hot plates, balances, thermometers, calculators, water test kits, computers, temperature and pH probes, collecting nets, insect traps, globes, digital cameras and journals/notebooks and other equipment as needed to teach the curriculum.	anemometers, psychrometers, hot plates, test tubes, spring scales, balances, microscopes, thermometers, calculators, computers, spectroscopes, timing devices, and other equipment as needed to teach the curriculum.
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.C Predict, observe and record changes in the state of matter caused by heating or cooling.	5.C Compare and contrast a variety of mixtures and solutions such as rocks in sand, sand in water, or sugar in water.	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.			
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.					