

## Alignment to Texas Essential Knowledge and Skills

### Sort it Out!

Lesson focuses on the engineering behind industrial sorting processes. Though exploring the coin manufacturing or minting process, students explore how sorting is engineered into manufacturing and packaging systems. Working as an engineering group, students then work in teams to design and build a system to sort different sized coins for packaging.

Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	IPC	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 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,	2.B Design and implement experimental	2.B Design and implement experimental	2.B Design and implement comparative and		

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		and select and use appropriate equipment and technology.	investigations by 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 using appropriate equipment and technology.	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 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.H Make measurements with 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.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.					

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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.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 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.	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.
<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 (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.				6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point, conductivity, and reactivity.	

**Alignment to Texas Essential Knowledge and Skills**

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<b>Strand: Force, Motion and Energy</b>							
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.	4.B Describe and analyze motion in one dimension using equations with the concepts of distance, displacement, speed, average velocity, instantaneous velocity, and acceleration.
6.C Observe forces such as magnetism and gravity acting on objects.			8.D Measure and graph changes in motion.			4.B Measure and graph distance and speed as a function of time using moving toys.	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.
						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.	6.B Investigate examples of kinetic and potential energy and their transformations.
						4.D Assess the relationship between force, mass and acceleration, noting the relationship is independent of the nature of the force, using equipment such as dynamic carts, moving toys, vehicles and falling objects.	

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						4.E Apply the concept of conservation of momentum using action and reaction forces such as is illustrated by students on skateboards.	
						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 bowling balls knocking down pins.	
						5.B Demonstrate common forms of potential energy including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs and batteries.	
<b>Strand: Earth and Space Science</b>							
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.						