Alignment to Texas Essential Knowledge and Skills

Interactive Gumball Machine
Students explore potential and kinetic energy while working in teams to design and build an interactive gumball machine.

Grade 5	Grade 6	Grade 7	Grade 8	IPC	Physics
Strand: Scientific Investigation and Reasoning					
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 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 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, 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 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.

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	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 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 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.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.
Strand: Matter and Energy					
5.A Classify matter based on physical properties including: mass, magnetism, physical state (solid, liquid, and gas), relative density (sinking and floating), and solubility				6.C Analyze physical and chemical properties of elements and compounds such as, color, density, viscosity, buoyancy, boiling point, freezing point,	

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in water, and the ability to conduct or insulate thermal energy or electric energy.				conductivity, and reactivity.	
Strand: Force, Motion and Energy					
6.A Explore the uses of energy including mechanical, light, thermal, electrical, and sound energy.	8.A Compare and contrast potential and kinetic energy.		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.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.B Differentiate between speed, velocity and acceleration.	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.
	8.C Calculate average speed using distance and time measurements.		6.C Investigate and describe applications of Newton's law of inertia, law of force and acceleration and law of action-reaction, such as in vehicle restraints, sports activities, amusement park rides, Earth's tectonic activities, and rocket launches.	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.
	8.D Measure and graph changes in motion.			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.	
	8.E Investigate how inclined planes and pulleys can be used to change the amount of force to move an object.			5.B Demonstrate common forms of potential energy including gravitational, elastic, and chemical, such as a ball on an inclined plane, springs and batteries.	