

Fourth Grade Standards Connections for Labs

		Physics of Roller Coasters	Advanced Physics of Roller Coasters	Chemicals of Innovation	Down the Drain	Engineering for Earthquakes	Simplicity of Electricity	Chemistry of Platination	DNA and Genetics
Next Generation Science Standards									
Engineering Design									
3-5-ETS1-1	Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	✓			✓	✓	✓		
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	✓			✓	✓	✓		
3-5-ETS1-3	Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	✓			✓	✓	✓		
Physical Science: Energy									
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.	✓							
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	✓					✓		
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	✓					✓		
Science and Engineering Practices									
Practice 1	Asking questions and defining problems	✓			✓	✓	✓		
Practice 2	Developing and using models	✓			✓	✓	✓		
Practice 3	Planning and carrying out investigations	✓			✓	✓	✓		
Practice 6	Constructing explanations and designing solutions	✓			✓	✓	✓		
Practice 7	Engaging in argument from evidence				✓				
Practice 8	Obtaining, evaluating, and communicating information				✓				
Disciplinary Core Ideas									
ESS1.C	<i>The History of Planet Earth</i> • Local regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes.					✓			
ESS2.B	<i>Plate Tectonics and Large-Scale Systems Interactions</i> • The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different land and water features areas of Earth.					✓			
PS2.B	<i>Types of Interactions</i> • Objects in contact exert forces on one another. • The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.					✓			
PS3.A	<i>Definitions of Energy</i> • The faster a given object is moving, the more energy it possesses. • Energy can be moved from place to place by moving objects or through sound, light, or electric currents.	✓					✓		

PS3.B	<i>Conservation of Energy and Energy Transfer</i> <ul style="list-style-type: none"> • Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. • Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. 	✓					✓			
ETS1.A	<i>Defining and Delimiting an Engineering Problem</i> <ul style="list-style-type: none"> • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. 	✓			✓	✓	✓			
ETS1.B	<i>Developing Possible Solutions</i> <ul style="list-style-type: none"> • At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. • Testing a solution involves investigating how well it performs under a range of likely conditions. 	✓			✓	✓	✓			
ETS1.C	<i>Optimizing the Design Solution</i> <ul style="list-style-type: none"> • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. 	✓			✓	✓	✓			
Crosscutting Concepts										
Energy and Matter	Energy can be transferred in various ways and between objects.	✓					✓			
Cause and Effect	Cause and effect relationships are routinely identified, tested, and used to explain change.									
Influence of Engineering, Technology, and Science on Society and the Natural World	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.	✓			✓	✓				
Common Core Language Arts										
Speaking and Listening										
SL.4.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 4 topics and texts, building on others' ideas and expressing their own clearly.	✓			✓	✓	✓			
SL.4.1b	Follow agreed-upon rules for discussions and carry out assigned roles.	✓			✓	✓	✓			
SL.4.1c	Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.	✓			✓	✓	✓			
SL.4.1d	Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.	✓			✓	✓	✓			
SL.4.4a	Plan and deliver a narrative presentation that: relates ideas, observations, or recollections; provides a clear context; and includes clear insight into why the event or experience is memorable.	✓			✓	✓	✓			

