

CRM 3 Force, Motion and Energy

Pacing

- 20 days
- Oct. 15-Nov. 9
- Weeks 8-11

DESIRED RESULTS

Making Meaning

The study of force, motion, and energy leads students to discovering how objects interact with each other in the real world. Students are very familiar with force, motion, and energy if they play sports, push strollers, pull wagons, and ride bikes or skateboards. These concepts build a foundation for secondary science in the study of Physics, Astronomy, and Engineering. The following make meaning valuable for learners and are investigated in this unit:

- Energy can cause a variety of effects as it moves from place to place including: motion, light, sound, electricity, magnetic fields, and heat.
- Energy is always conserved within a system and remains constant until it is transferred into or out of the system.
- The faster an object moves the more energy it possesses.
- When objects interact, each one exerts a force on the other; these forces can transfer energy between the objects.
- The strength of forces can be measured and compared.
- What happens when a force is applied to an object depends on the strength of the force itself, and the strength of the other forces acting upon it.
- If an object is at rest the forces acting on it are most likely equivalent.
- Forces that are imbalanced can cause changes in the speed or direction of an object.
- Gravity is a force that acts on matter.

Transfer: Students use critical thinking and problem solving to construct their own scientific understanding of forces and motion and develop their scientific process skills by asking scientific questions, designing and conducting investigations, constructing explanations from their observations, and discussing their explanations with others as they investigate energy, and forces and motion.

Enduring Understandings:

- Energy in its many forms is useful in our everyday lives.
- Energy causes change.
- Forces change an object’s position (location) or motion and show work being done.

Essential Questions:

- What is energy, and how do we use it in our everyday life?
- How do forces change an object’s position and/or motion?

Essential Vocabulary

- distance/distancia
- effort/esfuerzo
- energy/energía
- force/fuerza
- friction / fricción
- light energy/energía de luz
- magnet/imán
- magnetism/magnetismo
- mass/masa
- mechanical energy / energía mecánica
- pitch/tono

- position/posición
- potential energy/ energía potencial
- pulley/poela
- reflection/reflexión
- solar/luminosa
- sound/sonido
- sound energy/energía de sonido
- thermal energy / energía térmica
- thermal/térmica
- volume / volumen
- work / trabajo

Supporting Vocabulary Link

- [Elementary School Supporting Vocabulary](#)

<p>Student Prerequisite Knowledge <i>Students should know:</i></p> <ul style="list-style-type: none"> • Energy comes in many forms. • Substances are affected by different amounts of heat. • Sound can be changed by increasing and decreasing volume. • Objects can move due to forces and energy. • An object’s change in position depends on its shape, size and the surface over which it rolls. • Objects slide, roll, and spin in patterns. 		
<p>Resources: AISD Module Kit, Model Lesson Portfolio, STEMscopes, eBooks: Envisions Science Levelled Readers, Scott Foresman Text, Science Notebook Resources, BrainPop Jr., Discovery Education, Differentiation Strategies & Resources</p>		
<p>ELPS: Mandated by Texas Administrative Code (19 TAC §74.4), click on the link for English Language Proficiency Standards (ELPS) to support English Language Learners.</p>		
<p>TEKS Knowledge & Skills Acquisition</p>		
<p>STAAR: RC = Reporting Category; DC = Dual Coded Skills; Readiness Standard; Supporting Standard Concepts are addressed in another unit.</p>	<p style="text-align: center;">Students Will Know Students Will Be Able To</p>	
<p>3.6: Force, motion, and energy. The student knows that forces cause change and that energy exists in many forms. The student is expected to:</p>		
<p>3.6A: explore different forms of energy, including mechanical, light, sound, and heat/thermal in everyday life.</p>	<ul style="list-style-type: none"> • We use many different forms of energy in our everyday life. • Energy causes changes to matter. 	<ul style="list-style-type: none"> • Use prior knowledge to explore different forms of energy in everyday life. • Differentiate between the forms of energy.
<p>3.6B 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.</p>	<ul style="list-style-type: none"> • Forces change the position and motion of an object. • Work is done on an object when a force causes it to move position. 	<ul style="list-style-type: none"> • Use balls, pulleys, and swings to observe how position and motion can be changed by a push or a pull. • Demonstrate how position and motion can be changed by a push or pull, and describe the forces acting on the object.
<p>3.6C: observe forces such as magnetism and gravity acting on objects.</p>	<ul style="list-style-type: none"> • Some forces such as magnetism and gravity act on objects even when they are not touching the object. 	<ul style="list-style-type: none"> • Explore and observe magnetism and gravity acting on objects.
<p>The study of science is taught through the lens of Scientific Processes (TEKS 3.1-3.4); therefore, these TEKS should be taught in conjunction with content throughout the year. Suggestions for TEKS to embed in each unit are provided in the Yearly Itinerary; however, the TEKS that can be addressed within a unit depends greatly on the learning activities in which students are engaged. Therefore, teachers must be deliberate in their choice of learning activities to ensure that all Scientific Processes TEKS are appropriately embedded within the course. In 3rd grade, districts are encouraged to facilitate laboratory and field investigations for at least 60% of instructional time.</p>		

ASSESSMENT EVIDENCE	
Student Work Products/Assessment Evidence	
Performance Tasks	Other Evidence (i.e. unit tests, open ended exams, quiz, essay, student work samples, observations, etc.)
<ul style="list-style-type: none"> Students investigate and identify the types of energy found in their world and explain the energy forms in a foldable by using their prior knowledge and listening to a video to derive meaning. Students investigate position, motion and work. They will use their science notebook to describe and explain their investigations and observations in detail. Students will plan a full-inquiry investigation of force and motion. Students investigate magnetism and gravity. They will use their science notebook to describe and explain their observations in detail. 	<p>Short Cycle Assessment</p> <ul style="list-style-type: none"> SCA Testing Window: Nov. 9-16, 2012 Tested TEKS: 3.6A, 3.6B, 3.6C, 3.6D <p>Additional Suggestions for Assessment</p> <ul style="list-style-type: none"> Interactive Notebooks Observations and responses to questions during activities Student Investigation Data pages and responses Graphic organizers Lesson Assessment
LESSON PLANNING TOOLS	
<p>In the course of lesson planning, it is the expectation that teachers will include whole child considerations when planning such as differentiation, special education, English language learning, dual language, gifted and talented, social emotional learning, physical activity, and wellness.</p>	
<p>Model Lesson- <u>Energy</u></p> <ul style="list-style-type: none"> Observing Energy Mechanical Energy Sound Light Heat/ Thermal Energy Distinguishing Types of Energy <p>Suggested Pacing: (5 days) TEKS: 3.6A</p>	
<p>Model Lesson- <u>Forces and Work</u></p> <ul style="list-style-type: none"> What are Forces? Measuring Forces Work / Simple Machines Exploring Forces <ul style="list-style-type: none"> Describing Motion Demonstrating Effects of Force Contact Forces Work / Simple Machines <p>Suggested Pacing: (10 days) TEKS: 3.6B</p>	
<p>Model Lesson- <u>Non-Contact Forces</u></p> <ul style="list-style-type: none"> Magnetism Gravity Assessment <p>Suggested Pacing: (5 days) TEKS: 3.6C</p>	