


Seventh Grade Science Curriculum Bundle #2

Title		Suggested Dates
Force/Motion & Simple Machines		Sept 14 – Oct 2 (14 days)

Big Idea/Enduring Understanding	Guiding Questions
Force is needed to move objects.	How does force affect motion? How do simple machines affect your life?

The resources included here provide teaching examples and/or meaningful learning experiences to address the District Curriculum. In order to address the TEKS to the proper depth and complexity, teachers are encouraged to use resources to the degree that they are congruent with the TEKS and research-based best practices. Teaching using only the suggested resources does not guarantee student mastery of all standards. Teachers must use professional judgment to select among these and/or other resources to teach the district curriculum.

Knowledge & Skills with Student Expectations	Specificity & Examples	Suggested Resources (Read the note above)
<p>7.8 Knows that complex interactions occur between matter and energy</p> <p>7.8 A Illustrate examples of potential and kinetic energy in everyday life. Such as objects at rest movement of geologic faults and falling water</p>	<p>--- Potential energy (stored energy)</p> <ul style="list-style-type: none"> • Gravitational (objects at a height) • Elastic (stretched springs & rubber bands) <p>--- Kinetic energy (movement)</p> <ul style="list-style-type: none"> • Movement of geologic faults • Falling water • Kinetic energy of particles in states of matter (temperature) <p>--- Roller-coasters as examples of transformation of kinetic and potential energy.</p> <p>--- Changing the energy of an object involves work (see 7.6A) relate the amount of work done during an everyday activity to energy transformations</p> <p><u>Teacher note:</u> Consider a potential/kinetic energy scavenger hunt for real-world examples of objects with PE & KE.</p>	<p>Vocabulary: Potential Energy, Kinetic Energy, Transformation of Energy, Work, Simple Machines, Pulley, Screw, Wheel and Axle, Inclined plane, Lever, Wedge, Friction, Balanced Force and Unbalanced Force.</p> <p>“NRG” Potential & Kinetic Energy Activity Systems Reaching Equilibrium Datatable Potential & Kinetic Energy PPT</p> <p>Sudden Stops Hurt! - Newton’s First Law Lab</p> <p>Computer Lab-Newton's Laws - 7_4_Newton's 1st Law http://www.physicsclassroom.com/Class/</p> <p>Technology- Forces and Motion Students will create a document a document using word and graphics representing forces and motion.</p> <p>AVID Activity- Writing in Science pages 22-23 “Pre-write and Quickwrite”</p>

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<p>7.6 The student knows that there is a relationship between force and motion.</p> <p>7.6 A Demonstrate basic relationships between force and motion using simple machines including pulleys and levers.</p>	<p>Including</p> <p>--- Work</p> <ul style="list-style-type: none"> • Work = force X distance • Doing work on an object changes its energy (see 7.8A) <ul style="list-style-type: none"> • Machines make work easier to do by rearranging force and distance. <p>--- Simple Machines</p> <ul style="list-style-type: none"> • Pulleys • Levers • Wheels and axles • Ramps (inclined planes) • Wedge • Simple machines in the human body (see bundle Human Body) <p><i>contrast situations where work is done with different amounts of force to situations where no work is done such as moving a box with a ramp and without a ramp, or standing still</i></p>	<p>Simple Machines PPT Simple Machine & Work Review Sheet</p>
<p>7.6 The student knows that there is a relationship between force and motion.</p> <p>7.6 B Demonstrate that an object will remain at rest or move at a constant speed and in a straight line if it is not being subjected to an unbalanced force.</p>	<p>Including</p> <p>--- Newton's 1st law of motion</p> <ul style="list-style-type: none"> • Distinguish between balanced and unbalanced forces <ul style="list-style-type: none"> • Newton's First Law: If all the forces acting on an object are balanced, the object will continue in its state of motion (straight line, constant speed) • Gravity & Air resistance as balanced or unbalanced forces for falling objects • Definition of inertia as a quantity related to mass that measures the tendency of an object to resist changes in motion. <p>--- The role of friction as a balanced or unbalanced force</p> <p>--- Interpret graphs of motion to determine whether or not forces are balanced or unbalanced</p> <p>--- Real-world examples of objects in equilibrium</p> <ul style="list-style-type: none"> • Moving at a constant speed • Stationary <p>--- Analysis of diagrams to show forces on an object</p>	<p>Lab_NASCAR_Challenge</p>

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	<p><u>Teacher note:</u> Emphasis should be on Newtons’ First Law and its power as a tool for analysis: if we see that the motion of an object remains unchanged, we can deduce that there are no unbalanced forces; if we see that the motion of an object changes (speed or direction or both), we can deduce that there are unbalanced forces acting on it.</p> <p><u>Teacher Note:</u> Teacher may review Newton’s Third law (it was covered in 6th grade)</p> <p><u>Teacher Note:</u> <u>May need to run long on this unit approx 4 wks</u></p>	
<p>7.1 Conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>7.1A Demonstrate safe practices during field and laboratory investigations.</p>	<p>Including</p> <ul style="list-style-type: none"> --- Indoor/outdoor safety --- Recognize problems and how to prevent accidents --- Recognize safety symbols and what appropriate action to take ---Safety contract <p>In accordance with the Texas Safety Standards</p> <p><u>Teacher Note:</u> Safety skills and process TEKS should be embedded and reinforced throughout the year</p>	<p>Texas Safety Standards</p>
<p>7.1 Conducts field and laboratory investigations following home and school safety procedures and environmentally appropriate and ethical practices.</p> <p>7.1B Make wise choices in the use and conservation of resources and the disposal and recycling of materials.</p>	<p>Including</p> <ul style="list-style-type: none"> --- Knowledge of items appropriate for recycling, reuse, disposal 	
<p>7.2 Uses scientific methods during fields and laboratory investigations.</p> <p>7.2A Plan and implement descriptive and simple experimental investigations including asking well-defined questions, formulating testable hypotheses, and selecting and using equipment and technology.</p>	<p>Including</p> <ul style="list-style-type: none"> --- probeware for data collection --- using a standard lab report format --- manipulated and responding variables --- Emphasis should be on scientific methods and should build understanding of the variety of methods and their suitability for various tasks 	<p>AVID Activity- Writing in Science pages 55-94 ““Experimental Design Lab Report Activities”</p>

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<p>7.2 Uses scientific methods during fields and laboratory investigations.</p> <p>7.2 B Collect information by observing and measuring.</p>	<p>--- --- (Pre-AP: May emphasize using probeware in a variety of situations)</p> <p>--- Measurement using a variety of metric units</p> <p>--- conversion from one metric unit to another</p> <p>--- Using data tables to graph data</p> <p>--- Using graphs to create data tables</p> <p><u>Teacher note:</u> Measurement exercises should progress across the middle school grade levels and begin by developing conceptual understanding. In 7th grade additional units can be learned, as well as the metric prefix system.</p>	<p>AVID Activity- Writing in Science pages 26-28 “ Observation Narrative”</p>
<p>7.2 Uses scientific methods during fields and laboratory investigations.</p> <p>7.2 C Analyze and interpret information to construct reasonable explanations from direct and indirect evidence.</p>	<p>Including</p> <p>--- Identify the relationship between independent variable and dependent variable as observed from data collection/data tables.</p>	<p>AVID Activity- Writing in Science pages 29-30 “Comparative Analysis”</p>
<p>7.2 Uses scientific methods during fields and laboratory investigations.</p> <p>7.2 D Communicate valid conclusions.</p>	<p>Including</p> <p>--- writing in complete sentences</p> <p>--- paragraphs that utilize a restatement of the hypothesis</p> <p>--- communicating effectively in writing</p> <p>--- identify sources of error and estimate their effect</p>	<p>AVID Activity- Reading in Science pages 111-132 “ Additional Active Reading Graphic Organizers”</p>
<p>7.2 Uses scientific methods during fields and laboratory investigations.</p> <p>7.2E Construct simple graphs, tables, maps, and charts using tools including computers to organize, examine and evaluate data.</p>	<p>Including</p> <p>--- Spreadsheets and Graphs</p> <p>--- Graphing calculators or computer software with probeware</p>	
<p>7.3 Uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7.3A Analyze, review, and critique scientific explanations, including hypotheses and theories as to their strengths and weaknesses using scientific evidence and information.</p>	<p><u>Teacher Note:</u> Correlate to strengths and limitations of models.</p> <p><u>Teacher Note:</u> Relate to labs throughout the year. Should emphasize the nature of scientific explanations: testability, repeatability, evidence, and predictive nature.</p>	
<p>7.3 Uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7.3B Draw inferences based on data related to promotional materials for products and services</p>	<p>Find promotional material related to simple machines and force and motion.</p>	

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<p>7.3 Uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7.3 C Represent the natural world using models and identify their limitations.</p>	<p>Such as</p> <p>--- Compare and contrast models used with the real world item or concept under investigation</p> <ul style="list-style-type: none"> • Models of simple machines • Models use to demonstrate PE/KE <p><i>use models to represent aspects of the natural world such as human body systems and plant and animal cells; identify advantages and limitations of models such as size, scale, properties, and materials;</i></p>	
<p>7.3 Uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7.3D Evaluate the impact of research on scientific thought, society, and the environment.</p>	<p>--- Current events- related to force and motion</p>	
<p>7.3 Uses critical thinking and scientific problem solving to make informed decisions.</p> <p>7.3E Connect Grade 7 science concepts with the history of science and contributions of scientists.</p>	<p>Including</p> <p>--- Rube Goldberg</p> <p>--- Newton</p>	<p><u>AVID Activity</u>: Writing in Science page 24 “Brief Autobiography”.</p>
<p>7.4 Knows how to use a variety of tools and methods to conduct science inquiry.</p> <p>7.4A Collect, analyze, and record information using tools including beakers, petri dishes, meter sticks, graduated cylinders, weather instruments, timing devices, hot plates, test tubes, safety goggles, spring scales, magnets, balances, microscopes, telescopes, thermometers, calculators, field equipment, compasses, computers, and computer probes.</p>	<p>Including: triple beam balance, hand lens, compound microscope; stereoscope; temperature probes, pH probe, timers; stopwatches</p> <p><i>use appropriate tools to collect, record, and analyze information, including life science models, hand lens, stereoscopes, microscopes, beakers, 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, journals/notebooks, and other equipment as needed to teach the curriculum</i></p>	
<p>7.4 Knows how to use a variety of tools and methods to conduct science inquiry.</p> <p>7.4B collect and analyze information to recognize patterns such as rates of change</p>	<p>--- Calculate range</p> <p>--- Calculate average</p> <p>--- Use decimals system rather than fractions</p> <ul style="list-style-type: none"> • Mean • Median • mode 	

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	<ul style="list-style-type: none"> • mode <p><u>Teacher Note:</u> Be prepared to teach some math skills throughout the year.</p>	
<p>7.5 Knows that equilibrium of a system may change.</p> <p>7.5 A Describe how systems may reach equilibrium such as when a volcano erupts.</p>	<p>Such as</p> <ul style="list-style-type: none"> --- Balanced and Unbalanced Forces --- Simple Machines 	