

STEM Program Years 1- 10 Year 8 Overview Physical Sciences

Outcome	Concepts	Activity	Worksheets	Resources Required
<p>SU Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems</p> <p>SIS Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task</p> <p>Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed</p> <p>Construct and use a range of representations, including graphs, keys and models to represent and analyse patterns or relationships, including using digital technologies as appropriate</p> <p>Summarise data, from students' own investigations and secondary sources, and use scientific understanding to identify relationships and draw conclusions</p> <p>Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method</p> <p>Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations</p>	<p>Potential Energy is stored energy. Energy Sources have different types of potential energy (chemical, gravitational, heat, nuclear, solar)</p> <p>Kinetic energy is energy due to mass and speed.</p> <p>Energy is carried by different types of kinetic energy (sound, electrical, heat, light)</p> <p>Work is done when potential energy changes to kinetic energy.</p> <p>Energy can be transformed from one form to another but eventually is lost as heat.</p> <p>The efficiency of an energy device measures the percentage of useful energy produced.</p> <p>Simple machines, like gears, pulleys, ramps, levers and wheels help to transfer energy from one place to another.</p> <p>In machines although energy is conserved the machine can multiply force (force advantage) or distance (distance advantage) but not both at the same time.</p> <p>Gear ratios and gear trains help to increase the force or distance advantage of many machines.</p>	<p>Notes on Energy Sources, forms of energy.</p> <p>Notes on uses of energy convertors and efficiency.</p> <p>Investigating Potential to kinetic energy changes in a pendulum.</p> <p>Notes on the types and use of simple machines.</p> <p>Investigating advantages of simple machines.</p> <p>Investigate gear trains and effects on motion.</p>	<p>8.1 Lesson 1 Energy</p> <p>8.2 Investigate Pendulums 8.2B sample Pendulum results</p> <p>8.3 Lesson 2 Simple machines</p> <p>8.4 Analysing a Machine.</p> <p>8.5 Lesson 3 Gearing</p> <p>8.6 Investigating gear ratios (Lego Technic or Mindstorms and Datalogging)</p>	<p>Calculator</p> <p>retort stand, clamp and boss head</p> <p>a length of fishing line</p> <p>bob (use brass hangar and weights)</p> <p>protractor</p> <p>ruler</p> <p>Old machine to disassemble.</p> <p>LEGO or other engineering kits</p> <p>Data Logging Option LEGO Mindstorms (NXT or EV3 Kit)</p>

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<p>Science understanding influences the development of practices in areas of human activity such as industry.</p> <p>Use scientific knowledge and findings from investigations to evaluate claims Communicate ideas, findings and solutions to problems using scientific language and representations using digital technologies as appropriate SHE Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world</p> <p>Design Technology 8.3 Analyse how motion, force and energy, are used to manipulate and control electromechanical systems when designing simple, engineered solutions</p> <p>Digital Technology 8.11 Plan and manage projects, including tasks, time and other resources required, considering safety and sustainability</p> <p>Maths- Relationships Plot and Analyse simple linear relationships and lines of best fit</p>	<p>Cars vary weight, wheel size and gears to gain speed and strength.</p> <p>Design energy efficient cranes.</p> <p><i>Robotics Option</i> <i>SumoBots and Power</i></p> <p><i>Analyse and build various technologies that demonstrate electromechanical principle</i></p> <p><i>Plan and manage Project and resources to Build a Motorised Crane</i></p> <p><i>Relationships exist between variables both linear and non linear</i></p>	<p>Make battery powered cars and vary factors that affects speed (weight, wheel size and gear ratio)</p> <p>Project Make a powered "crane" that lifts more than its own weight.</p> <p><i>Do Gearing Down Challenges using LEGO BOTs</i></p> <p><i>Analysing Machine Investigating Gearing Investigating Strength and Speed of electric motor cars Design a Mortised Crane Do Robotics Challenges.</i></p> <p><i>Build an energy efficient Crane</i></p> <p><i>Investigate variables in a pendulum swing Investigate gear ratios and speed Investigate motor car speed and wheel size.</i></p>	<p>8.7 Investigating speed and strength of battery powered cars.</p> <p>8.8 Project Design a motorized crane.</p> <p>8.9 <i>Robotics: Gearing Challenges.</i></p> <p><i>Worksheets 8.4, 8.6,8.7, 8.8 and 8.9</i></p> <p><i>Worksheet 8.8</i></p> <p><i>Worksheets 8.2, 8.6 and 8.7</i></p>	<p>Car Building kit DC motor stopwatch/ruler or Motion Sensor Spring/ digital balance or Force Sensor</p> <p>Building materials or LEGO Kit 6-12V DC motor Simple machines String Weights Balance</p> <p>LEGO Robotics Kits Software Ramp Soft drink cans 1m diameter marked circular field. Stopwatch</p>

