7th Grade Science Unit 5 Overview: *Move It!*

Unit Outcomes At the end of this unit, your student should be able to:	**Key Vocabulary** Terms to deepen the student's understanding
✓ Describe the motion of an object based on its position, direction of the motion and speed as it relates to another object. ✓ Conclude that unbalanced forces change an object's motion. ✓ Determine balanced forces can have two effects on the motion of objects: objects remain stationary or it continues in the same motion. ✓ Conclude a force must act on an object to change its motion. ✓ Create a graph to show how the motion of an object changes in position over a period of time. ✓ Analyze a distance/time graph: a straight line to represent constant speed and a curved line to represent change of speed over time. ✓ Describe kinetic and potential energy and how it contributes to the mechanical energy of an object. ✓ Describe the different ways energy appears, travels and can be transferred. ✓ Describe why electrical circuits require a complete loop to pass electrical currents. ✓ Determine energy can be transferred between systems through the process of pushing and pulling. ✓ Conclude that simple machines can be used to make work easier by changing the size or direction of a force.	✓ Motion ✓ Position ✓ Direction ✓ Speed ✓ Acceleration ✓ Reference Point ✓ Inertia ✓ Velocity ✓ Balanced ✓ Unbalanced ✓ Friction ✓ Gravity ✓ Magnetic ✓ Force ✓ Distance ✓ Constant Speed ✓ Variable Motion ✓ Energy ✓ Kinetic Energy ✓ Potential Energy ✓ Mechanical Energy ✓ Energy Transformation ✓ Model ✓ Energy Transfer ✓ Thermal Energy ✓ Electrical Energy ✓ Electromagnetic Waves ✓ Green Energy ✓ Closed Circuit ✓ Open Circuit ✓ Electromagnet ✓ Simple Machines ✓ Inclined Plane ✓ Pulley ✓ Lever ✓ Wheel and Axle ✓ Mechanical Advantage ✓ Efficiency
Key Standards Addressed Connections to Common Core/NC Essential Standards	**Where This Unit Fits** Connections to prior and future learning
✓ 7.P.1.1 – Explain how the motion of an object can be describes by its position, direction of motion, and speed with respect to some other object. ✓ 7.P.1.2 – Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets). ✓ 7.P.1.3 – Illustrate the motion of an object using a graph to show a change in position over a period of time. ✓ 7.P.1.4 – Interpret distance versus time graphs for constant speed and variable motion. ✓ 7.P.2.1 – Explain how kinetic and potential energy contribute to the mechanical energy of an object. ✓ 7.P.2.2 – Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples). ✓ 7.P.2.3 – Recognize that energy can be transferred	Coming into this unit, students should have a strong foundation in: ✓ Recognizing the basic forms of energy (light, sound, heat, electrical, and magnetic) as the ability to cause motion or create change. ✓ Inferring the motion of objects in terms of how far they travel in a certain amount of time and the direction in which they travel. ✓ Inferring changes in speed or direction resulting from forces acting on an object. ✓ Explaining how factors such as gravity, friction, and change in mass affect the motion of objects. ✓ Predicting the effect of a given force or a change in mass on the motion of an object. This unit builds to the following future skills and concepts: ✓ Analyze motion in one and two dimensions using time, distance, displacement, velocity and acceleration. ✓ Explain how gravitational force affects the weight of an

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from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass. ✓ 7.P.2.4 – Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.	object and the velocity of an object in freefall. ✓ Classify frictional forces into one of four types: static, sliding, rolling, and fluid. ✓ Explain forces using Newton's Laws of Motion as well as the Universal Law of Gravitation. ✓ Analyze basic forces related to rotation in a circular path (centripetal force). ✓ Summarize static and current electricity. ✓ Explain simple series and parallel DC circuits in terms of Ohm's law. ✓ Explain how current is affected by changes in composition, length, temperature, and diameter of wire. ✓ Explain the relationship among work, power and energy. ✓ Interpret data on work and energy presented graphically and numerically.
Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
✓ ck12.org (Motion) ✓ ck12.org (Combining Forces) ✓ ck12.org (Position-Time Graphs) ✓ ck12.org (Potential Energy) ✓ ck12.org (Kinetic Energy) ✓ ck12.org (Electric Circuits) ✓ ck12.org (Work and Machines) ✓ Study Jams ✓ Edheads (Simple Machines) ✓ Discovery Education	✓ Describe the motion of some example objects using position, direction and speed. ✓ How do balanced and unbalanced forces affect an object's motion? ✓ What happens to an object's motion if no forces are acting on it? ✓ How can you graphically represent the motion of an object? ✓ How can you interpret different distance/time graphs? ✓ How does energy change forms? ✓ What is the relationship between potential and kinetic energy? ✓ How can you model or diagram energy transformations? ✓ How can energy be transferred between systems? ✓ Describe several examples of how the use of simple machines makes our lives a little easier.