**Pequea Valley School District**

**STEM Department**

**Unit: Simple Machines and Slow Car Course: STEM 9 Conceptual Physics Grade: 9**

|  |
| --- |
| **Planning the Focus Based on the Desired Result**  **What do you want all students to know, understand and do by the end of the unit?** |
| **Unit Essential Question(s)**  How do safety engineers use systems of equations in their tests?  How do simple machines make our lives easier? |
| **Keystone Eligible Content/PA Core Standard**  **3.1.12.A** Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.  **3.1.12.B** Apply concepts of models as a method to predict and understand science and technology.  **3.1.12.C** Assess and apply patterns in science and technology.  **3.4.10.C** Distinguish among the principles of force and motion |
| **Pacing: Approximate number of class sessions per unit**  22 days |
| **Tier 3 Vocabulary (Content specific vocabulary)**  work, power, Joule, Watt, machine, mechanical advantage, effort arm, effort force, fulcrum, resistance arm, resistance force efficiency, compound machine, pulley, wheel and axle, inclined plane, screw, wedge, lever, horsepower, kilowatt-hour, rate, speed, velocity, distance, displacement, time, instantaneous speed, average speed, constant speed, relative and slope. |
| **Know -** What do students need to **know** in order to be able to do and understand? ***List concepts, such as facts, formulas, key vocabulary and knowledge “nuggets”.***   * How to calculate speed and velocity * How to find the slope of a line * The conditions necessary for work to be done * How to calculate work * The six simple machines * How to calculate mechanical advantage * How power is calculated * How to find the efficiency of a machine |
| **Understand -** What do students need to **understand**? What is the **big idea**? ***List broad concepts or “big ideas” in a statement of enduring understanding.***   * The difference between work and power * The applications and uses of power * How simple machines are used to make work easier * The difference between speed and velocity * How math can be applied to a physical situation in order to make predictions * How the slope and y-intercept of a graph relate to the motion of an object |
| **Learning Outcome -** What do students need to be able to **accomplish** by the unit’s end? ***List skills and competencies.***  Learners will be able predict when and where two cars will collide using linear systems of equations.  Learners will be able to measure and calculate their work and power in climbing a set of stairs.  Learners will be evaluate the efficiency of a machine. |
| **Assessments:**  Work and Power Quiz  Stairs Lab Data Analysis  Lever & Inclined Plane Lab Data Analysis  Work, Power, and Simple Machines Exam  Speed Quiz  Slow Car Collision Data Analysis |
| **Software/Resources:**  Schoology  Google Drive  Explore Learning/ Gizmos  GoPro |