**Pequea Valley School District**

**STEM Department**

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

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| **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
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| **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
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| **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 QuizStairs Lab Data AnalysisLever & Inclined Plane Lab Data AnalysisWork, Power, and Simple Machines ExamSpeed QuizSlow Car Collision Data Analysis |
| **Software/Resources:**SchoologyGoogle DriveExplore Learning/ GizmosGoPro |