**Pequea Valley School District**

**STEM Department**

**Unit: Rocketry & Newton’s Laws 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 does an engineer use Newton’s Laws to launch and land a rocket? |
| **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**  8 days |
| **Tier 3 Vocabulary (Content specific vocabulary)**  free-fall, gravity, speed, velocity, acceleration, inertia, Newton’s First Law of Motion, force, Newton’s Second Law of Motion, mass, weight, Newtons, kilograms |
| **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”.***  What inertia is  The difference between mass and weight  How to calculate weight  Conditions necessary for free-fall  How mass, force, and acceleration are measured. |
| **Understand -** What do students need to **understand**? What is the **big idea**? ***List broad concepts or “big ideas” in a statement of enduring understanding.***  How Force, Mass, and Acceleration of an object are related  How Newton’s Laws apply to accelerating objects, such as free-fall balls, rockets, and cars |
| **Learning Outcome -** What do students need to be able to **accomplish** by the unit’s end? ***List skills and competencies.***  Create an experiment that verifies Newton’s 2nd Law  Communicate the structure and results of an experiment  Communicate the relationship between Force, Mass, and Acceleration |
| **Assessments:**   * Newton’s 2nd Law Lab Report * Quiz: Newton’s 1st Law * Quiz: Newton’s 1st and 2nd Laws * Exam: Newton’s 1st and 2nd Laws |
| **Software/Resources:**  Schoology  Explore Learning/ Gizmo  Google Drive  Altimeter and ipad  Vernier Motion Sensors |