Course Content by Unit

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| **Grade Level: 9-12** | | | | | | | |
| **Subject: Physics** | | | | | | | |
| **Unit: Momentum and Energy** | | | | | | | |
| **Time Allotment: 2 ½ weeks, 50 minutes a day** | | | | | | | |
| **Instructional Objectives** | **Content** | | | | **Biblical Integration** | |
| At the end of this unit students will be able to:   1. Recognize the relationship between momentum and impulse and predict the impacts they have on each other. 2. Apply the principle of the conservation of momentum to colliding objects. 3. Recognize the relationship between work and energy and apply the principle of the conservation of energy to falling objects. 4. Apply conservation of work to determining how simple machines harness mechanical advantage. | In this unit I will teach lessons on:   1. Momentum, impulse, and the relationship between the two. 2. Conservation of momentum and its application in explosion, elastic collision, and inelastic collision cases. 3. Work and power. 4. Kinetic energy, potential energy, and the conservation of energy. 5. Simple machines, mechanical advantage, and efficiency of machines. | | | | 1. Students will learn and discover the order and predictability of how things move in our everyday lives and how it points to a creator. 2. Students will think about the idea of conservation of energy and where the first energy came from   Romans 1:20, Genesis 1 | |  | |
| **Activities and Methods** | | **Evaluation/Assessment** | | **Texts and References** | |
| I will use these methods to teach this unit:   1. Lecture: including example problems, PowerPoint, and videos. Students will take notes and actively participate in generating questions, some of which may not be answered right away. 2. Guided practice: students work on problems in class with scaffolding from the teacher to support them 3. Homework Review: Review and discuss the homework 4. Activities – Egg drop contest project, Conservation of energy lab – relationship between gravitational potential energy and kinetic energy | | 1. Observation and evaluation of students’ participation in class during lectures and discussion 2. Homework assignments 3. Lab reports with analysis 4. Chapter tests | | Textbook: Conceptual Physics, Paul G. Hewitt, 2002, Chapters 7-8  Additional texts: Physics, Serway & Vaughn, 2002, Ch 5-6  Physics, Giancoli 6th ed, 2005, Ch 6-7 | |
| **CA Content Standards** | | | **ESLR** | | | |
| HS-PS2-2. Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system.  HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. | | | **Scholars**  Students will demonstrate that they are scholars by applying the knowledge and skills that they learn in class in order to approach and solve problems based on real life situations, thus preparing them to be key assets in their future careers. | | | |  | |