Course Content by Unit

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| **Grade Level: 9-12** | | | | | | | |
| **Subject: Physics** | | | | | | | |
| **Unit: Gravitation** | | | | | | | |
| **Time Allotment: 2 weeks, 50 minutes a day** | | | | | | | |
| **Instructional Objectives** | **Content** | | | | **Biblical Integration** | |
| At the end of this unit students will be able to:   1. Describe the effect of gravity and explain the cause of it 2. Explain what a force field is 3. Recognize how gravity affects the earth and other objects in the solar system | In this unit I will teach lessons on:   1. Newton’s Law of Universal Gravitation 2. Gravitational fields: outside and inside a planet 3. Weightlessness and other effects related to gravity or lack thereof 4. Satellite motion: circular and elliptical orbits 5. Kepler’s laws of planetary motion 6. Gravitational potential energy and kinetic energy in satellite motion 7. Escape speed | | | | 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 consider the amazing wonder of the universe and heavenly bodies and the uniqueness of life on Earth   Romans 1:20, Psalm 19:1-6, Deuteronomy 4:19, Job 38 | |  | |
| **Activities and Methods** | | **Evaluation/Assessment** | | **Texts and References** | |
| I will use these methods to teach this unit:   1. Lecture 2. Powerpoint 3. Note taking 4. Discussion 5. Modeling 6. Demonstration   Activities/Projects   1. Weather Report Project - Look at weather reports on tides and relate to gravitational effects of moon and earth 2. Movie: “To the Moon” that describes the various moon missions | | I will know my objective has been met because I will assign and assess:   1. Homework Assignment 2. Course Text Outlines 3. Labs 4. Quizzes 5. Chapter Tests 6. Notebook checks 7. Projects | | 1. Textbook: Conceptual Physics, Paul G. Hewitt, 2002, Chapters 12-14 2. Additional texts: Physics, Serway & Faughn, 2002, Ch 7; Physics, Giancoli 6th ed, 2005, Ch 5 3. [www.sfgate.com/weather](http://www.sfgate.com/weather)   “Newton’s Gravity of Curved Spacetime” (NASA), “To the Moon” (NOVA) | |
| **CA Content Standards** | | | **ESLR** | | | |
| HS-PS2-4. Use mathematical representations of Newton’s Law of Gravitation and Coulomb’s Law to describe and predict the gravitational and electrostatic forces between objects. | | | **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. | | | |  | |