Course Content by Unit

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| **Grade Level: 9-12** | | | | | | | |
| **Subject: Physics** | | | | | | | |
| **Unit: Circular Motion** | | | | | | | |
| **Time Allotment: 3 weeks, 50 minutes a day** | | | | | | | |
| **Instructional Objectives** | **Content** | | | | **Biblical Integration** | |
| At the end of this unit students will be able to:   1. Recognize the forces required to create and the effects of circular motion. 2. Recognize how the position of an object’s center of gravity contributes to when the object falls and to its stability. 3. Distinguish between torque and force. 4. Relate the effect of rotational inertia and the conservation of angular momentum on circular motion. | In this unit I will teach lessons on:   1. Rotation vs. revolution 2. Linear speed vs. rotational speed 3. Angular quantities: displacement, velocity, and acceleration 4. Centripetal acceleration and centripetal force 5. Centrifugal “force” 6. Center of gravity and center of mass, toppling, and stability 7. Torque and balanced torques 8. Rotational inertia 9. Angular momentum and the conservation of angular momentum | | | | 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.   Romans 1:20 | |  | |
| **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 – Hammer and ruler stability demonstration, Mass predicting lab – use the idea of balanced torques to determine the mass of an object | | 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 9-11  Additional texts: Physics, Serway & Vaughn, 2002, Ch 7-8  Physics, Giancoli 6th ed, 2005, Ch 5 | |
| **NGSS Standards** | | | **ESLR** | | | |
|  | | | **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. | | | |  | |