Course Content by Unit

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| **Grade Level: 9-12** | | | | | | | |
| **Subject: Physics** | | | | | | | |
| **Unit: Heat and Thermodynamics** | | | | | | | |
| **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 presence of and describe the impact and cause of temperature and heat in every day occurrences 2. Describe the unique properties of water and the benefit of its unique properties 3. Recognize the different types of heat transfer in every day occurrences 4. Explain the causes of phase changes 5. Explain the laws of thermodynamics and apply those laws to solving thermodynamic problems | In this unit I will teach lessons on:   1. Temperature and heat 2. Specific heat, especially of water 3. Thermal expansion 4. Heat transfer 5. Newton’s Law of Cooling 6. The Greenhouse effect 7. Phase changes 8. Energy of phase changes 9. First and second laws of thermodynamics 10. Entropy | | | | 1. Students will think about the complexity of the energy cycle that supports life and thus appreciate creation 2. Students will think more about the unique properties of water that allow life to exist on Earth 3. Students will ponder the 2nd law of thermodynamics which states that order always tends toward disorder   Genesis 1, Job 38-39 | |  | |
| **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. Thermal Equilibrium Lab – Observe the effect different factors have on thermal equilibrium 2. Heat Transfer Lab – Observe different types of heat transfer | | 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 21-24 2. Additional texts: Physics, Serway & Faughn, 2002, Ch 10-11; Physics, Giancoli 6th ed, 2005, Ch 13-15 3. “Lesson Plan Calories”: http://www.pistachos.org/data/Lesson\_Plan\_Calories.pdf | |
| **NGSS Standards** | | | **ESLR: “STUDENTS THAT ARE INDUSTRIOUS”** | | | |
|  | | | **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. | | | |  | |