Unit C: Electromagnetic Energy

**Focusing Questions**: How can field theory be used to explain the function of electrical devices in the home and in the workplace? How are the specific properties of the electromagnetic spectrum applied to medical, communication and remote-sensing technologies? How do imaging technologies reveal the structure and the history, and shape our understanding, of the universe?

**TOTAL NUMBER OF DAYS FOR UNIT: 18**

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| **Legend of Abbreviations used in table** | |
| GO 1 | 1. Students will explain field theory and analyze its applications in technologies used to produce, transmit and transform electrical energy. |
| GO 2 | 2. Students will describe the properties of the electromagnetic spectrum and their applications in medical technologies, communication systems and remote-sensing technologies used to study the universe. |

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| **Day** | **GO** | **Topics being covered** |
| **1** | **GO 1** | Topic 1.1 – Field Lines   * Lightning and why does it strike? * The Coulomb * Types of Fields (The electric field, magnetic field and gravitational field) * Describing Fields with diagrams   Assignment:   * Page 314, #1-3 * Page 326, #4 * Page 326, #3-5 (omit 5c) |
| **2** | **GO 1** | Topic 1.2 – Equations for Fields   * Gravitational Field Strength * Gravitational Force   Assignment:   * **Plotting the gravitational field strength of Venus (Summative)** * Page 334, #12-15 |
| **3** | **GO 1** | Topic 1.2 Continued   * Electric Field Strength * Electric Force * Magnetic Fields   Assignment:   * Page 338, #16 * Topic 1.2 Wrap Up questions and review |
| **4** | **GO 1** | * Go over review questions * Prep for quiz   Assignment:   * Page 346, #1-3 |
| **5** | **GO 1** | **QUIZ: Electric, Magnetic and Gravitational Fields (Field lines and equations) (Summative)**  Topic 1.3 – Motors and Generators   * Energy Conversions * Electrical Current * AC and DC generators and Motors   \*Note-up to page 31 in notes package |
| **6** | **GO 1** | Topic 1.3 Continued   * Understanding how motors work * Motor Analysis   Assignment:   * Motor Dissection * Page 364, #1-3 |
| **7** | **GO 1** | Topic 1.4 – Electric Circuits   * Series vs. Parallel circuits * Measuring current and voltage * Resistance   Assignment:   * **LAB: Measuring current, voltage and resistance set up (summative)** |
| **8** | **GO 1** | **LAB: measuring current, voltage and resistance completion**  Topic 1.4 Continued   * Drawing electric circuits * Resistance in both parallel and series circuits   Assignment:   * Page 381, # 36 and 37 * Page 383, #38 |
| **9** | **GO 1** | Topic 1.5 – Transmitting Electric Energy   * Power * Paying for electric energy * Environmental Costs of Generating Electricity   Assignment:   * Page 389, #42-44 * Page 394, #47-49 |
| **10** | **GO 1** | Topic 1.5 Continued   * Transmitting Electrical Energy and Transformers   Assignment:   * Chapter 1 Review in notes package and extra review |
| **11** | **GO 1** | **OPEN NOTE UNIT ASSIGNMENT: Section 1.3-1.5 (Formative)** |
| **12** | **GO 1** | * Go over unit assignment for the first half of class * **Quiz: Chapter 1 (Summative)** |
| **13** | **GO 2** | Topic 2.1-Electromagnetic Radiation   * What is radiation? * Energy transmitting through vibrations * Describing EMR * Wavelengths * Universal Wave Equation   Assignment:   * Examples on page 9 of notes package * Page 421, # 7 and 8 |
| **14** | **GO 2** | Topic 2.1 Continued   * EMR from the sun * Demo – gas discharge tubes   Assignment:   * Page 422, #9 and 10 * Page 428, #16 and 17 * Page 432, #22-25 |
| **15** | **GO 2** | Topic 2.2 – Astronomy   * Our Nearest Star * Analyzing starlight * Spectroscope * The Doppler Effect * Evolution of stars   Assignment:   * Page 440, #29 and 30 * **Spectral lines and Doppler shift assignment (formative)** |
| **16** | **GO 2** | Topic 2.2 Continued   * Properties of light * Reflection, refraction and diffraction   Assignment:   * Physics Unit Review |
| **17** | **GO 1-2** | **Diploma Review** |
| **18** | **GO 1-2** | **UNIT EXAM (Summative)** |