Physical Science Unit 3: Waves, Electricity, and Magnetism

Chapter 18, 20, and 21

Graduate Learner Outcome: As a Henry County graduate, I will understand and analyze energy and the characteristics of waves as demonstrated through the integration of scientific practices.

Pretest Score: _____ **Post Test Score:** _____

Unit 3 Goal: Write a goal that you have for this unit.

Standards and Learning Targets:

SPS9. Obtain, evaluate, and communicate information to explain the properties of waves.

a. Analyze and interpret data to identify the relationships among wavelength, frequency, and energy in electromagnetic waves and amplitude and energy in mechanical waves.
    - I can explain the difference between electromagnetic and mechanical waves.
    - I can predict whether the energy in an electromagnetic wave will increase or decrease based on changes in frequency,
    - I can analyze diagrams of electromagnetic waves to determine which has the longest or shortest wavelength and the highest or lowest frequency.
b. Ask questions to compare and contrast the characteristics of electromagnetic and mechanical waves.
    - I can explain why electromagnetic waves can travel through a vacuum.
    - I can compare and contrast the characteristics of electromagnetic waves and mechanical waves.
c. Develop models based on experimental evidence that illustrate the phenomena of reflection, refraction, interference, and diffraction.
    - I can explain how wave behaviors differ in mechanical waves versus electromagnetic waves.
    - I can develop models that illustrate wave interactions such as reflection, refraction, diffraction, and interference in light and sound waves.
d. Analyze and interpret data to explain how different media affect the speed of sound and light waves.
    - I can list the factors that affect the speed of sound and light waves.
    - I can identify how different types of media affect the speed of light.

SPS10. Obtain, evaluate, and communicate information to explain the properties of and relationships between electricity and magnetism.

a. Use mathematical and computational thinking to support a claim regarding relationships among voltage, current, and resistance.
    - I can define voltage, current, and resistance.

- Identify and describe the components in a circuit responsible for voltage, current, and resistance.
- I can, using appropriate units, calculate voltage, current, and resistance using Ohm's Law.
- I can use mathematical and computational thinking to support a claim regarding relationships among voltage, current, and resistance.

b. Develop and use models to illustrate and explain the conventional flow (direct and alternating) of current and the flow of electrons in simple series and parallel circuits.
   - I can describe the difference between alternating and direct current.
   - I can describe the difference between conventional current and flow of electrons.
   - I can describe how current is affected by a parallel circuit versus a series circuit.
   - I can design a functional simple series circuit and a parallel circuit.

c. Plan and carry out investigations to determine the relationship between magnetism and the movement of electrical charge.
   - I can describe how an electrical charge flows and how electrical charges attract/repel.
   - I can define and explain magnetism.
   - I can describe how current through a wire around an object affects its magnetism.
   - I can explain the structure and function of electromagnets.

Activities/Quizzes/Resources: (All resources can be found on my school website.)

1. Unit 3 Planning Guide
2. Unit 3 Learning Path
2. Chapter 18 Powerpoint
3. Chapter 18 Outline
4. Section 18.1 Lesson Video
5. Section 18.2 Lesson Video
6. Section 18.3 Lesson Video
7. Light Worksheet
8. Chapter 20 Powerpoint
9. Chapter 20 Outline
10. Section 20.1 Lesson Video
11. Section 20.2 Lesson Video
12. Section 20.3 Lesson Video
13. Circuits Worksheet
14. Chapter 21 Powerpoint
15. Chapter 21 Outline
16. Section 21.1 Lesson Video
17. Section 21.2 Lesson Video
18. Magnetism Video
19. Magnetism Video Sheet
20. Review Games
21. Extra Practice Sheets
22. Unit 3 Quiz

Performance Task/Test:

Based on the learning targets from this unit, you will demonstrate your understanding of the properties of and relationships between electricity and magnetism.

- Lab 5 – Circuits Lab
- Lab 6 – Magnetism Lab

Unit 3 Test (You will complete the post test at the end of this unit to show mastery.)

Unit 3 Reflection: Reflect on what you could have done better to master this unit.