Comparing Energy Flow Lesson Plan:

(Unit 3 Sound Waves: Lesson 8)

Lesson Standard(s): Include State Standard, Success Criteria, and Spiral Connection

State Standards:

8.PS2.1, 8.PS2.2, 8.ETS1.1

I can Ask questions and carry out investigations to answer questions about how the pattern of energy flow compares in different systems using a speaker, a wire coil, a lightbulb, a battery, and a computer

I can critically read scientific text to gather evidence to explain the differences in the electric current produced by the computer (the cause) that results in a changing magnetic field within the speaker system (the effect).

I can Statement:

Student Friendly I Can Statement: I can investigate and explain how energy flows through an electrical system and how electric current makes electrical systems work.

Driving Question:

Student Friendly Driving Question: How does energy travel through an electrical system to make the system work?

Success Criteria

I will be successful when I can:

- I can identify the parts of an electrical system.
- I can explain how energy moves through an electrical system.
- I can explain how electricity creates a magnetic field.
- I can use evidence from an investigation or reading to explain electrical systems.
- I can model how electrical systems convert electrical energy to other forms of energy
- I can explain how changes in current affect the electrical system.

Student-Friendly Spiral Connection

What I learned before: I learned that changing the distance between two magnets affects the strength of the magnetic force and the amount of energy transferred through the magnetic field (Lesson 7)

What I am learning now: I am learning how electrical energy moves through a system and how electric current flowing through a wire coil creates a changing magnetic field (Lesson 8)

What I will learn later: I will learn how the magnet and the electromagnet work together to move the speaker and produce sound (Lesson 9).

Lesson Hook: Identify the "Why" and how are you capturing and maintaining students' attention.

Day 1: Battery and incandescent bulb investigations

Bell Work: Write five sentences about how you think a light bulb works?

Students will look at a video about the Centennial Light Bulb, first installed in 1901, and discuss how they think a light bulb works and how the Centennial Light Bulb has been burning since 1901.

https://www.youtube.com/shorts/I9DN5XkQFnI

Then students will discuss different systems from an energy perspective to identify how they could help us figure out what a battery vs. a computer provides a speaker, a wire coil, and a lightbulb to get them to function.

Day 2: Volume investigation

Bell Work: Gently place your hand around your throat and talk. Write five sentences about how you think energy produces sound.

Then students will share the questions, ideas for investigations, and predictions that students generated last time

Day 3: What Have We Figured Our

Bell Work: Watch Bach's Brandenburg Concerto No. 2 (https://www.youtube.com/watch?v=VC24gV1o7XQ&list=RDVC24gV1o7XQ&start_radio=1) Write five sentences about how you think lower and higher sounds are produced by the instruments.

Students will watch a video of sand on a Chladni Plate and discuss how patterns change as the frequency (pitch) changes)

https://www.youtube.com/shorts/6RryXd-REKs

Then students will share which hypotheses were rejected and supported from the previous day. Create and complete a two-column chart for "What we figured out" and "Questions we have".

Direct Instruction: Instructional strategies you plan to incorporate within the lesson.

Day 1: Battery and incandescent bulb investigations
Tell students what they will be investigating, remind them of lab safety, and assign them to lab groups and lab stations.

Day 2: Frequency investigation
Tell students what they will be investigating, remind them of lab safety, and assign them to lab groups and lab stations.

Day 3: What Have We Figured Out
Provide instructions on how to complete the reading

Student Application: Activities/Tasks incorporated within the lesson which will promote a high level of rigor and relevance.

Day 1: Battery and incandescent bulb investigations

Students will explore connecting a battery to an incandescent lightbulb

Students will observe how changing the volume affects the light produced by an incandescent light bulb and discuss the results as a whole class

Students will explore how to get a light bulb to shine brighter.

Students will individually develop questions and make predictions about the response of a light bulb to changes in frequency of sound.

Day 2: Frequency investigation

Students will observe how changing the frequency of sound production in the computer app affects the pattern in the light produced by the LED.

Students will work in small groups to explore how to produce light (of different colors) from a single LED using batteries and wires.

Students will work in groups to develop a hypothesis to test with the LED bulb.

Day 3: What Have We Figured Out

Students will read: Music to My Ears in their textbook

Students will summarize and discuss with the whole class key ideas from this lesson.

Students will summarize key ideas from this lesson that will be used in the next lesson by completing a home learning assignment: What is electric Current?

Focus Questions: To be used to assess standard mastery, lesson progression, and comprehension (How, Why)

Day 1: Battery and incandescent bulb investigations

What happens when I connect a battery to an incandescent lightbulb

How will changing the volume affect the light produced by an incandescent light bulb?

How can I get a light bulb to shine brighter?

What predictions can I make about the response of a light bulb to changes in frequency of sound?

Day 2: Frequency investigation

How will changing frequency of sound production in the computer app affect the pattern in the light produced by the incandescent lightbulb and compass in its magnetic field?

How can I produce light (of different colors) from a single LED using batteries and wires?

What is a hypothesis my group can test with the LED bulb?

How will changing the frequency of sound production in the computer app affect the pattern in the light produced by the LED?

Day 3: What Have We Figured Out

How can I use data from observations and information from texts to figure out how energy travels through an electrical system to make the system work?

Assessment Tools: List and identify the standard they will assess

Checking understanding from bell work and classroom discussions.

Students will complete: What is electric Current?

Closure: How will you make the connection to the standard(s), application, and success criteria

Students will complete a short CRE (Claim, Evidence, and Reason) to answer the lesson's driving question, at the conclusion of each part of the lesson. .

How does energy travel through an electrical system to make the system work?