# **Energy Audit**

### **Lesson Overview**

This lesson focuses on understanding energy consumption in daily life through an energy audit activity. Students will document, analyze, and reflect on their personal energy use over a 24-hour period.

### **Standards**

- **NGSS HS-ESS3-2**: Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.
- **Common Core CCSS.ELA-LITERACY.RST.9-10.7**: Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

# **Learning Outcomes**

- 1. Identify various sources of energy used in daily activities.
- 2. **Document** personal energy use over a 24-hour period using a structured chart.
- 3. **Analyze** the data collected to understand patterns and the impact of energy consumption.
- 4. **Explain** how different items contribute to overall energy use and discuss potential alternatives for reduction.
- 5. **Evaluate** personal energy consumption and propose strategies for energy conservation.
- 6. **Reflect** on the significance of energy conservation and its impact on the environment.

# **Materials Needed**

- Energy Audit Chart (provided below)
- Access to information on energy consumption of common household items

- Calculator
- Notebook or digital device for documentation

### **Lesson Activities**

#### Introduction (15 minutes)

- Begin with a brief discussion on energy sources and their importance.
- Introduce the concept of an energy audit and its purpose in understanding personal energy consumption.

#### Activity: Energy Audit (60 minutes)

- 1. **Preparation**: Provide students with the Energy Audit Chart. Explain how to fill out the chart with examples of common household items.
- 2. **Data Collection**: Instruct students to track their energy use over a 24-hour period, noting each item's purpose and energy consumption.
- 3. **Documentation**: Students fill out the chart with the item, usage reason, and energy amount. Encourage thoroughness and accuracy.
- 4. **Calculating the Energy Usage**: Use an AI tool like SchoolAI to create a chatbot for students to ask energy usage questions. Students can also use a site like <u>Electricity</u> <u>Calculator</u> to calculate usage.

Students can calculate energy usage for household items by following these steps:

- **Identify Power Rating**: Check the label or manual of the appliance to find its power rating, usually in watts (W).
- **Determine Usage Time**: Record how many hours per day the appliance is used.
- Calculate Daily Energy Consumption: Use the formula: *Energy (kWh)=(Power (W)1000)×Usage Time (hours)*Energy (kWh)=(1000Power (W))×Usage Time (hours)
- **Calculate Monthly/Yearly Consumption**: Multiply the daily energy consumption by the number of days the appliance is used in a month or year.
- Estimate Cost: Multiply the energy consumption by the cost per kWh from the electricity bill.

#### **Energy Audit Chart**

ltem	How/Why It's Used	Amount of Energy Used	Cost of Energy
Example: Laptop	Homework and research	50 kWh	
Example: Lightbulb	Illumination during evening	60 kWh	

#### Analysis and Discussion (30 minutes)

- **Group Analysis**: Students share their findings in small groups, discussing patterns and surprising insights.
- **Class Discussion**: Facilitate a discussion on the collective impact of these energy uses and potential areas for reduction.

#### Conclusion (15 minutes)

- Have students propose actionable strategies for reducing personal energy consumption.
- Encourage students to reflect on the broader implications of energy conservation on the environment and society.

#### Assessment

- Students submit their completed Energy Audit Chart.
- Write a short reflection (1-2 paragraphs) discussing their learning experience and proposed changes to their energy habits.

## **Extensions**

- Students can research the energy consumption of less common household items or technologies for a deeper understanding.
- Create a class project to implement energy-saving strategies and measure their impact over time.