Lesson Plans & Objectives

Set 1: Energy Fundamentals

1. **Forces and Motion**
   - Describe force.
   - Understand and describe types of forces, including gravitational force and frictional force.

2. **Newton's First Law of Motion**
   - Describe motion.
   - Describe what causes changes in motion.
   - Identify the characteristics of objects in motion.

3. **Newton's Second Law of Motion**
   - Explain Newton's Second Law of Motion.
   - Describe what causes an object to accelerate.
   - Use Newton's Second Law equation, Force = mass x acceleration (F = m x a), to solve word problems.
   - Understand F = m x a can be used to solve for a (a = F ÷ m). Use this equation to find acceleration in word problems.

4. **Newton's Third Law of Motion**
   - Explain Newton's Third Law of Motion.
   - Compare Newton's Three Laws of Motion.
   - Contrast Newton's Three Laws of Motion.
   - Provide examples of Newton's Third Law of Motion in real life.

5. **Simple and Compound Machines**
   - Identify and explain simple machines and how they work.
   - Identify and explain how compound machines work.

Set 2: Forms of Energy

1. **Forms of Energy**
   - Explain the purpose of electrical energy.
   - Identify different forms of energy.
   - Define and explain kinetic energy.
   - Define and explain potential energy.
   - List forms of both kinetic and potential energy.

2. **Law of Conservation of Energy**
   - Identify when energy is converted.
   - List the different forms of energy.
   - Explain why there is no loss of energy.
   - Provide examples of energy conservation.

3. **Mechanical Energy**
   - Identify mechanical energy.
   - Explain the difference between potential mechanical energy and kinetic mechanical energy.

4. **Chemical Energy**
   - Distinguish between chemical energy and other forms of energy.
   - Identify chemical energy.
   - List the forms of chemical energy.

5. **Light and Solar Energy**
   - Describe how light is a form of energy and that it can be characterized as a wave.
   - Explain how we see light, e.g. incandescent, fluorescent, etc.
   - Identify different forms of light bulbs.
   - Explain why we cannot see the entire spectrum of electromagnetic waves.

6. **Nature of Light**
   - Explain the nature of light.
   - Understand that light is a form of energy and that it can be characterized as a wave.

7. **Heat Energy**
   - Describe heat energy and its functions.
   - Define conduction.
   - Define convection.
   - Define radiation.
   - Explain the difference between temperature and heat.

8. **Electrical Energy**
   - Explain the purpose of electrical energy.
   - Describe how electricity works.
   - Identify how electrical energy is measured.

9. **Renewable and Nonrenewable Energy**
   - Identify and explain both, renewable and non-renewable energy sources.
   - Provide examples of common types of renewable and non-renewable resources.
   - Discover ways to conserve energy.
   - Evaluate their families' use of energy.
   - Understand the benefits and disadvantages of using renewable resources.

Set 3: Energy Use & Delivery

1. **Electricity**
   - Identify the characteristics of electricity.
   - Label an atom.
   - Explain static electricity.
   - Describe characteristics of each subatomic particle.

2. **Electrical Circuits**
   - Describe how electricity is measured in homes (kWhs).
     - Use and understand math prefix kilo-.
     - Convert watts to kW and kW to watts.
     - Find kWh, using base-ten multiplication.
     - Solve real-world word problems using watts, kWs, and kWhs.
   - Read a home electric meter, using place value of thousands, hundreds, tens, and ones.
   - Explain how electricity in a closed circuit can produce heat, light, sound, and magnetic fields.

3. **Electromagnets**
   - Identify and explain an electromagnet.
   - Describe the relationship between electricity and magnetism.
   - Compare an electromagnet to a bar magnet.

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4. **Energy Delivery**
   - Describe how energy is delivered to homes.
   - Describe how electricity is measured in homes (kWhs).
   - Explain what will happen when there is a power outage.
   - List the types of power outages.

5. **Energy Efficiency**
   - List and explain ways to conserve energy.
   - Identify the author's purpose, which is to persuade.
   - Write to persuade others to be more energy efficient.
   - Identify wattage required to operate appliances or electronics, calculate the amount of electricity required to operate said items and determine the annual cost for operating things they use at home.

6. **Energy at Home**
   - Read and answer real world questions about an electric bill.
   - Plot points to create a line graph representing monthly electric charges.
   - Interpret a line graph depicting monthly electric charges.