

Study Guide: Forms of Energy and Heat Transfer

4th grade Science – Ms. Yiouli

Energy is the ability to do _____. There are different forms of energy that move and travel in various ways. **Mechanical Energy** is the energy related to _____ and _____. It moves through _____ and _____, often seen in moving parts like gears or engines. **Potential Energy** is stored energy that an object has because of its _____ or _____. For example, a stretched rubber band holds potential energy. **Kinetic Energy**, on the other hand, is the energy an object has due to its _____. A ball rolling down a hill is an example of kinetic energy.

Electrical Energy is energy produced by the movement of _____ and travels through _____ called conductors, like copper wires. There are two main types of electrical energy:

1. **Static Electricity** happens when electrons build up on the surface of an object and stay in one place. An example is when you rub a balloon on your hair, and it sticks to a wall.
2. **Current Electricity** is the flow of electrons through a closed path called a **circuit**.

Light Energy moves in _____ lines and can reflect, refract, or be absorbed. Light can also travel through different types of materials:

1. **Transparent** materials allow _____ light to pass through. Example: _____.
2. **Translucent** materials allow _____ light to pass through, making objects appear blurry. Example: _____.
3. **Opaque** materials allow _____ light to pass through, blocking visibility. Example: _____.

Reflection, Refraction, and Absorption

- **Reflection** happens when light _____ a surface, like a mirror showing your reflection.

- **Refraction** occurs when light _____ as it passes through a new material, like a straw appearing bent in a glass of water.
- **Absorption** happens when light is _____ by a material and converted to heat, like black pavement becoming hot in the sun.

Thermal Energy relates to _____ (hot or cold) and always moves from _____ objects to _____ objects. **Sound Energy** travels in _____ and requires a medium such as _____ or _____ to move.

Materials also play a role in energy transfer. An **Insulator** is a material that _____ the flow of heat or electricity, such as _____ and _____. A **Conductor** allows the flow of heat or electricity, with examples like _____ and _____.

There are three types of heat transfer. **Conduction** is heat transfer through _____ between objects. An example is a metal spoon heating up in hot soup. **Convection** is heat transfer through _____ in liquids and gases, like warm air rising and cool air sinking. **Radiation** is heat transfer through _____ without direct contact, such as feeling the warmth of the sun on your skin.

To understand these concepts better, answer the following:

1. Why are metal pans good for cooking but plastic handles are used for safety?

2. Describe how convection helps heat a room.

3. Give an example of how radiation transfers heat without touching an object.

