Worksheet: Energy Stores and Transfers

PhysicsSheets

Specification: GCSE Physics (AQA 4.1.1.1 & 4.1.1.2 / Edexcel SP3)

Energy Stores: Kinetic, Gravitational Potential, Elastic Potential, Thermal, Chemical, Electrostatic, Magnetic, Nuclear.

Energy Transfers: Mechanically (by forces), Electrically (by current), By Heating (conduction, convection, radiation), By Radiation (light, sound).

Conservation of Energy: Energy cannot be created or destroyed, only transferred from one store to another.

Section A: Energy Stores & Transfers

1. Identify the primary energy store described in each case:

a) Energy stored in a moving object. _____

b) Energy stored in the bonds of chemicals. _____

c) Energy stored due to an object's height in a gravitational field. _____

d) Energy stored in a stretched or compressed spring. _____

e) Energy stored in the nucleus of an atom. _____

f) Energy stored in a hot object. _____

2. Complete the sentences below using appropriate scientific terms:

a) The principle of conservation of energy states that energy cannot be _____ or _____, only _____ from one store to another.

b) When energy is transferred, some energy is often _____ to the surroundings, usually as _____ energy, making it less _____.

c) The four main ways energy can be transferred are by _____ work, _____ work, _____, and by _____ (e.g., light or sound).

Section B: Energy Transfers in Scenarios

3. For each scenario, describe the main energy transfers that occur, including any energy that is dissipated to the surroundings.

a) A child slides down a plastic slide from the top to the bottom.

b) A battery-powered torch is switched on, producing light.

c) A car travelling at speed applies its brakes and comes to a stop.

d) A compressed spring launches a small ball vertically upwards, which then reaches its maximum height.

Section C: Exam Application & Extended Writing

4. A student investigates the efficiency of a small electric motor lifting a mass.

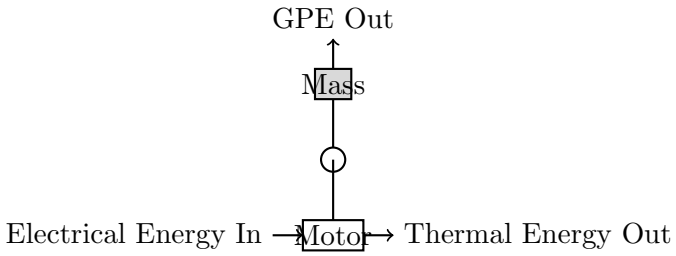

Figure 1: Electric Motor Lifting a Mass

a) The motor is supplied with 200 J of electrical energy. It lifts the mass, gaining 120 J of gravitational potential energy. Calculate the efficiency of the motor and explain what happens to the 'wasted' energy.

b) A 2.0 kW electric kettle is used to boil 1.5 kg of water. Describe the energy transfers involved from the moment the kettle is switched on until the water reaches boiling point. Explain, in terms of the particles, how the thermal energy is transferred through the water and how the internal energy of the water changes as it heats up. (6 marks)