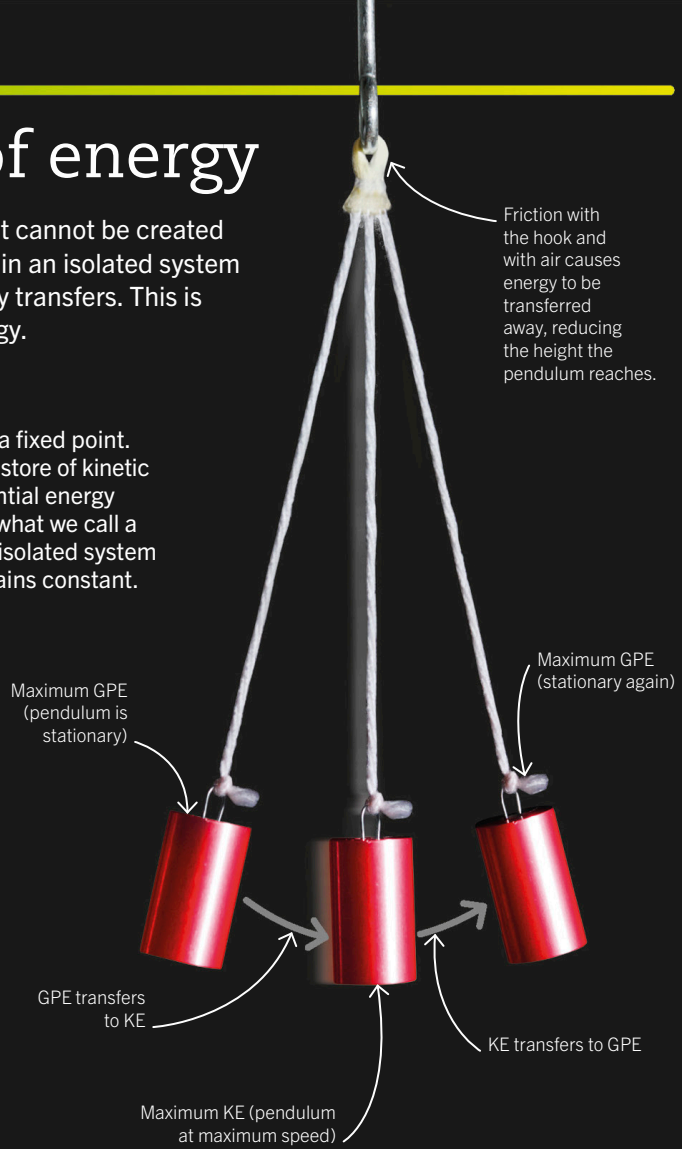
Conservation of energy

Energy can be transferred or stored, but it cannot be created or destroyed. The total amount of energy in an isolated system remains the same before and after energy transfers. This is known as the law of conservation of energy.

Energy transfers in a pendulum
A pendulum is a mass suspended freely from a fixed point. Energy is transferred between the pendulum's store of kinetic energy (KE) and its store of gravitational potential energy (GPE). The pendulum, hook, and air make up what we call a system. The total amount of energy within an isolated system (one that energy does not enter or leave) remains constant.



Key facts

- ✓ **Energy can be transferred or stored, but it cannot be created or destroyed.**
- ✓ **The total amount of energy within an isolated system remains the same before and after energy transfers.**
- ✓ **As a pendulum swings, energy is transferred between its stores of kinetic energy and gravitational potential energy.**

Harmonic motion

The pendulum's repetitive, back-and-forth movement is known as simple harmonic motion. Each swing takes exactly the same length of time, which is why pendulums are used as timekeepers in mechanical clocks. When the pendulum's angle of swing is plotted on the y-axis of a graph against time, it shows a pattern called a sine wave. Plotting GPE and KE on a graph also produces sine waves. When added, these form a straight line, showing that energy is transferred between them but conserved.