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First Law of Thermodynamics

The first law of thermodynamics states that energy cannot be created or destroyed, only transformed from one form to another. This principle is fundamental to understanding the behavior of systems in thermodynamics.

In a closed system, the change in internal energy (ΔU) is equal to the heat added to the system (Q) minus the work done by the system (W):

$$\Delta U = Q - W$$

This equation shows that the total energy of the system remains constant, as any energy added as heat is either stored within the system or used to perform work.

The first law is a statement of the conservation of energy, which is a universal principle in physics. It applies to all processes, whether they are reversible or irreversible.

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First Law of Thermodynamics

The first law of thermodynamics states that energy cannot be created or destroyed, only converted from one form to another. In a closed system, the change in internal energy (ΔU) is equal to the heat added to the system (Q) minus the work done by the system (W), expressed as $\Delta U = Q - W$. This principle is fundamental in understanding the conservation of energy in various physical processes.

This law is a direct consequence of the conservation of energy. It applies to all systems, whether they are simple mechanical systems or complex biological organisms. The law is essential for analyzing the efficiency of engines, the behavior of gases, and the metabolic processes of living cells.

