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# Cell Biology 201

## Ch 5- Bio-energetics

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# Food Chain



Producer



Primary Consumer



Secondary Consumer



Tertiary Consumer



Decomposers

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# Bioenergetics

The study of the transformation of energy in organisms

## Thermodynamics

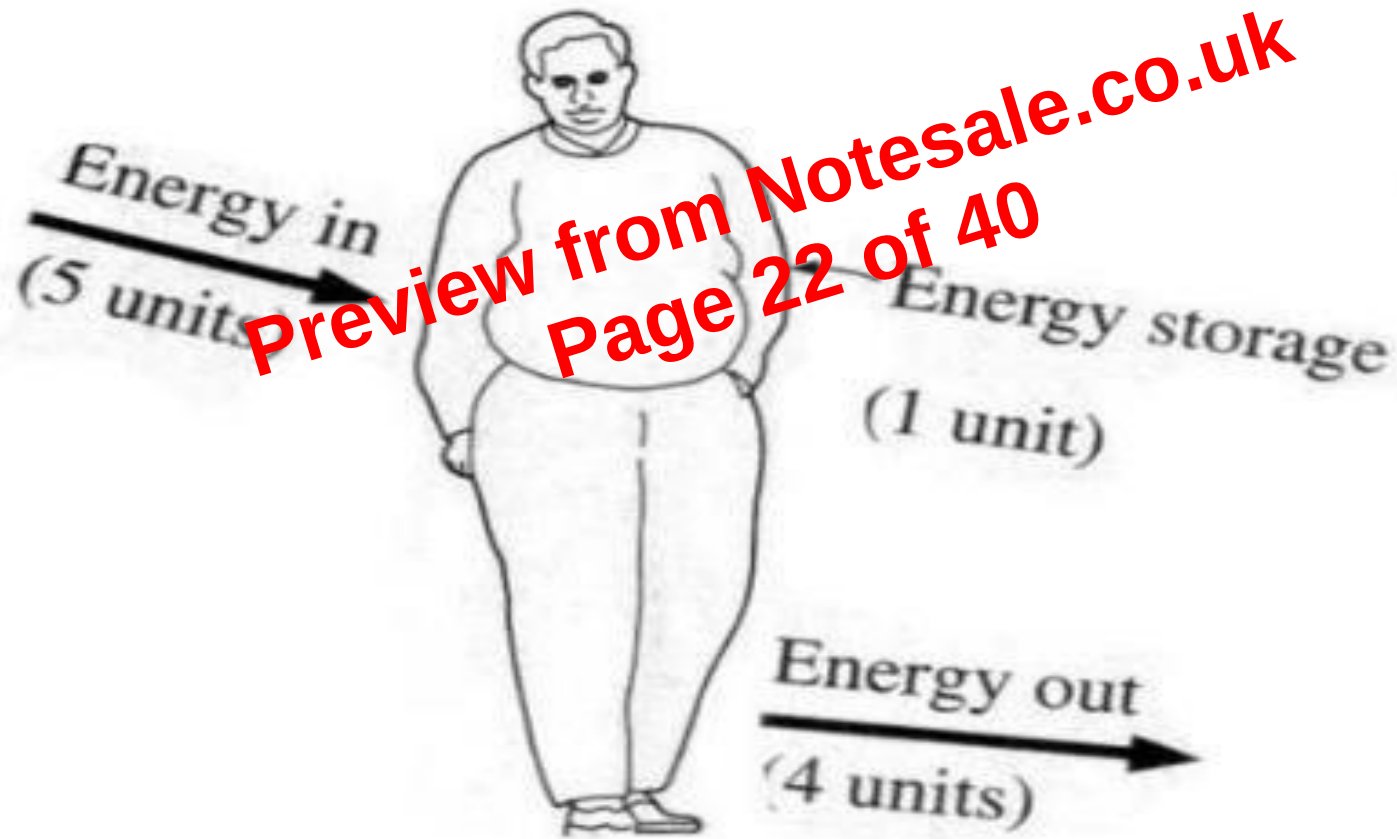
Study of heat and temperature and their relation to energy and work.

## System-

The restricted portion of the universe that is being considered at any given moment is called the system

## Surroundings-

All the rest of the universe (other than that particular system under consideration ) is referred to as its “surroundings”



Conservation of energy principle for the human body.

# Entropy Change as a Measure of Thermodynamic Spontaneity

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Every real process must be

Accompanied by an

Increase In The Entropy of Universe.



## Second Law of Thermodynamics

The second law of thermodynamics states that the entropy of the universe increases for spontaneous processes, and the entropy of the universe does not change for reversible processes.

In other words:

For reversible processes:

$$\Delta S_{\text{univ}} = \Delta S_{\text{system}} + \Delta S_{\text{surroundings}} = 0$$

For irreversible processes:

$$\Delta S_{\text{univ}} = \Delta S_{\text{system}} + \Delta S_{\text{surroundings}} > 0$$