Section 2.1 – Energy and ATP

Both plants and animals breakdown organic molecules to make ATP

What is energy?

- Energy is the ability to do work
- It can take a variety of forms, including light, thermal, electrical, kinetic, etc.
- It can change from one form to another
- It cannot be created or destroyed
- It is measured in joules (j)

Why do organisms need energy?

Living organisms are highly organised systems that require a constant input of energy to prevent them from becoming disordered.

- Metabolism – chemical processes
- Movement (inside/outside)
- Active transport
- Production of enzymes/hormones
- Maintaining body temperature

The flow of energy through a system occurs in three stages:

1. Plants produce organic molecules
2. Molecules are used in respiration to make ATP
3. ATP is used to do work

How does ATP store energy?

The ponds between phosphate groups are unstable and have low activation energies.

Water is used to covert ATP into ADP ($ATP + H_2O \rightarrow ADP + Pi + ENERGY$)

This is a hydrolysis reaction
The reaction is reversible when ADP reacts with Pi in a condensation reaction.

Roles of ATP

- ATP is an intermediate energy substance used to transfer energy.
- Cells maintain just a few seconds supply of ATP
- It is a better immediate energy source than glucose because the energy is more manageable in small quantities.
- The hydrolysis of ATP is a single step reaction