Link Reaction

- Pyruvate produced during glycolysis is actively transported into the matric of the mitochondria.
- Occurs twice for every glucose molecule as 2 pyruvates are given off from glycolysis. This means twice the amount of every products is formed.

1. Pyruvate is oxidised to acetate. The 3-carbon pyruvate loses a carbon dioxide molecule (decarboxylated) and 2 hydrogens. These hydrogens are accepted by NAD to form reduced NAD which is later used to produce ATP.
2. 2-carbon acetate combines with coenzyme A (CoA) producing acetylcoenzyme A

Pyruvate + NAD + CoA → acetyl CoA + Reduced NAD + CO2

Products from 2 Link Reactions	Where it Goes
2 Acetyl CoA	Krebs Cycle
2 Carbon Dioxide	Released as a Waste Product
2 Reduced NAD	Oxidative Phosphorylation

Krebs Cycle

- Involves a series of oxidation-reduction reactions.
- Takes place in matrix of mitochondria.
- Happens once for every pyruvate molecules so it goes around twice for every glucose molecule.

1. Acetyl CoA combines with a 4-carbon molecule (oxaloacetate) to form a six carbon molecules (citrate). Coenzyme A goes back into the link reaction to be reused.
2. Citrate undergoes decarboxylation and dehydrogenation (hydrogen used to produce reduced NAD) to produce a 5-carbon molecule.
3. The 5-carbon molecule is converted into a 4C molecule (oxaloacetate) which then combines with a new molecule of acetylcoenzyme A to begin the cycle again.

- ATP is produced by the direct transfer of a phosphate group from an intermediate compound to ADP in substrate-level phosphorylation.
- The coenzyme NAD works with dehydrogenase enzymes that catalyse the removal of hydrogen atoms from substrates and transfer them to other molecules involved in oxidative phosphorylation.
- The Krebs cycle is a source of intermediate compounds used in cells to manufacture of other important substances e.g. fatty acids, amino acids and chlorophyll.