

Chapter 4 Cellular Metabolism

Metabolism:

Metabolic reactions are of two types:

In _____ reactions, larger molecules are constructed from smaller ones.

In _____ reactions, larger molecules are broken down into smaller ones.

Which process requires energy? Which process releases energy?

The process of joining two molecules by removing water is called _____

The process of splitting two molecule by adding water is called _____

Control of Metabolic Reactions:

_____ control the rates of all the metabolic reactions of the cell

Enzymes function to lower the _____ of a reaction so it may begin.

Enzymes accelerate chemical reactions. Because they do this, enzymes are called _____.

Each enzyme is specific. The substances the enzymes act on are called _____.

List 3 factors that may alter the action of an enzyme.

Cellular Respiration:

ATP stores the energy for every reaction in the body. Where exactly is this energy stored in the ATP molecule?

The process that releases the energy in the chemical bonds of the energy nutrients and stores it in molecules of ATP. It has 3 basic stages, each of which have several steps and are controlled by many enzymes. The first stage does not require oxygen, so it is said to be _____. The other two stages require oxygen and therefore are _____.

The anaerobic respiration stage is called _____. Where does it take place?

What chemical does it start with? What chemical does it end with?

Are any ATP's formed? If so, how many?

Aerobic respiration has two stages. What are they called? Where do they occur?

What are the three end products of this process?

Are any ATPs formed in aerobic respiration? If so, how many?

Lipids and protein pathways – these two nutrients can be used to make ATP. Where they “plug into” the process is going to depend on how many carbons are in the piece the cell is working on. How many ATPs formed will also depend on this.

Nucleic Acids: DNA and RNA

Deoxyribonucleic acid (DNA)

Contains the _____ code needed for the synthesis of each _____ (including enzymes) required by the cell.

What is the sugar in DNA called?

Name the four bases.

What are the two base complementary pairs of DNA?

DNA is double strands, and twists to form a _____

The sequence of nucleotides in a DNA molecule gives the sequence of amino acids for a given protein.

Messenger RNA (mRNA)

Copy and transfer the genetic information to the cytoplasm where proteins are manufactured.

What is the sugar in RNA called?

Name the four bases:

What are the three types of RNA called?

Protein Synthesis:

_____ RNA molecules copy part of the DNA code in the nucleus.

They then travel to the _____ where protein synthesis will occur.

They lie across the _____ and wait for the _____ RNA to bring in the appropriate amino acids.

The correct amino acids will be lined up because the tRNA bases are arranged in _____ that are complementary to the _____ of the bases of the mRNA.

The amino acids bond with peptide bonds to each other to form a protein.

DNA Replication:

Each new cell must be provided with an exact replica of the parent cell's DNA.

When does DNA replication occur?

The DNA molecule splits. Nucleotides form _____ pairs with the original strands.

Each new DNA molecule consists of one parental strand and one newly synthesized strand of DNA.

What is a mutation?

How might it affect the protein being produced from it?