Structure of DNA Notes Guide: - General Biology B

You are responsible not only for the material in this guide but the diagrams and pictures on the notes. The notes can be found on Mr. Walkers website: www.walkersclass.com.

Unit 1: Objective 1: Describe the structure of the DNA nucleotide and its place in the double helix

Obj 1: DNA

- DNA is often called the blueprint of life.
    - In simple terms, DNA stores genetic material and contains the instructions for making proteins within the cell.

Watson & Crick's Model

Why do we study DNA?

- We study DNA for many reasons, e.g.,
  -its central importance to all life on Earth, medical benefits such as cures for diseases, and better food crops.

Chromosomes and DNA

Our _____ are on our chromosomes.
Chromosomes are made up of a chemical called _____.

The Shape of the Molecule

- DNA is a very long _____.
- The basic shape is like a twisted ladder or zipper.
- This is called a *double helix.*

The Double Helix Molecule

- The DNA double helix has _____ strands twisted together.

One Strand of DNA

- The backbone of the molecule is alternating phosphates and deoxyribose sugar
- The teeth are nitrogenous _____.

Nucleotides

- One deoxyribose together with its phosphate and base make a _____

One Strand of DNA

- One strand of DNA is a polymer of nucleotides.
- One strand of DNA has many _____ of nucleotides.

Four nitrogenous bases

- Cytosine C
- Thymine T
- Adenine A
- Guanine G

Two Kinds of Bases in DNA

Pyrimidines are single ring bases.

_____ are double ring bases.

Thymine and Cytosine are pyrimidines

- Thymine and cytosine each have _____ ring of carbon and nitrogen atoms.

Adenine and Guanine are purines

- Adenine and guanine each have _____ rings of carbon and nitrogen atoms.

Two Stranded DNA

- Remember, DNA has two strands that fit together something like a zipper.
- The teeth are the nitrogenous bases but why do they stick together?

Objective 2: Explain the pairing and sequencing of the nitrogenous bases and the process of DNA replication

Hydrogen Bonds

- The bases attract each other because of _____ bonds.
- Hydrogen bonds are weak but there are millions and millions of them in a single molecule of DNA.
- The bonds between cytosine and guanine are shown here with dotted lines

Hydrogen Bonds, cont.

- When making hydrogen bonds, cytosine always _____ up with guanine
- Adenine always pairs up with _____
- Adenine is bonded to thymine here

Chargraff's Rule:

Adenine and Thymine always join together

- A T

Cytosine and Guanine always join together

- C G

DNA by the Numbers

- Each cell has about 2 meters of DNA.
- The average human has 15 trillion cells.
- The average human has enough DNA to go from the earth to the sun more than 400 times.
- DNA has a diameter of only 0.000000002 m.