**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](http://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.