

Assignment - DNA WorkshopPart 1 - DNA Structure

- Go to http://bcs.deakin.edu.au/bcs_courses/forensic/Chemical%20Detective/DNA_Structure.htm

Answers -

1.) What three basic units make up a nucleotide?

___five carbon sugar___ ___phosphate group___ ___organic base___

2.) Name the four bases that form DNA:

a.) adenine

b.) cytosine

c.) guanine

d.) thymine

3.) Which bases have double rings? adenine and guanine

4.) What happens during a **condensation reaction** between nucleotides?

The phosphate and the base join together and "release" a water molecule in the chemical reaction joining them.

5.) Give the name of the bases that always match the base given below.

Adenine - ___Thymine___

Cytosine - ___Guanine___

6.) What type of bond forms between bases?

Hydrogen bonding (forms between hydrogen and nitrogen, fluorine, or oxygen).

- Go to <http://www.ucmp.berkeley.edu/glossary/gloss3/dna.html>

Answers -

1.) What is the proper name of the spiral shape that DNA takes?

Double helix

2.) Give me your best guess as to what the purpose of DNA "twisting" like this?

1. Decreases space the long strands need. 2. Decreases chances of getting tangles up. 3. Decreases chance of strand fracturing.

3.) If you took a typical piece of DNA from a eukaryotic cell (animal, plant etc.) and unraveled it, how far would it stretch?

1600 kilometres

4.) Give the correct term for the procedure where DNA makes a copy of itself. ___replication___

Answers -

- Go to http://www.accessexcellence.org/AB/GG/dna_molecule.html

1.) How many H- bonds form between: A-T 2 and C-G 3

*Click on the "Structure of Molecule" to see the structure of DNA.

2.) What is the size of the distance between turns of the helix?

3.4 nm → 0.0034 μm → 0.0000034 mm

Part 2 - Sequencing DNA

- Go to <http://www.pbs.org/wgbh/nova/sheppard/analyze.html>

On this site you will use gel electrophoresis to determine the sequence of some DNA, and catch a sibling thief!

1.) Read introduction page

2.) Go and read Part 1

3.) Go to Part 2 and follow the procedures #1-8. If it says to "start over" you need to go back to step #1, and be more careful!! When doing step #8, put the film into the slot on the developer.

Answers -

1.) What do restriction enzymes do?

Cut the DNA strand into shorter segments depending on the sequence.

2.) What size of DNA fragments tends to move most easily through the agarose?

The smaller the easier it moves through the holes in the pores of the agarose gel.

3.) What type of charge do the fragments of DNA have?

Slightly negative

4.) Why do scientists cover the gel with a nylon membrane?

Eases ability to pick up the DNA strands.

5.) What special property of the probes allows scientists to detect where the DNA fragments are located?

The probes are radioactively tagged for ease of locating.

6.) Who committed this crime?

Honey

Part 3 - DNA Function

- Go to <http://www.pbs.org/wgbh/aso/tryit/dna/#>

On this site you are going to control a DNA strand and replicate the DNA just as your cells do. You will then use the copied piece of DNA to transcribe (build) proteins/enzymes through the processes your cells do called transcription and translation.

- 1.) Read introduction page
- 2.) Click on go to DNA Workshop Activity
- 3.) Read information
- 4.) Click on DNA Replication and complete the replication
- 5.) Click on Protein Synthesis and complete both Transcription and translation.

Answers -

1.) Where do replication and transcription take place?

Inside of the nucleus

2.) Where does translation take place?

In the cell body (golgi apparatus)

3.) List the names of the amino acids in their correct sequence.

methionine, glycine, serine