**GENERAL HUMAN BIOLOGY – YEAR 11**

**TASK 6 – DNA Replication Investigation**

**Weighting 10%**

**NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MARK: \_\_\_\_\_ / 42 = \_\_\_\_\_ %**

This assessment has been broken into multiple sections. To gain full marks, all sections must be completed and in the correct order.

**Part A – Research and Method 6 marks**

You are to design a method for creating a model of Mitosis or Meiosis. A list of possible materials will be given to you.

The research and write-up of the practical will be completed in class

**Part B – Model Practical 14 marks**

You will swap methods (from Part A) with another student to create a model of a either Mitosis or Meiosis, analyse the effectiveness of your method and answer some questions.

**Part C – Validation 22 marks**

**Part A – Research and Method (6 marks)**

**Background Information:**

An organism’s cells have two choices they can either make an identical copy or make four half copies. Creating an identical cell is called mitosis and is used for growth and repair while Meiosis creates half copies used in sexual reproduction. When these processes go wrong diseases such as cancer and Down’s syndrome occur.

**Research:**

You must research Mitosis and Meiosis and its relationship to the development of diseases.

* Similarities and differences between Mitosis and Meiosis
* How mitosis and Meiosis can lead to Cancer and Down’s syndrome
* What state the DNA is in at each step and what is happening

**Method:**

Write your method on the paper provided, include a labelled diagram.

* Remember to be specific as it will be swapped with another student.

Below is a list of materials you may use in your model.

* Pipe cleaners
* Matchsticks
* Popsicle sticks
* Coloured paper
* String
* Plasticine
  + If you require other equipment (within reason) you can request it **before** the day you complete the assessment.

**Part B – Model Practical 14 marks**

* Collect your task sheet
* Make a Model following the instructions (6 marks)

**Evaluation:**

Evaluate the method you following using the prompts below (4 marks)

* Was it clear? Explain why/why not.
* Was the equipment suitable?
  + If not, what should have been used instead?
  + If yes, explain why

Collect the model made using your method, analyse the model using the prompts below

(4 marks)

* Compare the model to the labelled diagram, does it match?
  + Explain why/why not
* How could you improve your method

**Part C: Validation**  **22 marks**

1. A nucleotide is often called a building block of DNA, draw a labelled nucleotide.

(3 marks)

1. Explain the structure of DNA and how it coils into a chromosome. (3 marks)

1. People often compare genes to a series of light switches, explain this is relation to a skin cell. (3 marks)

1. Explain one difference between cancer cells developing and Down syndrome? (3 marks)

1. Draw a labelled diagram showing a phase of mitosis and Meiosis that differs. (4 marks)

DNA extraction can be used during DNA Profiling. DNA profiling can be used for a range of reasons, including forensic investigation, paternity testing, inheritance of disease and identification.

A child inherits half its chromosomes, and hence it’s DNA, from each of its biological parents. In cases of disputed paternity, DNA profiles are obtained from the child and then those who claim to be the biological parents of the child. Each band on the child’s DNA profile must match either the mother or father’s DNA profile thus, ensuring that the parents are in fact the biological parents.

1. How does DNA profiling allow paternity testing to occur? You can use diagrams to support your answer. (3 marks)

1. If a child’s parents die before the hospital can perform DNA profiling to determine paternity. Explain how the hospital could determine who the biological parents of the child are without digging up their graves?

(3 marks)