THE RIVERS SECONDARY COLLEGE
The heart of secondary education for Lismore

Assessment Task Notification

RICHMOND RIVER HIGH CAMPUS

Task Number	1	**Task Name**	DNA Models
Course	12 Biology	**Faculty**	Science
Teachers	Mrs Anderson	**Head Teacher**	Mr Yates
Issue date	Tuesday 12 November 2024	**Due date**	Monday 16 December 2024
Focus (Topic)	DNA Molecule	**Task Weighting**	20%

Outcomes

A student:
BIO 12-3 conducts investigations to collect valid and reliable primary and secondary data and information
BIO 12-6 solves scientific problems using primary and secondary data, critical thinking skills and scientific processes
BIO 12-12 explains the structures of DNA and analyses the mechanisms of inheritance and how processes of reproduction ensure continuity of species

Task description

This task will address the following syllabus content:
Students:

- select and extract information from a wide range of reliable secondary sources and acknowledge them using an accepted referencing style
- use modelling (including mathematical examples) to explain phenomena, make predictions and solve problems using evidence from primary and secondary sources (ACSBL006, ACSBL010)

1.1.1.1 Cell Replication Inquiry question: **How important is it for genetic material to be replicated exactly?**
1.1.1.2 DNA and Polypeptide Synthesis Inquiry question**: Why is polypeptide synthesis important?**

Background information: DNA contains heritable instructions for building and maintaining an organism.
This research and model making assessment task has 3 components:

1. **DNA Model**
2. **Written report *in response to the questions*.**
3. **Annotated Bibliography**

You will be provided with 3 lessons in class to assist with organizing and completing this task, however, more time outside of class will need to be spent on this assessment.

Each component is described in more detail on the following pages.
Task Submission
Section 1 (DNA model) needs to be handed in to Mr Allen in room 15 before 9.07am. Section 2 & 3 (Written report & Annotated bibliography) can be submitted either on Google Classroom or a printed copy can be handed to Mr Allen or Ms Anderson when you submit your model.

Task Description

1. DNA Model

Design and make a 3-D model of a section of the Dexoxyribonucleic acid molecule using inexpensive materials that are available around the home.

Your model should:

- Show the basic structure of a nucleotide
- Show the shape of the DNA molecule
- Have all parts clearly labelled or show a key
- Have your name attached
- Be able to be used as a visual aid in a classroom

2. Written report

Create a written report in response to the questions below. *Your report should be no longer than 1 double-sided A4 page (Times New Roman 12 if typed).*

Question 1: Describe and analyse the relative importance of the work of James Watson, Francis Crick, Rosalind Franklin and Maurice Wilkins in determining the structure of DNA.

Question 2: How does DNA replicate and why is it important for this process to take place?

Question 3: Why is DNA necessary to life?

3. Annotated Bibliography

Create an annotated bibliography for all parts of the assessment task. *A minimum of 10 different resources should be used for this assessment.*

Helpful Hints:

Annotated Bibliography

An **annotated bibliography** is a list of research sources that includes concise descriptions and evaluations of each source. The **annotation** usually contains a brief summary of content and a short assessment of the source and a reflection. Maximum 150 words for each annotation. You need to include the formal reference for each source as well as:

- A **summary** of the source: what are the main arguments? What topics are covered? If someone asked you what the source was about, what would you say?
- An **assessment** of the source: is the source relevant to your research? How does it compare with other sources in your bibliography? Is it reliable information? Is it biased, objective? What is the goal of the source?
- A **reflection** of the source: how does it fit into your research? Was the source helpful? Does it change your perspective of your topic? How can you use this source in your research?

- *You will be provided with 3 lessons in class to assist with organizing and completing this task, however, more time outside of class will need to be spent on this assessment.*
- *It would help to create your annotated bibliography as you complete your research when completing Parts 1 and 2.*
- *Please use the RRHC referencing guidelines or a website like citethisforme.com to write your references.*

Marking Guidelines

CRITERIA	GRADE
***Outstanding* – Extensive knowledge, understanding and skills are displayed through a response which:** • Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to an outstanding level for all components. • Demonstrates an extensive knowledge and understanding of scientific concepts relating to DNA, including all 5 pieces of the required information. • Demonstrates an outstanding ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND at least 10 relevant sources used	O
***High* – Thorough knowledge, understanding and skills are displayed through a response which:** • Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a high level for all components OR to an outstanding level for 5 components. • Demonstrates a thorough knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 4 pieces of the required information. • Demonstrates a high ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND at least 10 relevant sources used	H
***Sound* – Satisfactory knowledge, understanding and skills are displayed through a response which:** • Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a sound level for all components OR to a high/outstanding level for 4 components. • Demonstrates a sound knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 3 pieces of the required information • Demonstrates a sound ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND at least 10 relevant sources used	S
Basic – Elementary knowledge, understanding and skills are displayed through a response which: • Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a basic level for all components OR to a sound level for 3 components • Demonstrates a basic knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 2 pieces of the required information • Demonstrates a basic ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND/OR between 5-9 relevant sources used	B
Limited – Students do not reach minimum requirements for this task, through a response which: • Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a limited level • Demonstrates a limited knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 1 piece of the required information • Demonstrates a limited ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND/OR 1-4 relevant sources used	L
• ***Late submission – no misadventure*** • ***Assessment not submitted***	Parental notification

Marking Guidelines

Outcomes	Criteria	Self Mark	Your mark
Skills **12-3** **12-6**	**Part 1 – DNA Model**		
	DNA model has the following components: - 3-D structure - Nucleotide structure correct - DNA model shape correct - Correct base pairs - Large enough to be used as a classroom aid - Fully labelled OR a key (*including: bases, nucleic acid, deoxyribose, phosphates, base pairs, nucleotide, student name*) Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to an outstanding level for all components. *May miss 1 label only* (8-10 marks) Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a high level for all components OR to an outstanding level for 5 components. (6-7 marks) Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a sound level for all components OR to a high/outstanding level for 4 components (4-5 marks) Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a basic level for all components OR to a sound level for 3 components (3 marks) Solves scientific problems using secondary data, critical thinking skills and uses modelling using evidence from secondary sources to a limited level (1-2 marks)		
	Part 3 – Annotated Bibliography		
	Demonstrates a high to outstanding ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND at least 10 relevant sources used (8-10 marks) Demonstrates a sound ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND at least 10 relevant sources used (5-7 marks) Demonstrates a basic ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND/OR between 5-9 relevant sources used (3-4 marks) Demonstrates a limited ability to select and process, accurate, reliable, valid, and relevant qualitative and quantitative secondary data AND/OR 1-4 relevant sources used (1-2 marks) Annotated Bibliography not attempted – 0 marks		
	Subtotal – Skills /20		

Knowledge & Understanding 12-12	**Part 2**		
	17-20 marks - Demonstrates an extensive knowledge and understanding of scientific concepts relating to DNA. Information includes - Detailed description of the work of James Watson, Francis Crick, Rosalind Franklin and Maurice Wilkins in determining the structure of DNA - Accurate analysis the relative importance of the work of Watson, Crick, Franklin and Wilkins in determining the structure of DNA. - Clear description of how DNA replicates including diagram/s - Comprehensive explanation about why DNA replication is an important process - Comprehensive explanation about why DNA is necessary to life 13-16 marks - Demonstrates a thorough knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 4 of the required information 9-12 marks - Demonstrates a sound knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 3 of the required information 6-8 marks - Demonstrates a basic knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 2 of the required information 1-5 mark - Demonstrates a limited knowledge and understanding of scientific concepts relating to DNA AND/OR Information includes 1 of the required information		
	Subtotal – Knowledge and Understanding /20		
	TOTAL /40		
	RANK		
Teacher Comments			