

91156



NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

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SUPERVISOR'S USE ONLY

Level 2 Biology, 2014

91156 Demonstrate understanding of life processes at the cellular level

9.30 am Monday 17 November 2014

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of life processes at the cellular level.	Demonstrate in-depth understanding of life processes at the cellular level.	Demonstrate comprehensive understanding of life processes at the cellular level.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

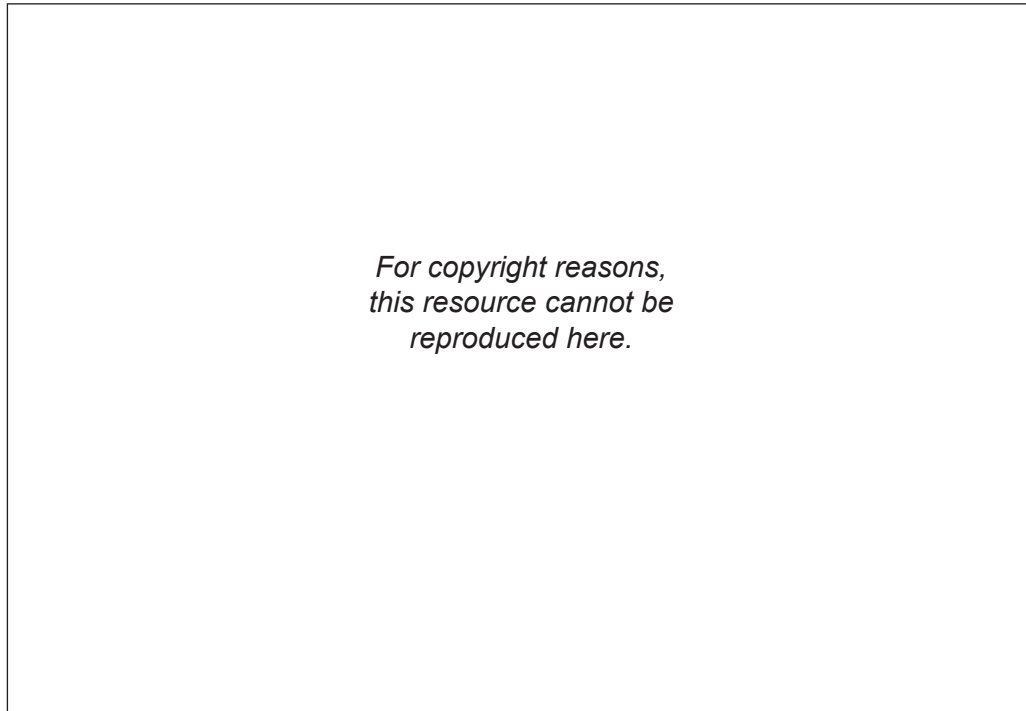
If you need more space for any answer, use the page(s) provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–8 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL

ASSESSOR'S USE ONLY

QUESTION ONE: CELL DIVISION

http://en.wikipedia.org/wiki/Cell_cycle

- (a) The picture above shows onion cells in different phases of the cell cycle. The cells labelled **A**, **B** and **C** are not in the sequence that cell division occurs in.

Put them in the correct sequence.

- (b) Comprehensively discuss how and why cells divide.

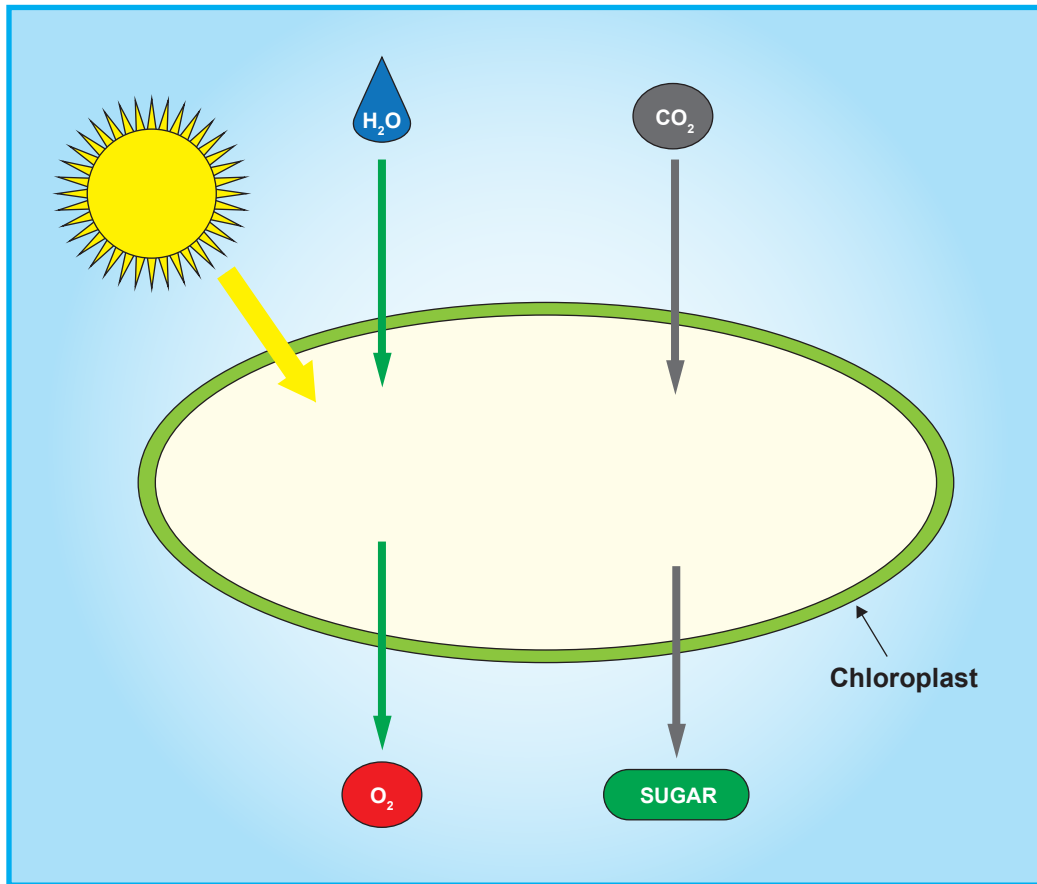
In your answer;

- describe the process of mitosis
- explain the process of DNA replication and how it allows mitosis to occur
- discuss, by giving reasons, when and why different factors cause the cells to divide, AND provide examples to support your answer.

You may use diagrams to support your answer.

QUESTION TWO: PHOTOSYNTHESIS

Photosynthesis is an important cell process carried out by green leaf and stem plant cells. The diagram below shows this cellular process.



Adapted from: http://bioweb.uwlax.edu/bio203/2011/kruse_sara/nutrition.htm

Discuss the factors that affect the rate of photosynthesis.

In your answer:

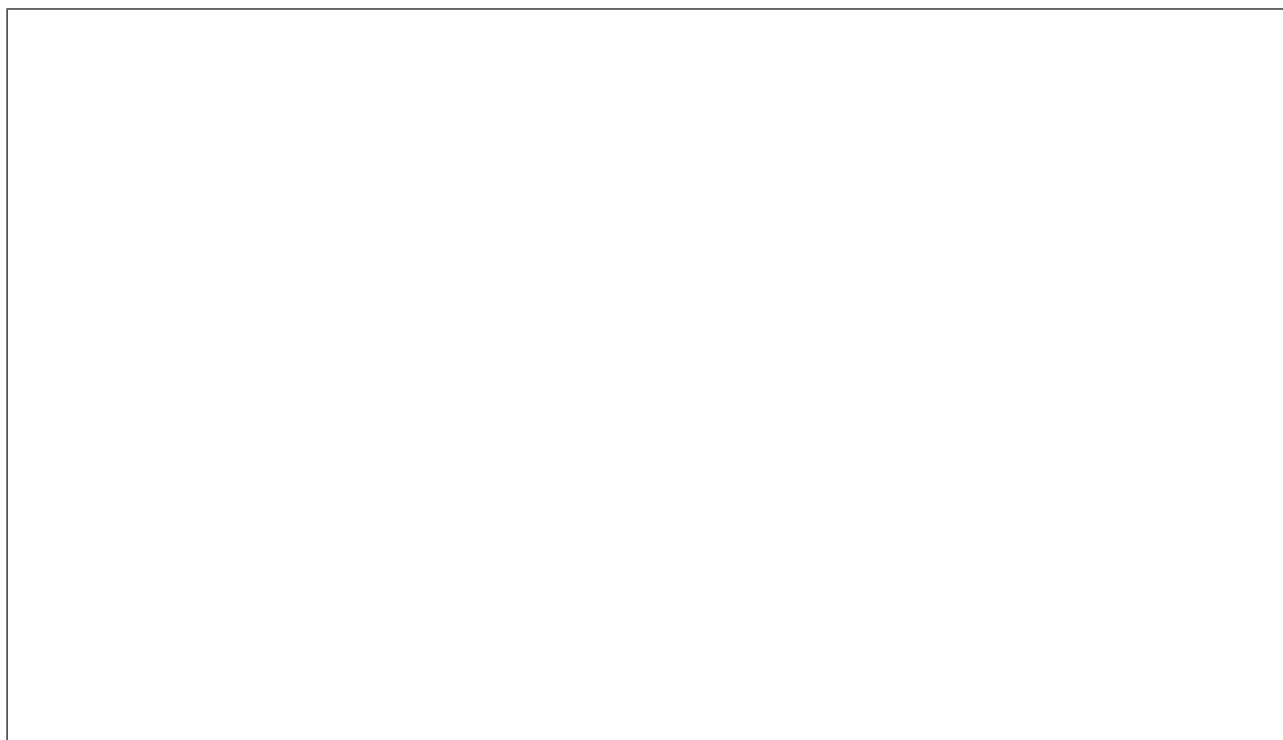
- describe photosynthesis and give a word equation for this cell process
- explain how water and carbon dioxide can affect the rate of photosynthesis
- discuss in detail how factors other than carbon dioxide and water affect the rate of photosynthesis.

QUESTION THREE: MITOCHONDRIA

Mitochondria are found in animal and plant cells. The number of mitochondria per cell can vary widely. Red blood cells do not contain any mitochondria, whereas muscle cells may contain hundreds or thousands. The table below shows how the number of mitochondria can vary in different cells.

Human cell type	Number of mitochondria
Red blood cell	0
Skin cell	approx. 200
Liver cell	1000–2000
Heart muscle cell	5000+

- (a) Draw a diagram of a mitochondrion, labelling the structures: outer membrane, inner membrane, matrix, and cristae.



- (b) Using the examples in the table above, discuss why there are different numbers of mitochondria in different types of human cells.

In your answer:

- explain the cell process that mitochondria carry out, and the purpose of this process
- provide reasons why different numbers of mitochondria are found in different types of cells
- make comparisons between the different types of cells in the table, AND link the number of mitochondria in the cell to its function and energy requirements.

