



Government of **Western Australia**
School Curriculum and Standards Authority



BIOLOGY

GENERAL COURSE

Externally set task

Sample 2016

Note: This Externally set task sample is based on the following content from Unit 3 of the General Year 12 syllabus.

- represent data in meaningful and useful ways; organise and analyse data to identify trends, patterns and relationships; qualitatively describe sources of measurement error; and use evidence to make and justify conclusions
- there are a number of asexual methods of reproduction in plants and animals, including:
 - binary fission
 - budding
 - vegetative propagation
 - cuttings
 - bulbs and tubers
 - spores
 - parthenogenesis
- cell division has a critical role in reproduction and growth:
 - mitosis (description of the main events)
 - meiosis (description of the main events)
 - comparison of mitosis and meiosis, including:
 - haploid and diploid cells
 - number of divisions
 - variability of daughter cells produced
 - number of daughter cells produced

In future years, this information will be provided late in Term 3 of the year prior to the conduct of the Externally set task. This will enable teachers to tailor their teaching and learning program to ensure that the content is delivered prior to the students undertaking the task in Term 2 of Year 12.

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Biology

Externally set task

Working time for the task: 60 minutes

Total marks: 36 marks

Weighting: 15% of the school mark

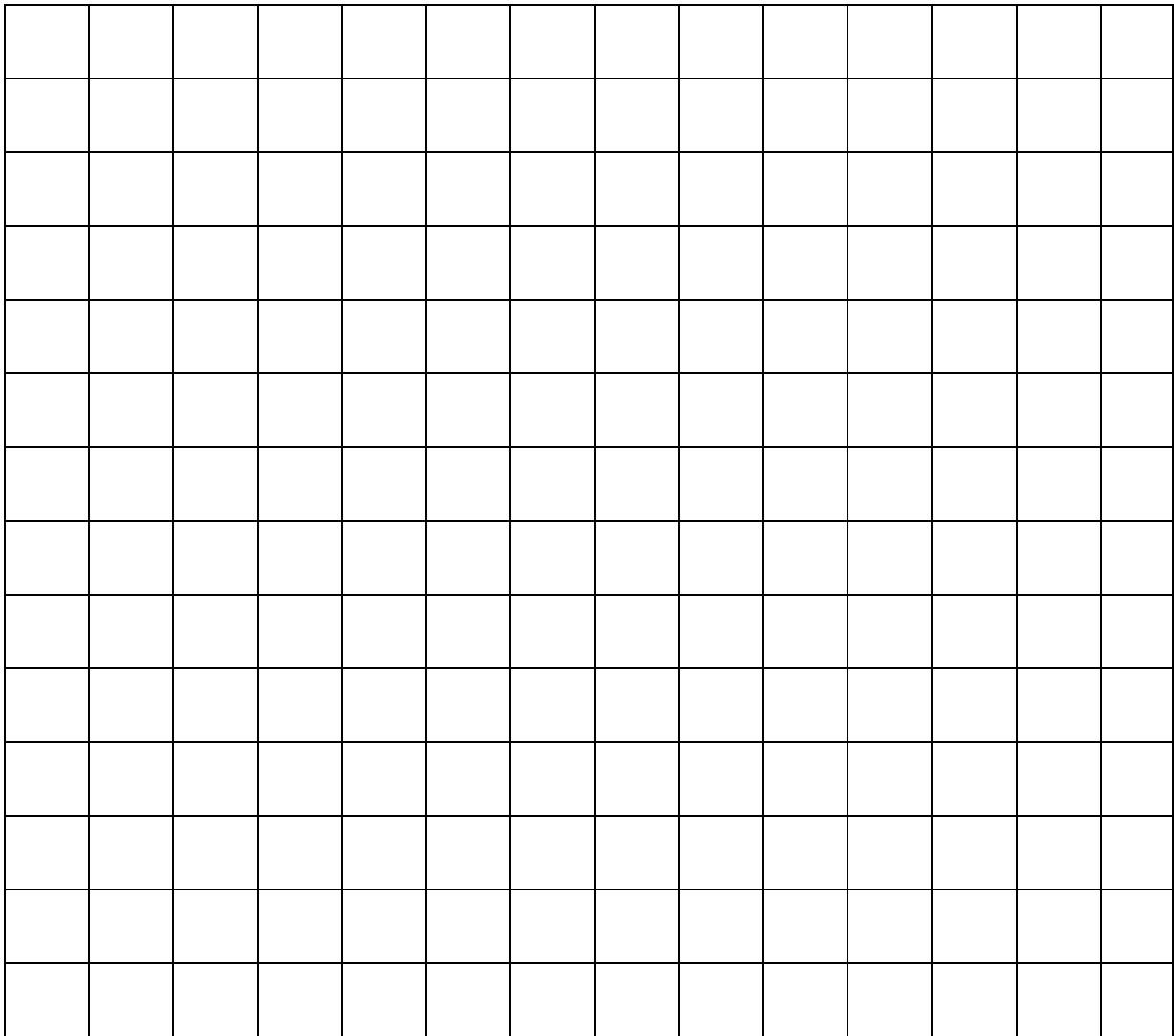
There are two questions in this task. Answer both questions.

1. A microbiologist set up two separate, identical flasks of nutrient broth for growing bacteria. She introduced the same species of bacterium to each flask at a concentration of 1 bacterial cell per mL of culture. She then incubated one flask at 16°C and the other flask at 24°C and recorded the concentration of bacteria in each flask at intervals of 40 minutes over time. The results are shown in the table below.

(22 marks)

Concentration of bacteria (number of bacterial cells per mL of culture) in two flasks held at different temperatures through time							
	20 minutes	60 minutes	100 minutes	140 minutes	180 minutes	220 minutes	260 minutes
Flask 1 (16°C)	2	3	4	4	8	9	16
Flask 2 (24°C)	2	4	Missing data	18	26	26	20

- (a) On the grid provided, plot a line graph of the number of bacterial cells per mL of culture against time for each of Flasks 1 and 2. For each flask, plot the data separately, but on the same grid below. (6 marks)



- (b)(i) Using the table, what was the number of bacterial cells per mL of culture in Flask 1 at 180 minutes? (1 mark)

- (ii) Using the table, when did the highest concentration of bacteria occur in Flask 2? (1 mark)

(c)(i) Using the graph, predict the concentration of bacteria in Flask 1 at 280 minutes. (1 mark)

(ii) Using the graph, predict the concentration of bacteria in Flask 2 at 100 minutes. (1 mark)

(iii) Which of the above predictions, for Flask 1 or Flask 2, is likely to be more accurate? Give a reason for your answer. (2 marks)

(d)(i) Describe the changes in the concentration of bacteria in Flask 1 during the experiment. (2 marks)

(ii) Describe the changes in the concentration of bacteria in Flask 2 during the experiment. (2 marks)

(e)(i) Give **two (2)** possible reasons why the concentration of bacteria in Flask 2 did not keep increasing throughout the entire experiment. (2 marks)

Reason 1:

Reason 2:
