INTEGRATED SCIENCE

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.

Science Inquiry Skills:

- identify, research and construct questions for investigation; propose hypotheses; and predict possible outcomes
- plan, select and use appropriate investigation methods, including pre-testing, to collect reliable data; assess risk and address ethical issues associated with these methods
- 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

Science Understanding:

- abiotic factors, including temperature, pH, salinity, light, water and atmospheric gases impact on the survival of organisms within the environment
- there is interaction between organisms, biological communities and the abiotic environment in which they live

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.

Integrated Science

Externally set task

Working time for the task: 60 minutes

Total marks: 36 marks

Weighting: 15% of the school mark

Materials required for this task:
- This Question/Answer booklet
- The Source booklet (which contains four sources for the context you have studied)

---

1.   Duckweed is a very small light green plant that is free floating on the surface of freshwater or slightly saline water. Duckweed has 1 to 3 leaves, or fronds, up to 2mm in length, with a single root protruding from each frond. Students investigated the effect of a pollutant on the growth of duckweed. They set up a preliminary experiment by putting 200 mL of water and 18 duckweed plants into each of two containers. They added 10 mL of pollutant to one of the containers. Both containers were left for three weeks and the number of duckweed leaves counted after this time.

(25 marks)

(a)   Why did one flask contain no pollutant?   (2 marks)

_____

_____

(b)   Write a possible hypothesis for the experiment.   (2 marks)

_____

_____

(c)   What are the independent and dependent variables?   (2 marks)

Independent: _____

Dependent: _____

(d)   Name **three (3)** variables that should be controlled and describe how they could be controlled.
                                                                                          (6 marks)

_____

_____

_____

The students counted the number of leaves of duckweed in each flask, each week for 3 weeks. The results are shown in the table.

Amount of pollutant added	Number of duckweed leaves			
	start	Week 1	Week 2	Week 3
0 mL	18	23	26	28
10 mL	18	14	10	6

(e)   Draw a graph using the data from the table.   (6 marks)

Additional grid is provided at the back of this booklet.
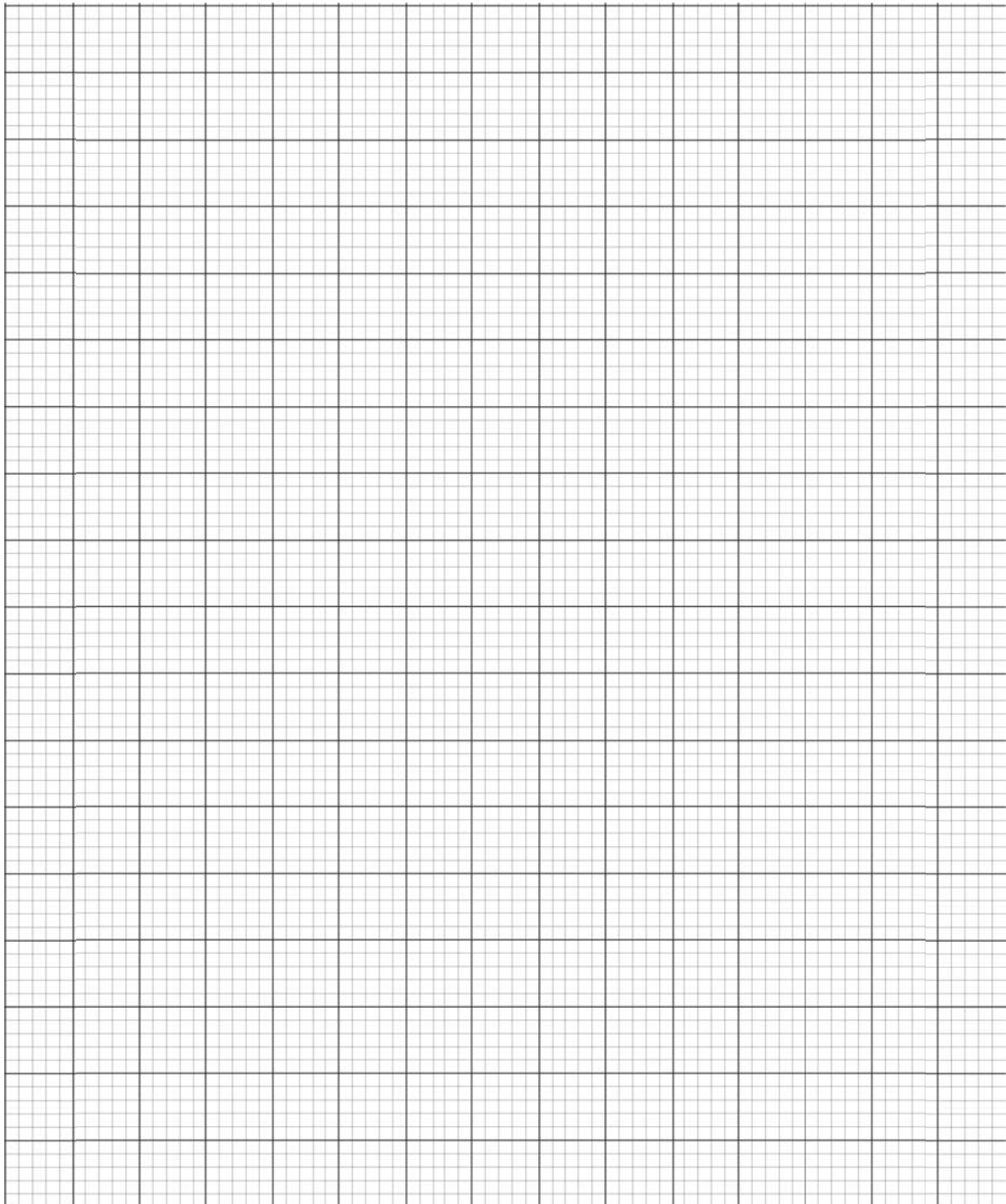
(f)   Write a valid conclusion for this experiment, based on the results shown.   (3 marks)

_____

_____

_____

(g)   Suggest improvements to the experiment so that the level of pollutant that affects the growth of duckweed can be determined from the results. Justify your answer by explaining how the improvements increase the reliability and validity of the experiment.   (4 marks)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. Scientists measured the number of species of small invertebrates (animals without backbones), living on the bottom of a section of a river, to establish the river's health. One measurement was taken upstream from a sewage outlet and then further measurements were taken at intervals downstream. The results are shown in the column graph below. The numbers on the bottom of each column indicates how far downstream from the sewage outlet the sample was taken.

(12 marks)

Number of species found at different distances from a sewage outlet
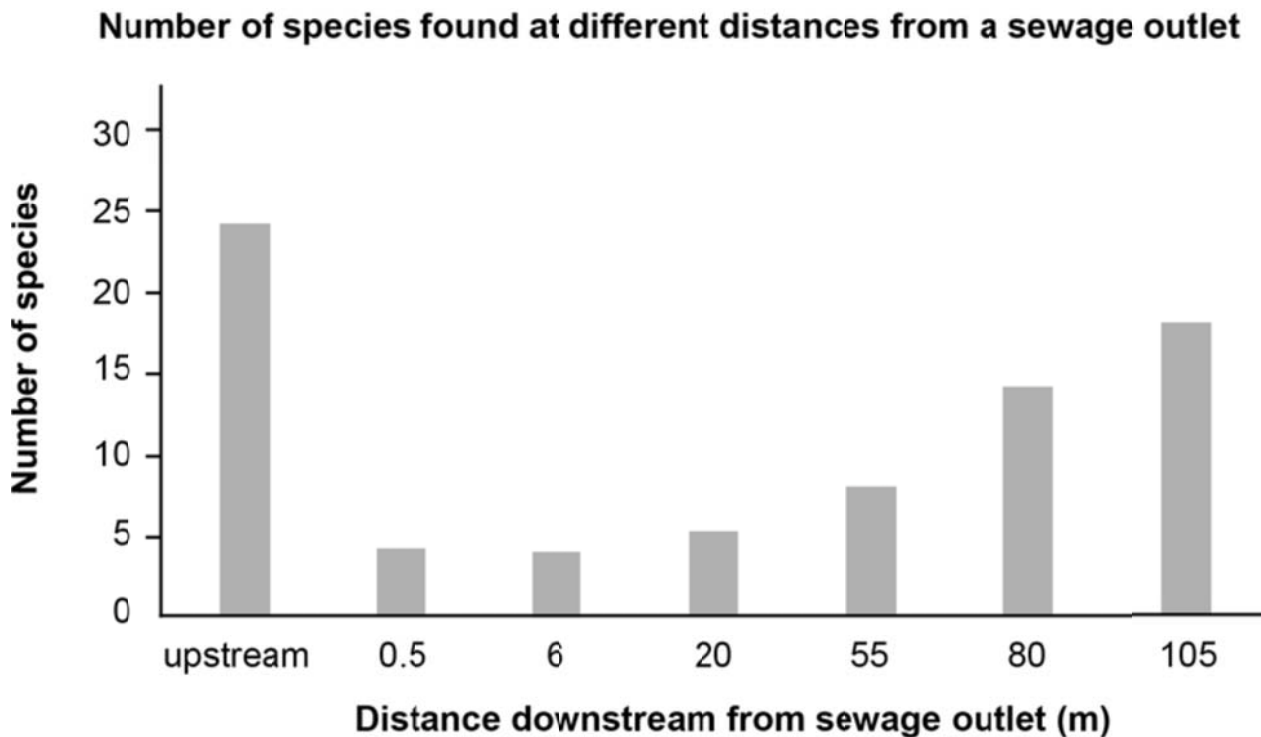
(a) Where along the river were the greatest numbers of different species found? Give a reason why.

(2 marks)

_____

_____

_____

(b) Describe how the location of the sewage outlet affects the number of species found as you move downstream. (3 marks)

_____

_____

_____

_____

_____

(c)   Where would scientist consider the river to be most healthy?   (1 mark)

_____

_____

_____

(d)   Name and describe **three (3)** more tests that scientists can carry out on the water to provide
        evidence of the health of the river.   (6 marks)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Additional working space:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Additional grid: Use the grid below to answer Question 5 if you have cancelled your first attempt.