



INTEGRATED SCIENCE

GENERAL COURSE

Marking key for the Externally set task
Sample 2016

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Integrated Science

Externally set task – marking key

1(a) Why did one flask contain no pollutant?

(2 marks)

| Description | Marks |
|--------------------------|----------|
| The control | 1 |
| For comparison of growth | 1 |
| Total | 2 |

(b) Write a possible hypothesis for the experiment.

(2 marks)

| Description | Marks |
|---|----------|
| If pollutant (independent variable) is in the water | 1 |
| Then duckweed numbers (dependent variable) will decrease | 1 |
| Or any reasonable hypothesis showing relationship between independent and dependent variables | |
| Total | 2 |

(c) What are the independent and dependent variable?

(2 marks)

| Description | Marks |
|--------------------------------------|----------|
| Independent: pollutant | 1 |
| Dependent: number of duckweed leaves | 1 |
| Total | 2 |

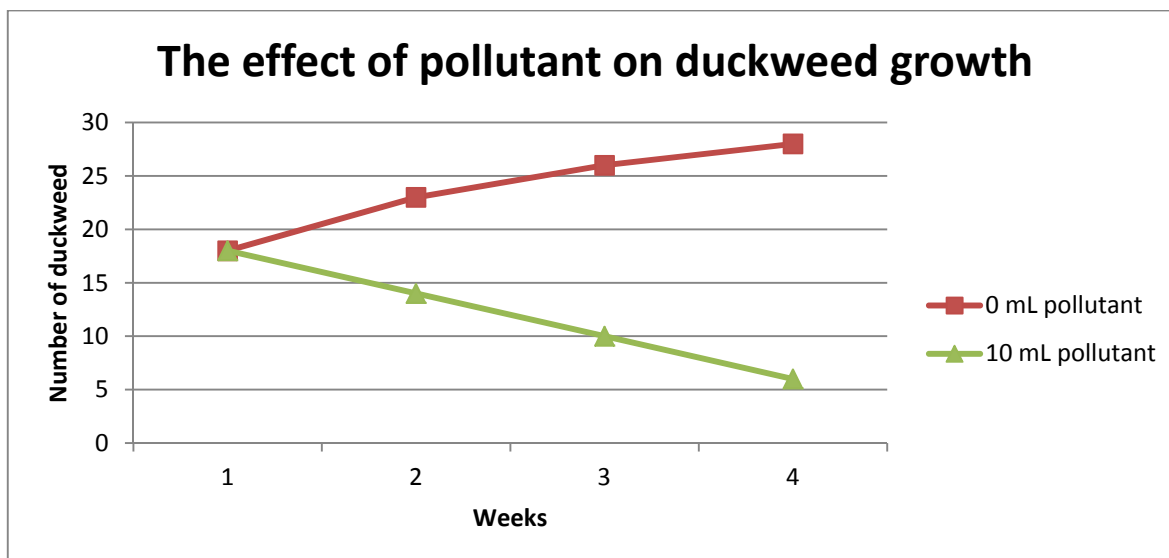
(d) Name **three (3)** variables that were controlled

(6 marks)

| Description | Marks |
|--|----------|
| 1 mark each for any 3 controlled variables and 1 mark for appropriate description. <ul style="list-style-type: none"> the temperature of the containers - left in same ambient temperature the amount of light – left in same area without shade/shadow the number of duckweed plants – 18 duckweed plants per container the volume of water – 200 mL of water per container the shape/size of the container – same type of container used | 1–6 |
| Total | 6 |

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

(6 marks)



| Description | Marks |
|---|----------|
| Correctly plot points | 1 |
| Labels of axes with correct name and unit | 1–2 |
| Uses a suitable scale | 1 |
| Title appropriate, with both variables included | 1 |
| Key | 1 |
| Total | 6 |

(f) Write a valid conclusion for this experiment, based on the results shown.

(3 marks)

| Description | Marks |
|---|----------|
| Referring to hypothesis – number of duckweed leaves decreased in presence of pollutant | 1 |
| Using data to help explain – with 10 mL of pollutant, number of duckweed leaves decreased from 18 to 6 over 3 weeks | 1–2 |
| Total | 3 |

(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)

| Description | Marks |
|--|----------|
| Use different quantities of pollutants introduced into the water | 1 |
| Helps determine a more accurate amount of pollutant that would not affect duckweed numbers | 1 |
| Increase number of replicates/beakers with each concentration of nutrients | 1 |
| So an average can be taken to make results more accurate/reliable | 1 |
| Total | 4 |

2(a) Where along the river were the greatest numbers of different species found? Give a reason why.

(2 marks)

| Description | Marks |
|--|----------|
| Upstream of the sewage outlet | 1 |
| Little/no pollution found in the water | 1 |
| Total | 2 |

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

(3 marks)

| Description | Marks |
|--|----------|
| Drops dramatically at the sewage outlet from above the outlet | 1 |
| Number of species slowly increases as distance from the outlet increases | 1–2 |
| Total | 3 |

(c) Where would you consider the river to be most healthy?

(1 mark)

| Description | Marks |
|------------------------|----------|
| Upstream of the outlet | 1 |
| Total | 1 |

(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)

| Description | Marks |
|---|----------|
| Any 3 tests named pH, salinity, dissolved oxygen, temperature, sulphate, nitrate, turbidity | 1–3 |
| Description for corresponding named test <ul style="list-style-type: none"> • pH – take sample of water and test with universal indicator/pH probe to measure acidity/alkalinity. • Salinity – take sample of water and test with conductivity probe to measure salt content. • Dissolved oxygen – take sample of water and test with dissolved oxygen probe to indicate amount of oxygen dissolved in water. • Temperature – use thermometer or probe to measure temperature of water. • Sulphate – take sample of water, and using Pallin test kit, test for sulphates in water using the photometer. • Nitrates – same as sulphates • Turbidity – use secchi disk and lower into water and stop when not visible, measure depth of visibility OR • Fill turbidity tube to determine height of water that visibility is lost. | 1–3 |
| Total | 6 |