**Year 12 Biology**

**Task 12 Competitive Exclusion Principle**

**Validation**

**Miss Cunningham**

**Weighting 5%**

**Total Marks: / 20**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A student in their Biology class wanted to investigate the competitive exclusion principle by recreating the *Paramecium* experiment. The student planned their experiment below, completed it and included their results and findings. Using your knowledge on the competitive exclusion principle and the information below, you are to complete this validation in test conditions and answer the following questions in full sentence answers.

Aim

To investigate the competitive exclusion principle using two different strains of Paramecium to see if they can both survive simultaneously.

Hypothesis

One strain of Paramecium will drive the other strain of Paramecium to extinction, so they both won’t survive simultaneously.

Method

1. On agar plate, place small sample of Paramecium strain 1 and Paramecium strain 2 on separate ends.
2. Leave agar with samples covered in warm place to grow over 17 days.
3. Record number of colonies of each strain each day in the results table.

Results Table

|  |  |  |
| --- | --- | --- |
| **Day** | **Paramecium Strain 1 colonies** | **Paramecium Strain 2 colonies** |
| 0 | 0 | 0 |
| 1 | 2 | 2 |
| 2 | 10 | 9 |
| 3 | 35 | 24 |
| 4 | 51 | 59 |
| 5 | 52 | 67 |
| 6 | 43 | 60 |
| 7 | 46 | 111 |
| 8 | 48 | 102 |
| 9 | 38 | 110 |
| 10 | 25 | 111 |
| 11 | 23 | 118 |
| 12 | 12 | 123 |
| 13 | 14 | 125 |
| 14 | 10 | 142 |
| 15 | 11 | 156 |
| 16 | 7 | 151 |
| 17 | 0 | 154 |

1. **Using the information above, identify the following variables (5 marks).**

**Independent:**

Strain of Paramecium

**Dependent:**

Number of colonies

**3 Controlled:**

Size of agar, type of agar, amount of sunlight, temperature kept, equipment used etc.

1. **Graph the data in the area below from the results table (5 marks).**

**Title (1)**

**Axis title (1)**

**Indices (1)**

**Line graph (1)**

**Scale (1)**

1. **Discuss the trend in the results for both strains, being sure to refer to data in your answer (2 marks).**

**Discuss trend in strain 1 (0.5)**

**Includes data of strain 1 (0.5)**

**Discuss trend in strain 2 (0.5)**

**Includes data of strain 2 (0.5)**

1. **Does the data support or disprove the student’s hypothesis? Explain your reasons why or why not (2 marks).**

**Yes/No (1)**

**Explain why in relation to restating hypothesis (1)**

1. **Does the data support the competitive exclusion principle? Explain your reasons why or why not (2 marks).**

**Yes/No (1)**

**Explain reason why or why not in relation to concept of principle (1)**

1. **Identify two potential errors that the student may have encountered with his experiment to effect the validity of it (2 marks).**

**1 mark per error (max 2)**

1. **Identify two potential improvements that the student may implement to improve the validity of this experiment for next time (2 marks).**

**1 mark per improvement (max 2)**

**End of Assessment**