**JOSEPH BANKS SECONDARY COLLEGE**

**Investigation Two**

**General Integrated Science – Monitoring an ecosystem**

**Background:**

Ecosystems within Australia need to be monitored to ensure their ongoing health and the health of the species within them. To achieve this, Environmental Scientists and Ecologists will look at different environmental indicators within the system to gauge its health. Typically, scientists will record a number of abiotic and biotic factors in the system to gain information on species diversity and abundance.

Lake Joondalup lies within the Yellagonga Catchment Area, the catchment lies on the Swan Coastal Plain and is located approximately 20 km north of central Perth. The surface water catchment area impacting on the Park is estimated to cover an area of approximately 400 hectares. The catchment is linked to the park by surface flows via drainage infrastructure and groundwater flows. The catchment encompasses land on either side of the park located in the Cities of Joondalup and Wanneroo and includes medium to high-density residential, commercial and light industrial development interspersed with green areas. Lakes Joondalup and Goollelal, and the swamps Beenyup and Walluburnup, are the receiving aquatic environments for water from this catchment via surface and groundwater flows.

Within these systems, freshwater invertebrates (insects, crustaceans, snails and worms) are often used as indicators of the state of streams, rivers, lakes and ponds. As seasons change, the diversity and abundance of invertebrates can change as water temperature and quality changes. In this investigation, you will be comparing the species diversity and abundance of freshwater invertebrates across multiple locations within Lake Joondalup.

**DIRECTIONS:**

Use the provided method to complete your investigation. Complete the experiment and fill out your investigation booklet.

You must hand in the following;

* Completed Monitoring a Local Ecosystem Investigation.

**WEIGHTING:**

This assessment is worth 10% of your overall grade for this course.

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| **Section** | **Description** | **Marks Allocated** | **Marks Received** |
| Introduction | * Provides background information about monitoring techniques and the importance of sampling a system. * Relates the information to ecosystems. | 3  2 |  |
| Independent Variable | * Correctly names independent variable * Names units for independent variable | 1  1 |  |
| Dependent Variable | * Correctly names dependent variable * Names units for dependent variable | 1  1 |  |
| Controlled Variables | * Correctly names at least three controlled variables * Names manner in which variables will be controlled | 3  3 |  |
| Hypothesis | * Includes independent variable in hypothesis * Includes dependent variable in hypothesis | 1  1 |  |
| Method | * Lists all materials including quantities. * Creates a numbered, repeatable list of instructions for conducting this experiment * Methods section includes strategies for minimising uncontrolled variables and other factors | 2  2  1 |  |
| Diagram | * Includes fully labelled diagram * Diagram drawn in pencil | 1  1 |  |
| Results (Table and Notes) | * Records raw data using required number of tables * Includes dependent and independent variable labels in each table * Identifies outliers in the raw data | 4  4  1 |  |
| Graph | * Completes all required graphs * Includes an appropriate title for each graph stating dependent and independent variables * Correctly labels all axes * Includes units with labelled axes * Uses correct type of graph * Correctly plots points on the graph * Pencil and Ruler | 9  9  1  1  9  9  1 |  |
| Discussion | * Describes patterns and trends in the data * Accurately relates the patterns observed in the data to the hypothesis. * Uses questions to form paragraphs rather than simple answers. * Relates findings to the health of an ecosystem in terms of species diversity and abundance. | 4  2  1  10 |  |
| Evaluation | * Comments on the reliability and validity of the data collected * Comments on the reliability of the way in which data was collected * Describes at least two limitations with the experiment that may affect the accuracy of the data * Suggests at least two improvements for the experiment in the future | 2  2  2  2 |  |
| Conclusion | * Summarises findings from the investigation * Comments on whether the outcome of the investigation was valid | 2  1 |  |
| **TOTAL MARKS** |  | **100** |  |

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| **Background** |  |
| **Aim** | To investigate.. |
| **INDEPENDENT VARIABLE:** Which variable will you change in the investigation?  **DEPENDENT VARIABLE:** Which variable will you measure in the investigation?  **CONTROLLED VARIABLES:**  Which variables will you keep the same to ensure a fair test? |  |
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|  |
| **Hypothesis**  Write an **if/then** statement that describes the relationship between the independent and dependent variables. |  |
| **Reliability**  How many times will you do the test?  Why this many times? |  |
| **Safety**  List specific safety factors. |  |
| **Materials Required** Write a list of all materials that you will require for this experiment, including quantities. |  |
| Draw a diagram of your apparatus. | Complete your diagram on a separate piece of paper. |
| **Method**  Provide a detailed step-by-step method. |  |
| **Results**  Constructs a table with a;   * Title which incorporates the variables * Column and row headings * Accurate units. | **Title:** |
| **Graph**  Constructs a graph with   * A suitable title incorporating the variables * Axes labels * An incremental scale * Accurate plotting of data.   Always use a pencil and ruler! | Title:  Macintosh HD:Users:chantalsimpson:Desktop:3.tiff |
| **Discussion**  Summarise the results from your investigation  Describe the patterns and trends visible in your data.  How do your results relate to your hypothesis?  How do your findings relate to ecosystems and the distribution of species?  What are the impacts of changes in macro invertebrate species diversity and abundance. |  |
| **Conclusion** *Write this using full sentences. Consider the following questions*  Was your hypothesis supported/ not supported?  What did you learn about abiotic and biotic factors? |  |
| **Evaluation** *Write this in paragraph form using full sentences and answering the questions below.*  **1.** What difficulties did you experience during the experiment? Such as the way you measured or in other things affecting the experiment?  **2.** Make specific suggestions for improving the investigation. |  |