Joseph Banks Secondary College

Year 12 Integrated Science: General

Unit 3 - Task 1

Assessment type: Investigation – Canning River Water Chemistry

Conditions

Period allowed for completion of the task:

- 2 excursions to collect data dedicated to understanding how abiotic factors can impact species abundance and diversity
- 3 lessons of class time to complete data analysis and write up.
- One week of additional time to complete the assessment.

Directions:

- Complete the investigation booklet provided by the Department of Parks and Wildlife.
- Use your completed booklet to produce a written report of your findings using the provided scaffold as a layout guide.
- Report may be typed.
- All graphs and tables must be hand drawn using a ruler and pencil.

Task Weighting :

15% of the school mark for this pair of units

Background:

An ecosystem is defined as any community of living and non-living things that work together. Ecosystems do not have clear boundaries, and it may be difficult to see where one ecosystem ends and another begins. In order to understand what makes each ecosystem unique, we need to look at the biotic and abiotic factors within them. Biotic factors are all of the living organisms within an ecosystem. These may be plants, animals, fungi, and any other living things. Abiotic factors are all of the non-living things in an ecosystem.

Both biotic and abiotic factors are related to each other in an ecosystem, and if one factor is changed or removed, it can affect the entire ecosystem. Abiotic factors are especially important because they directly affect how organisms survive. Abiotic factors come in all types and can vary among different ecosystems. For example, abiotic factors found in aquatic systems may be things like water depth, pH, sunlight, turbidity (amount of water cloudiness), salinity (salt concentration), available nutrients (nitrogen, phosphorous, etc.), and dissolved oxygen (amount of oxygen dissolved in the water). Abiotic variables found in terrestrial ecosystems can include things like rain, wind, temperature, altitude, soil, pollution, nutrients, pH, types of soil, and sunlight.

The boundaries of an individual abiotic factor can be just as unclear as the boundaries of an ecosystem. Climate is an abiotic factor - think about how many individual abiotic factors make up something as large as a climate. Natural disasters, such as earthquakes, volcanoes, and forest fires, are also abiotic factors. These types of abiotic factors certainly have drastic effects on the ecosystems they encounter.

A special type of abiotic factor is called a limiting factor. Limiting factors keep populations within an ecosystem at a certain level. They may also limit the types of organisms that inhabit that ecosystem. Food, shelter, water, and sunlight are just a few examples of limiting abiotic factors that limit the size of populations. In a desert environment, these resources are even scarcer, and only organisms that can tolerate such tough conditions survive there. In this way, the limiting factors are also limiting which organisms inhabit this ecosystem.

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?	
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:

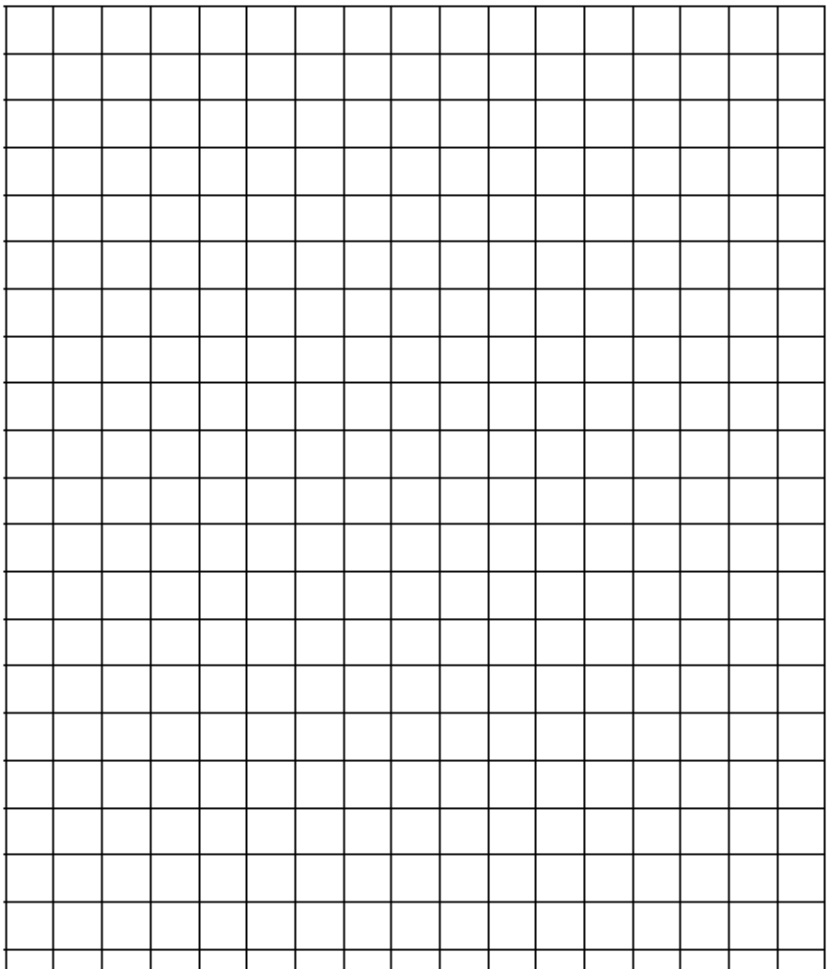
Graph

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:



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.	

Section	Description	Marks Available	Marks Received
Introduction	Provides background information about abiotic factors and their importance. Relates the information to ecosystems.	3 2	/5
Independent Variable	Correctly names the independent variable Correctly names the units for the independent variable	1 1	/2
Dependent Variable	Correctly names the dependent variable Correctly names the units for the depdendent variable	1 1	/2
Controlled Variables	Correctly names at least three controlled variables States how each variable is controlled	3 3	/6
Hypothesis	Includes independent variable in hypothesis Includes dependent variable in hypothesis	1 1	/2
Method	Lists all materials, including quantities Creates a numbered, repeatable list of instructions for conducting this experiment Method section includes strategies for minimising unctrolled variables and other factors.	2 2 1	/5
Diagram	Includes fully labelled diagram Diagram drawn in pencil	1 1	/2
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	/9
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	/49
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 effect of abiotic factors on water quality and species diversity and abundance.	4 2 1 10	/17
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	/8
Conclusion	Summarises findings from the investigation Comments on whether the outcome of the investigation was valid	1 1	/3
Total Marks		100	/100