

Investigation One

General Integrated Science – Comparative Ecosystems

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.

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 Comparative Ecosystems Investigation

WEIGHTING:

This assessment is worth 15% of your overall grade for this course.

Section	Description	Marks Allocated	Marks Received
Introduction	<ul style="list-style-type: none"> - Provides background information about abiotic factors and their importance. - Relates the information to ecosystems. 	3	
		2	
Independent Variable	<ul style="list-style-type: none"> - Correctly names independent variable - Names units for independent variable 	1	
		1	
Dependent Variable	<ul style="list-style-type: none"> - Correctly names dependent variable - Names units for dependent variable 	1	
		1	
Controlled Variables	<ul style="list-style-type: none"> - Correctly names at least three controlled variables - Names manner in which variables will be controlled 	3	
		3	
Hypothesis	<ul style="list-style-type: none"> - Includes independent variable in hypothesis - Includes dependent variable in hypothesis 	1	
		1	
Method	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Includes fully labelled diagram - Diagram drawn in pencil 	1	
		1	
Results (Table and Notes)	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	
Discussion	<ul style="list-style-type: none"> - 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	
Evaluation	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Summarises findings from the investigation - Comments on whether the outcome of the investigation was valid 	2	
		1	
TOTAL MARKS		100	

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	

<p>How many times will you do the test?</p> <p>Why this many times?</p>	
<p>Safety</p> <p>List specific safety factors.</p>	
<p>Materials Required</p> <p>Write a list of all materials that you will require for this experiment, including quantities.</p>	
<p>Draw a diagram of your apparatus.</p>	<p>Complete your diagram on a separate piece of paper.</p>
<p>Method</p> <p>Provide a detailed step-by-step method.</p>	

Results

- Constructs a table with a;
- Title which incorporates the variables
 - Column and row headings
 - Accurate units.

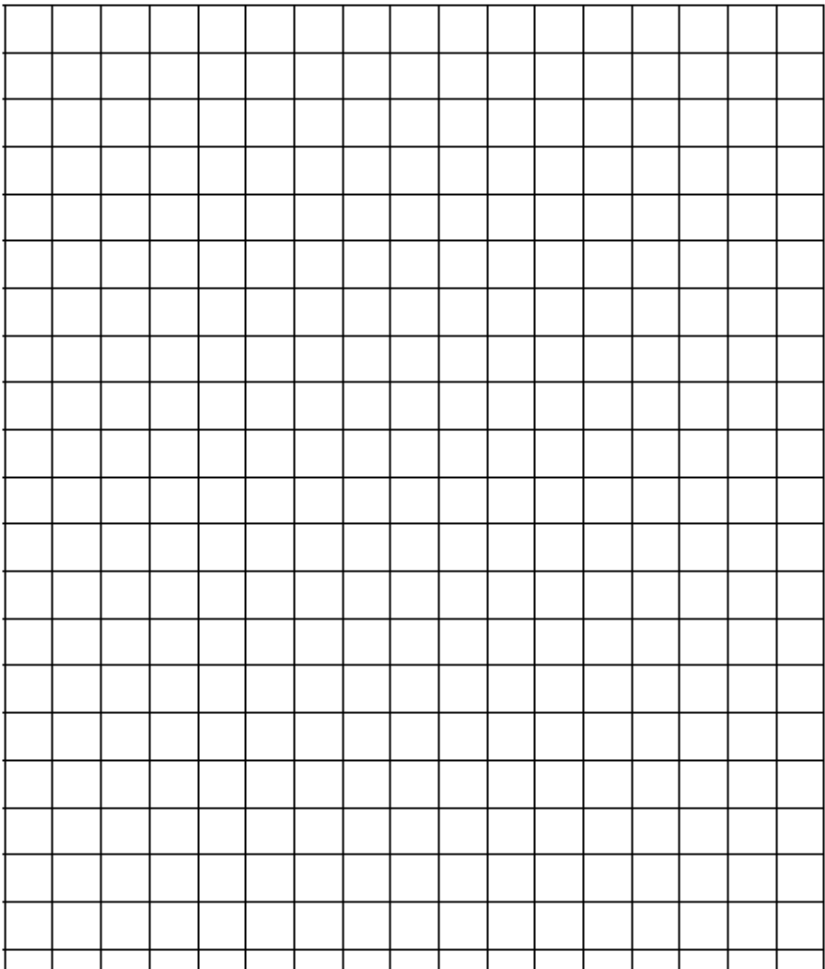
Title:

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:



<p>Discussion</p> <p>Summarise the results from your investigation</p> <p>Describe the patterns and trends visible in your data.</p> <p>How do your results relate to your hypothesis?</p> <p>How do your findings relate to ecosystems and the distribution of species?</p> <p>What are the impacts of these abiotic and biotic factors on ecosystems, food chains and food webs? How can a change in one affect another?</p>	
<p>Conclusion</p> <p><i>Write this using full sentences. Consider the following questions</i></p> <p>Was your hypothesis supported/ not supported?</p> <p>What did you learn about abiotic and biotic factors?</p>	
<p>Evaluation</p>	

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.