

EEI – HUMANS IN THE ECOSYSTEM

Year 9	Science
Name	

Work in small groups to compare plant diversity in 3 different ecosystems within the Daintree Research Observatory grounds.

You will:

- ☐ develop a plan to measure abiotic and biotic factors in three different ecosystems
- ☐ make hypothesis about how the 3 different ecosystems will differ
- ☐ collect data
- ☐ collect plant specimens from each of the 3 ecosystems
- ☐ make inferences and conclusions
- ☐ present your findings.

Each group member MUST present their own individual report and plant specimens

Due date: _____

DAINTREE RESEARCH OBSERVATORY - JCU

For this assessment task you will be investigating how humans might impact the delicate Daintree rainforest ecosystems. You will be conducting this study at the Daintree Research Observatory, which is run by James Cook University.

Location

The Daintree Rainforest Observatory is located at 40 m elevation in lowland tropical rainforest at Cape Tribulation, 140 kilometres north of Cairns in Queensland Australia (16° 06' 14.8" S, 145° 26' 58.0" E). The site is adjacent to the Daintree National Park. The Daintree rainforest has the highest biodiversity anywhere in Australia and has a unique Gondwanan flora.

In 1988 the rainforests among which the crane is situated were declared the Wet Tropics World Heritage Area. This is one of the few areas in the world where the reef meets the rainforest and the only place where two World Heritage Areas sit side by side. The site is flanked to the west by coastal ranges rising to more than 1400m and by the Coral Sea to the east.

Climate

Annual average rainfall is approximately 3500mm and is strongly seasonal with 70% falling during the wet season which runs from December to April. Summers are often hot and humid with the mean daily temperature in January around 28°C. However, temperatures up to 36°C are not unusual during the summer months. Winters are mild and dry with the mean daily temperature in July around 22°C.

Northern Australia is subject to tropical cyclones in the wet season and their occurrence is unpredictable. The impact of these severe tropical storm systems are regarded as a natural phenomenon and a key evolutionary factor in shaping the ecology of Queensland's tropical lowland rainforests.

History

The area in which this site is located was selectively logged in the late 1950's and early 1960's. There are however standing specimens of *Toona ciliata* (Red Cedar) in the area, which suggests that this logging was probably not intensive.

Extreme disturbance due to storm damage (tropical cyclones) is common in the area on a cycle of approximately 50 years. On the 11th of February 1999, tropical cyclone Rona (category 3) passed over the Cape Tribulation area causing widespread major damage. Wind gusts of up to 170 km/hr, local flooding and storm surges of up to 1.4m were recorded in the area. The canopy crane site was severely damaged, as approximately 10% of the trees were felled and 50% of the trees suffered complete crown loss on the research plot. The past 10 years has shown profound recovery of the forest.

http://www.jcu.edu.au/canopycrane/about/JCUPRD_046915.html

TASK OVERVIEW

For this assignment, you will be traveling to the Daintree Research Observatory to collect data comparing three different ecosystems. The tasks you will be completing are commonly conducted by scientists to evaluate the health of an ecosystem. In this assignment you will be comparing three different ecosystems, heavily managed, re-vegetated, and un-managed, to answer the focus questions “**how do humans affect ecosystems?**”.

The following sections will help you plan, conduct and report on possible human impacts to the Daintree ecosystems.

Section 1. Introduction

Aim

Make your hypothesis (ie. What will be the difference between the three ecosystems?)

What (variables) might you need to measure in the three different ecosystems?

Abiotic (non-living)	Biotic (living)

Plan and design the procedure to measure the variables

[illegible]

Equipment

[illegible]

Teacher approval _____ Date _____

Section 2. Results

Ecosystem 1 - _____

Date: _____ Time: _____

Group Members: _____

Table 1: Abiotic Factors

Air Temperature	
Ground Temperature	
Light Reaching Plants	
Soil Description	
Soil pH	
Soil penetration	

Table 2: Biotic Factors

Species	Average Height	% Cover

Other observations: _____

Ecosystem 2 - _____

Date: _____ Time: _____

Group Members: _____

Table 1 : Abiotic Factors

Air Temperature	
Ground Temperature	
Light Reaching Plants	
Soil Description	
Soil pH	
Soil penetration	

Table 2: Biotic Factors

Species	Average Height	% Cover

Other observations: _____

Ecosystem 3 - _____

Date: _____ Time: _____

Group Members: _____

Table 1 : Abiotic Factors

Air Temperature	
Ground Temperature	
Light Reaching Plants	
Soil Description	
Soil pH	
Soil penetration	

Table 2: Biotic Factors

Species	Average Height	% Cover

Other observations: _____

Draw accurate graphs for each of the three ecosystems. Attach these pages to this *Student booklet*.

1. Draw one pie graph for each ecosystem showing the percentage cover of the species present
2. Draw bar graphs to enable comparison between the ecosystems.
 - Number of species (diversity)
 - Maximum height of plants
 - Temperatures (air and soil)
 - Soil pH
 - Soil penetration
 - Amount of light

Section 3. Discussion

Use the following questions to guide your discussion

1. What is biodiversity?

2. Why is it important to measure the biodiversity of a biome?

3. Refer to the graphs, state your results and consider what factors may have caused the differences observed

4. How do your findings relate to the hypotheses? Does the data support or reject each hypothesis. Explain.

5. What further studies could be done to test these ideas further? Discuss any potential errors, and how the method could be improved.

Section 4. Conclusion

Write one paragraph summarizing your findings. Be sure to relate your findings to the hypotheses.

Student Criteria Sheet YEAR 9 BIOLOGY - ECOSYSTEMS					
	A	B	C	D	E
UNDERSTANDING BIOLOGY	Applies detailed biological knowledge to Interpret and critically analyse results. Draws justified conclusions that relate to the hypotheses.	Applies biological knowledge, and uses literature to interpret results. Draws conclusions that relate to the hypotheses	Discusses results and draws conclusions	Discusses results	
INVESTIGATING BIOLOGY	Formulates correctly worded, justified hypotheses	Formulates testable hypotheses	Attempts to develop a hypothesis	States an aim	
	Designs and modifies the investigation to present a logical, efficient method	Selects and implements investigations to present a logical method	Evidence of a suitable method	Attempts a method	Attempts a method
	Presents processed data as clear and accurate diagrams, tables, graphs clearly linked to the hypothesis	Presents data as diagrams, tables and graphs that identify trends(minor errors)	Presents data as diagrams, tables and or graphs.	Presents data	
	Evaluation of methods, explanation and accurate identification of sources of uncertainty, and reasoned proposals of modifications to improve the quality of evidence	Analysis of methods, accurate identification of sources of uncertainty, and specific proposals of modifications to improve the quality of evidence	Discusses effectiveness of experimental method	States a source of error and improvement	States a source of error or improvement
COMMUNICATING	Uses clear and concise vocabulary and scientific terminology to concisely communicate information. Correct format used	Uses clear and concise vocabulary and scientific terminology to effectively communicate information. Correct format used	Uses scientific terminology to communicate information. Mainly uses correct format	little scientific terminology; is difficult to follow.	States information

COMMENTS