Classwork 4 Biology

Students of Preliminary Biology,

I have set up a Google classroom (code *4662t5o*) where work will be provided and where you can submit work. You may also submit work to my email address: anthony.neenan@det.nsw.edu.au

Any questions can also be forwarded via Google classroom and email.
Following is the work expected to complete this term:

1. Assessment task 2. is due Tuesday 24th March (attached)

2. Technology and Evidence of Past Ecosystem Change

Read pages554-559 and summarise each technology/evidence:

- Rock Structure and Formation
- Radiometric Dating
- Ice-core drilling
- Indigenous art

This has already been covered in class with those students present

3. Adaptations to changing ecosystems

Read page 562 and summarise each:

- Sclerophyll plants
- Small mammals and kangaroos

This will be covered in class on Tuesday 24th withy those students present

4. Human Induced changes leading to extinction

Read pages 572-582 and summarise each human impact that is affecting ecosystems:

- Habitat destruction
- Invasive species
- Overexploitation
- Pollution
- Climate change

5. Rehabilitating mine sites

Complete attached worksheet

6. TAKE HOME EXAM

Students will be forwarded the Preliminary HSC Biology exam. This will be completed as an open book exam with details to be communicated to students when finalised. Keep an eye on Google classroom and emails for further information about this.

Preliminary Biology

Assessment Task 2

Depth Study - Mangrove Ecosystem Study

The Task:

To research mangrove and coastal ecology and perform field studies at sites in the Brunswick River estuary. Students will then produce a report detailing our fieldwork and the importance of mangroves to the estuarine ecosystem and threats to this ecosystem from human activities.

Due Date:

Tuesday 24th March (week 9)

Weighting:

30% Preliminary Assessment mark

Assessor:

Mr. Anthony Neenan

Syllabus Dot Point:

Students:

- investigate and determine relationships between biotic and abiotic factors in an ecosystem, including: (ACSBL019)
  - – the impact of abiotic factors
  - – the impact of biotic factors, including predation, competition and symbiotic relationships
  - – the ecological niches occupied by species
  - – predicting consequences for populations in ecosystems due to predation, competition, symbiosis and disease
  - – measuring populations of organisms using sampling techniques

- investigate changes in past ecosystems that may inform our approach to the management of future ecosystems, including:
  - – the role of human-induced selection pressures on the extinction of species
  - – models that humans can use to predict future impacts on biodiversity
  - – the role of changing climate on ecosystems

Outcomes Assessed:

BIO11/12-3 conducts investigations to collect valid and reliable primary and secondary data and information

BIO11/12-4 selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media

BIO11/12-7 communicates scientific understanding using suitable language and terminology for a specific audience or purpose

BIO11-10 describes biological diversity by explaining the relationships between a range of organisms in terms of specialisation for selected habitats and evolution of species

BIO11-11 analyses ecosystem dynamics and the interrelationships of organisms within the ecosystem

Report Specifics /criteria:
Your report must include the following headings and content:

Formal Scientific Title – Title section must **include your name.**

Introduction
Outline:

- location of the field studies (include a map)
- date of field study
- climate details (include maximum temperature and average monthly rainfall graphs)
- natural history of the area
  - geological history
  - source of sandy sediments found in study area
  - vegetation of study area and surrounds (Big Scrub)
  - human habitation and changes since European settlement

Mangrove ecology

- Explain the importance of Mangroves to the local ecosystem. What is their ecological role?
- List the species of Mangroves present at our study site. What other mangrove species are present in this region (Far North Coast NSW)?
- Include a diagram of a mangrove ecosystem food web

Mangrove Adaptations

- Detail adaptations that mangroves have evolved that helps them tolerate salt, waterlogged and anoxic soil, unstable sediments and reproductive adaptations (identify mangrove species that exhibit these adaptations)

Belt Transect

- Explain what a belt transect is and the purpose of undertaking a belt transect
- Include a reproduction of your belt transect data
- Interpretation of belt transect data including the major abiotic factors that affected the vegetation changes along transect

Quadrat/Cover Abundance

- Explain a what quadrat sampling is and the purpose of using quadrat sampling
- Include a reproduction of your quadrat/cover abundance data
- Interpretation of quadrat/cover abundance data including the dominance of introduced species

Human Impacts on mangrove ecosystems

- Outline human impacts on mangrove ecosystems
- Explain the deleterious effects of these impacts

Conclusion
A one paragraph summation of your Scientific Report

Format
Your document should be presented as a Scientific Report as outlined above. Your report must include clear headings and subheadings. Images and diagrams should be included to help communicate your understanding and need to have a figure caption. Refer to diagrams in your text.

Word Limit:
Your report should be between 1000-1500 words.

Referencing:
Harvard style referencing is required for all assertions in your report. Harvard referencing includes in-text citations and complete reference list accompanying presentation.

Making Rubric

Aspect	Details	Available Marks
Content - Title	Short title that accurately represents your report & your name.	1
Content - Introduction	• location of the field studies (include a map) • date of field study • climate details (include maximum temperature and average monthly rainfall graphs) • natural history of the area - geological history - source of sandy sediments found in study area - vegetation of study area and surrounds (Big Scrub) - human habitation and changes since European settlement	4
Content – Mangrove ecology	• Explain the importance of Mangroves to the local ecosystem. What is their ecological role? • List the species of Mangroves present at our study site. What other mangrove species are present in this region (Far North Coast NSW)? • Include a diagram of a mangrove ecosystem food web	3
Content – Mangrove adaptations	• Detail adaptations that mangroves have evolved that helps them tolerate salt, waterlogged and anoxic soil, unstable sediments and reproductive adaptations (identify mangrove species that exhibit these adaptations)	3
Content – Belt transect	• Explain what a belt transect is and the purpose of undertaking a belt transect • Include a reproduction of your belt transect data • Interpretation of belt transect data including the major abiotic factors that affected the vegetation changes along transect	3
Content - Quadrat/cover abundance	• Explain a what quadrat sampling is and the purpose of using quadrat sampling • Include a reproduction of your quadrat/cover abundance data • Interpretation of quadrat/cover abundance data including the dominance of introduced species	3
Content – Human impacts on Mangrove ecosystem	• Outline human impacts on mangrove ecosystems • Explain the deleterious effects of these impacts	3
Report Conclusion	A succinct one paragraph summation of report.	1
Formatting	The report is formatted with clear headings, eye catching design and graphics including diagrams and photographs are included to communicate your understanding.	3
Spelling and Grammar	Your work has been well edited with few spelling and grammatical errors.	3
Referencing	Harvard style referencing is required for all assertions in your report. A range of references are used including books, journal articles, websites and personal communications from speakers at field trip.	3
Total		30

Rehabilitating Mine Sites

When mining operations end, the site may be denuded of vegetation, often with unconsolidated sediment from waste rock/tailings. This land is susceptible to erosion which may silt up rivers and streams. The sediment may also be contaminated with pollutants from the mining operation.

Q1. Why are the sediments at mine sites susceptible to erosion?

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Q2. Describe the environmental impacts of eroded sediments.

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This problem may be alleviated with a regime of revegetation. Contour channels and silt traps may be incorporated to catch eroded material. Topsoil/compost is laid down and the site revegetated with grass and trees. This also improves the visual amenity of the site.

Q3. Describe methods to prevent eroded material from entering creeks and streams and how these methods work.

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Another large problem is acid runoff. As water moves through site, sulfides from waste rock dissolve in the water and make it acidic. The acid water is also often contaminated with high levels of metals such as iron, lead and cadmium.

Q4. Why is acidic water often high in heavy metals such as cadmium?

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The methods to rehabilitate mine sites with this problem include water diversion and the use of dams/holding ponds and the application of a neutralising agent such as lime.

Q5. Explain why lime is added to mine site tailings dams.

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The ability to effectively rehabilitate a mine site depends on the contaminants involved but often the job is not done properly. Especially with acid mine drainage which is a long-term problem. The process can also be very expensive and new laws ensure that a bond is placed down on new mines to pay for probable rehabilitation costs in the future.

Q6. Justify the imposition of “Mine Rehabilitation Security Bonds” on new mining operations

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