



Edith Cowan University

2025 ATAR Revision Seminars

ATAR Biology

Curriculum Dot points

Examination and study tips

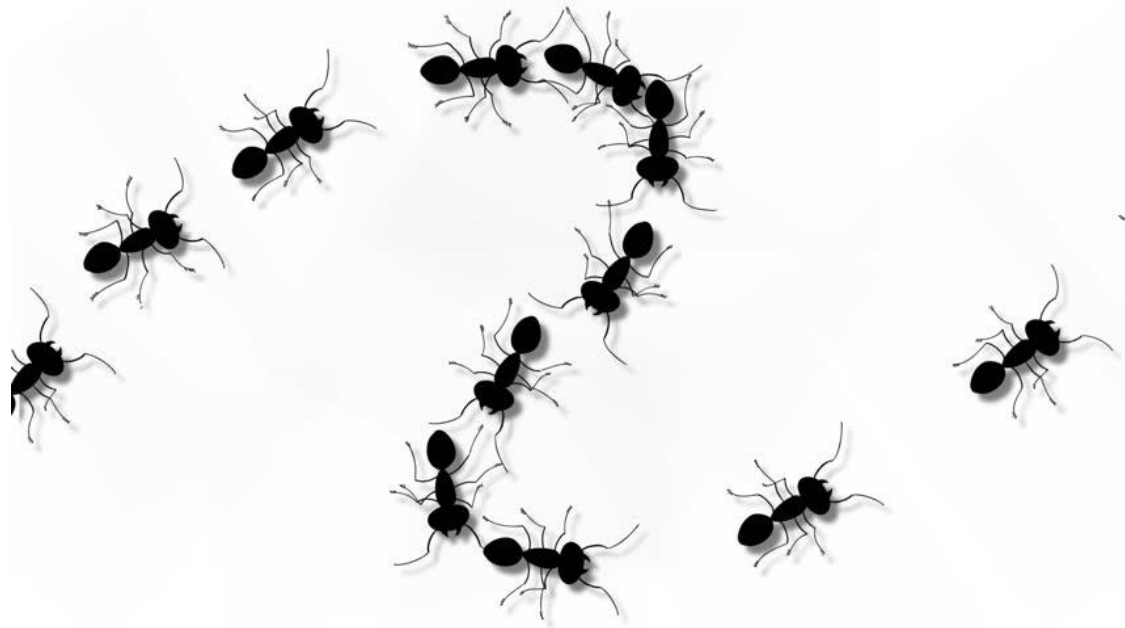
Revision notes Examination questions

Examination marker comments

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12 ATAR Biology
ECU Revision Seminar
Unit 3 Workbook



The golden opportunity you are seeking is in yourself.

It is not in your environment; it is not in luck or chance, or the help of others; *it is in yourself alone.*

--- Orison Swett Marden

It is not too late to make a difference to your results. You can improve your exam performance by studying effectively. This seminar will help you to do that, with specific revision for Units 3 & 4 ATAR Biology.

The **School Curriculum and Standards Authority (SCSA)** is responsible for setting the curriculum and developing the ATAR exams. On their website you will find the curriculum for Biology Units 3&4 (hopefully you have seen this already!), past exam papers and other useful information.

Website: <https://senior-secondary.scsa.wa.edu.au/>

Techniques for active study

- Summarize the text you are reading.
- Put class notes or text into retrieval charts.
- Go back to the unit outline and write notes or draw diagrams for each objective.
- Redo test or exam questions that you got wrong.
- Complete the suggested text questions that are on your programme.
- Ask someone to quiz you.
- Write charts for the wall of your bedroom.
- Draw mind maps for each topic.
- Use revision/study books. If you haven't got one go to the library (school or community), they will have copies.

Creating a work space!

It is important that you find a space at home where you can work without distractions. Lying on the floor in front of the t.v is NOT a good space!! Some households don't allow for your own study room- you may have to think outside the square. I had a friend who put a desk in the back of her walk-in robe, so she could have a quiet space to study when she went back to university at the age of 40.

Get organised: (it's not too late)

- create a study timetable and stick to it- a routine will help you remain consistent
- use a planner to map out your exams;
- highlighter's, coloured post it notes are both good for making information stand out.

General Exam advice

- ATAR exams (and most assessments) are written with the aim to have a mean of 60%. 2020 & 2021 had a mean of 55%, 2022 a mean of 58%. This means that most candidates scored around 58%. Keep this in mind when setting yourself a goal for the Biology exam.
- Section A: Multiple choice is usually answered well- a mean of around 74%, Section C: Short answers has a mean around 54% and Section C: Extended Response scoring the lowest with the mean around 45%.

Feedback from the SCSA Examiners Board 2016-2024

- *Read questions carefully!* Often students lose marks by not answering the question fully or by misinterpreting the question. (see SCSA Glossary of Key Words in the formulation of questions. Appendix 1)
- Use *formal* and *precise* language.
- Use *science* terminology. Using the correct science words demonstrates your understanding.
- *Be clear* in your answers- **just state the answer**, especially in the short answer section where time and space are at a premium.
- Do not *repeat* or *rephrase* the question.
- Annotate diagrams (label them) and refer to them in your written answer, this demonstrates your understanding.
- Spend time planning your answers to extended response questions.
 - Dot points, sub-headings are acceptable.
- Develop an in-depth understanding of important concepts such as scientific method (validity and reliability), replication of genetic material (eg meiosis), protein synthesis, variation, DNA Technology- in particular recombinant DNA and DNA Identification, Natural Selection and homeostasis- maintaining the internal environment.
- Write legibly

Science Inquiry Skills

Unit 3

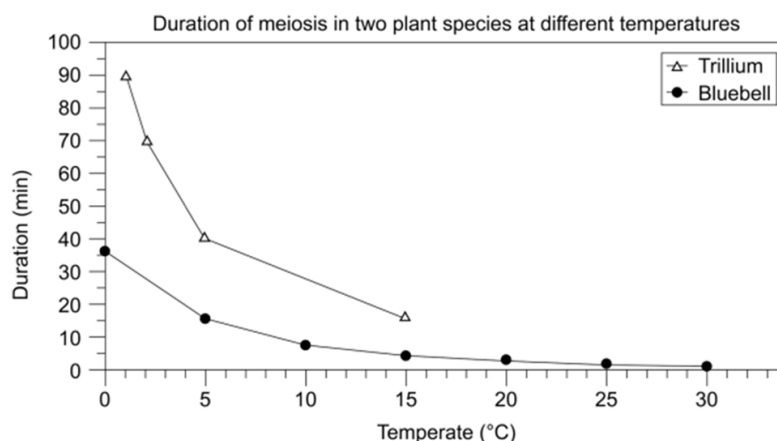
- identify, research and construct questions for investigation; **propose hypotheses**; and predict possible outcomes
- design investigations, including the procedure(s) to be followed, the materials required, and the type and amount of primary and/or secondary data to be collected; conduct risk assessments; and consider research ethics, including the ethics of research involving living organisms.
- conduct investigations safely, competently and methodically for the collection of **valid and reliable data**
- **represent data** in meaningful and useful ways, including the use of **mean, median, range and probability**; **organise and analyse data to identify trends, patterns and relationships**; discuss the ways in which **measurement error, instrumental accuracy, the nature of the procedure and the sample size may influence uncertainty and limitations in data**; and **select, synthesise and use evidence to make and justify conclusions**
- interpret a range of scientific and media texts, and evaluate models, processes, claims and conclusions by considering the quality of available evidence, and use reasoning to construct scientific arguments
- **select, construct and use appropriate representations** to communicate conceptual understanding, solve problems and make predictions
- communicate to specific audiences and for specific purposes using appropriate language, nomenclature, genres and modes, including scientific reports

What is a FAIR test?

	Validity	Reliability
Definition		
How to increase it		

Typically, there is one question in Section Two: Short answer.

Q1. Biologists measured the **duration of meiosis** (in minutes) at **different environmental temperatures** in **two plant species**.

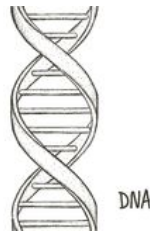


Unit 3: Continuity of the Species

Learning outcomes

By the end of this unit, students:

- understand the cellular processes and mechanisms that ensure the continuity of life, and how these processes contribute to unity and diversity within a species
- understand the processes and mechanisms that explain how life on Earth has persisted, changed and diversified over the last 3.5 billion years
- understand how models and theories have developed over time
- use science inquiry skills to design, conduct, evaluate and communicate investigations into heredity, gene technology applications, and population gene pool changes
- evaluate, with reference to empirical evidence, claims about heredity processes, gene technology, and population gene pool processes, and justify evaluations
- communicate biological understanding using qualitative and quantitative representations in appropriate modes and genres.



Understand the **cellular processes and mechanisms** that ensure the **continuity of life**, and **how** these processes **contribute to unity and diversity within a species**.

• **PART ONE**

- Structure of DNA
- DNA Replication
- Genetic Code
- Protein Synthesis
- DNA Technologies
 - Genetic engineering techniques
 - DNA sequencing
 - DNA profiling
 - Recombinant DNA
 - Transgenic organisms
- Cell Reproduction
- Patterns of Inheritance



DNA

In the space below draw a labelled diagram of a nucleotide.

DNA Replication

Q2.

The process of DNA replication requires enzymes.

Identify the **two (2)** main enzymes that *attach* to the DNA molecule and describe their function.

(4 marks)

Q3.

Describe how a DNA molecule replicates itself. (4 marks)

Genetic Code

A set of rules by which the genetic information in DNA or mRNA is translated into proteins.

Q4.

The diagram shown to you depicts protein synthesis during the transcription phase. HOW do you know this?

Identify the structures on the diagram above at the areas labelled A – E.

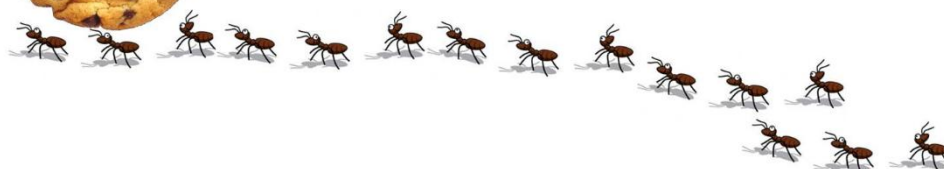
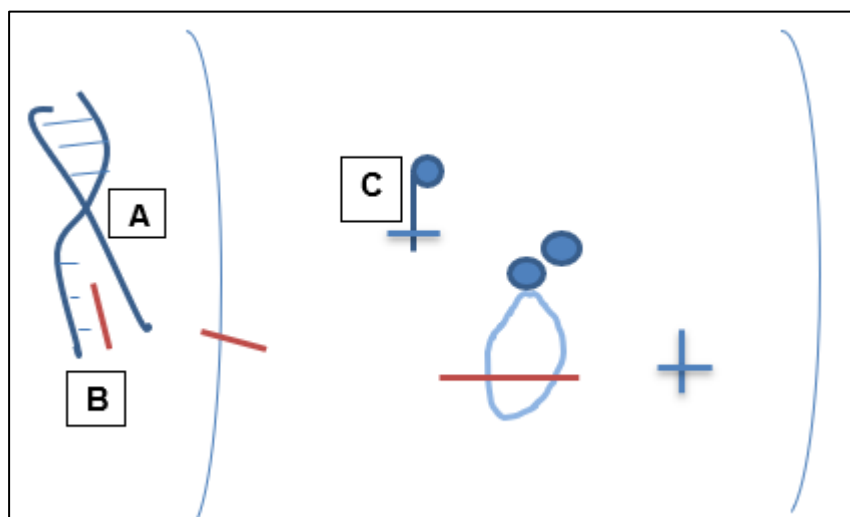
- A: _____
- B: _____
- C: _____
- D: _____
- E: _____

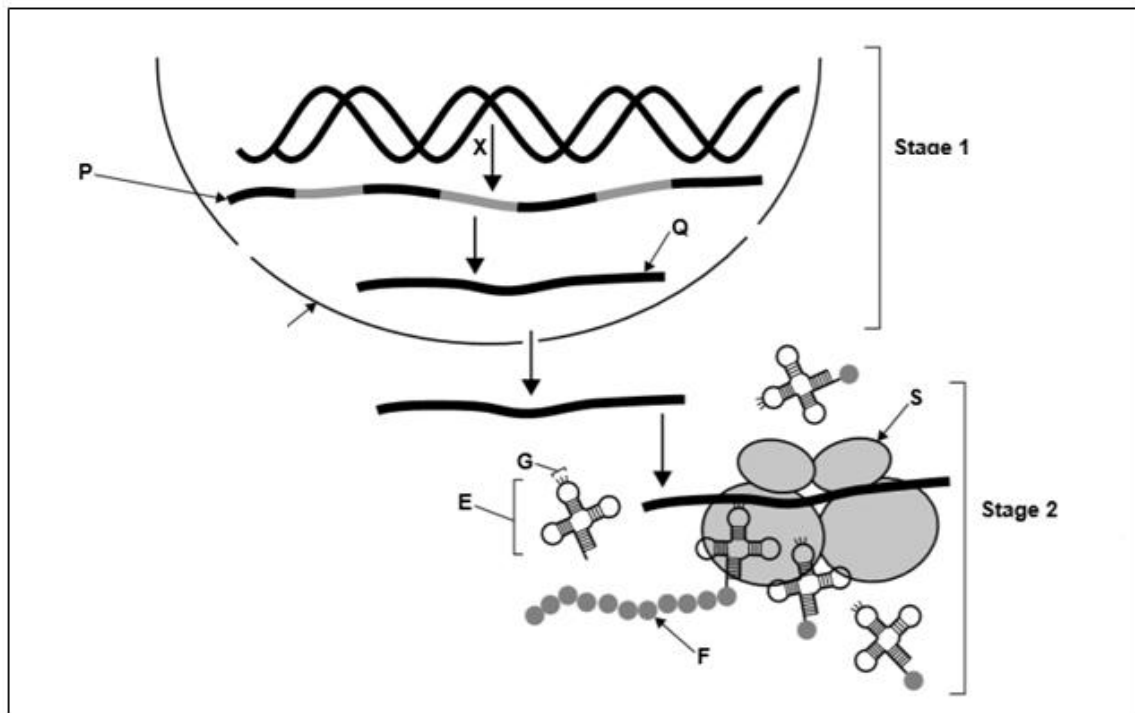
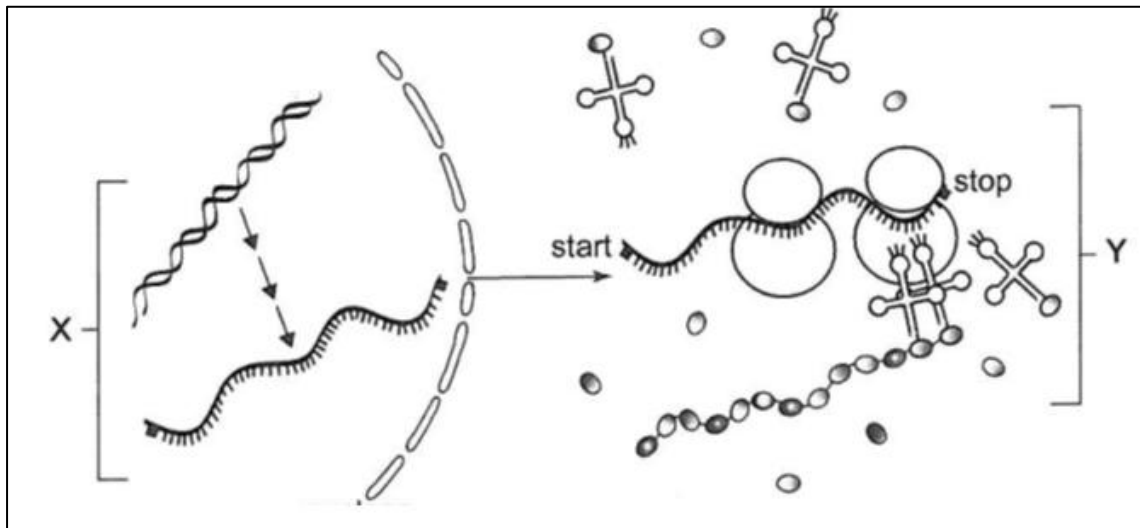
(5 marks)

Distinguish between the structures labelled A and B (2 marks)

A.
B.

Below are 3 diagrams of protein synthesis.





It is important to recognise that this is protein synthesis NOT DNA replication. The following questions could relate to any of these diagrams.

Q5. What is the purpose of protein synthesis?

There are two processes occurring in the diagram, what are they and where in the cell do they occur? (4 marks)

Describe the sequence of events from start to finish (10 marks)

Transcription	Translation
Initiation	Initiation
Elongation	Elongation
Termination	Termination

DNA Technologies

Biotechnology: The use of living things to make new products or systems.

Traditional	Modern

Q6. Distinguish between; **Cutting DNA**, **Recombining DNA** and **Amplifying DNA**. (6 marks)



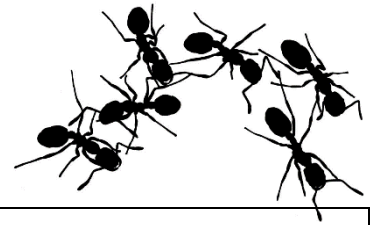
Q8:

[illegible]

Cellular Reproduction

Chromosomes, Mitosis v's Meiosis: see summary booklet.

Q9:

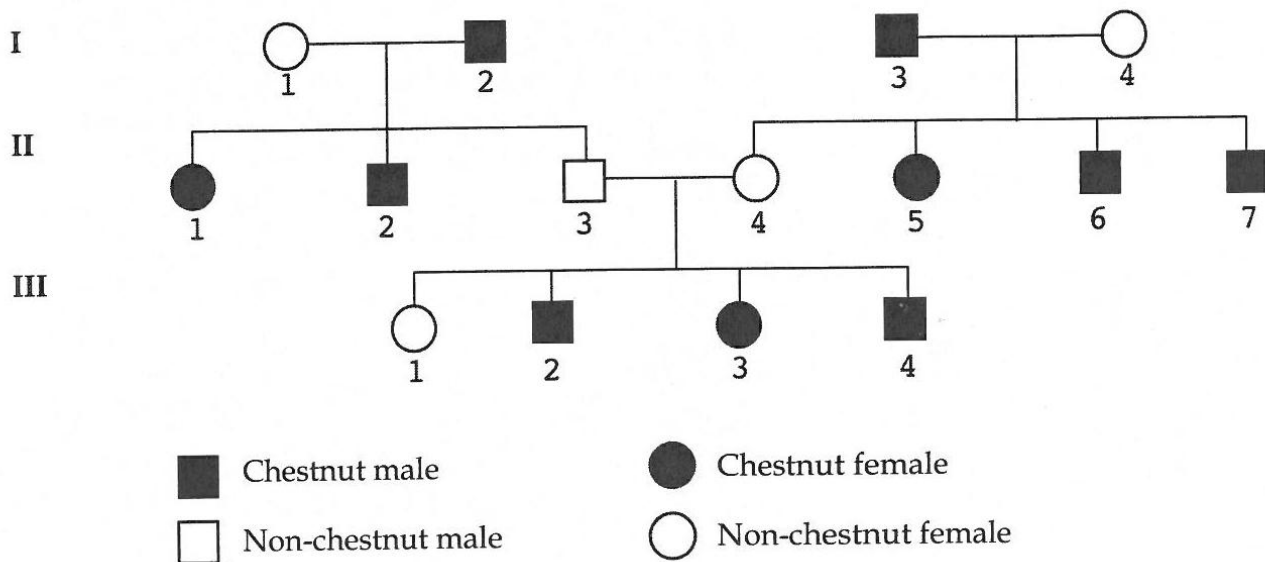


(4 marks)

Mutations: see summary booklet

Patterns of Inheritance

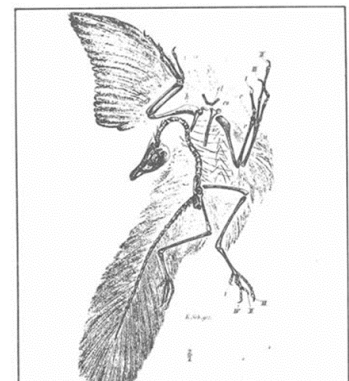
See summary book for examples.



Understand the processes and mechanisms that explain how life on Earth has persisted, changed and diversified over the last 3.5 billion years

PART TWO

- Fossils
- Evidence for Evolution
- Phylogenetic Trees
- Natural Selection
- Changes in allele frequency
- Speciation
- Evolution
- Extinction
- Environmental Conservation



Fossils

see summary booklet

Evidence for Evolution

Q10. *Glossopteris* is a genus of flowerless seed ferns, common 250 million years ago, it is now extinct. Many species of *Glossopteris* have been identified from leaf fossils.

a. Define the term 'fossil'. (1 mark)

b. Outline how fossils can provide evidence for evolution. (3 marks)

c. It has not been possible to determine the total number of *Glossopteris* species because the fossil record is incomplete. List four reasons why the fossil record is incomplete. (4 marks)

d. Approximately when did life first evolve on Earth? (1 mark)

--

e. Describe the first life forms on Earth. (3 marks)

f. Use these data to describe the evolutionary relationships of these monkeys. (4 marks)



g. Explain how differences in the amino acid sequence of a protein can provide evidence of evolutionary relationships between organisms. (4 marks)

Phylogenetic Trees (see summary booklet)

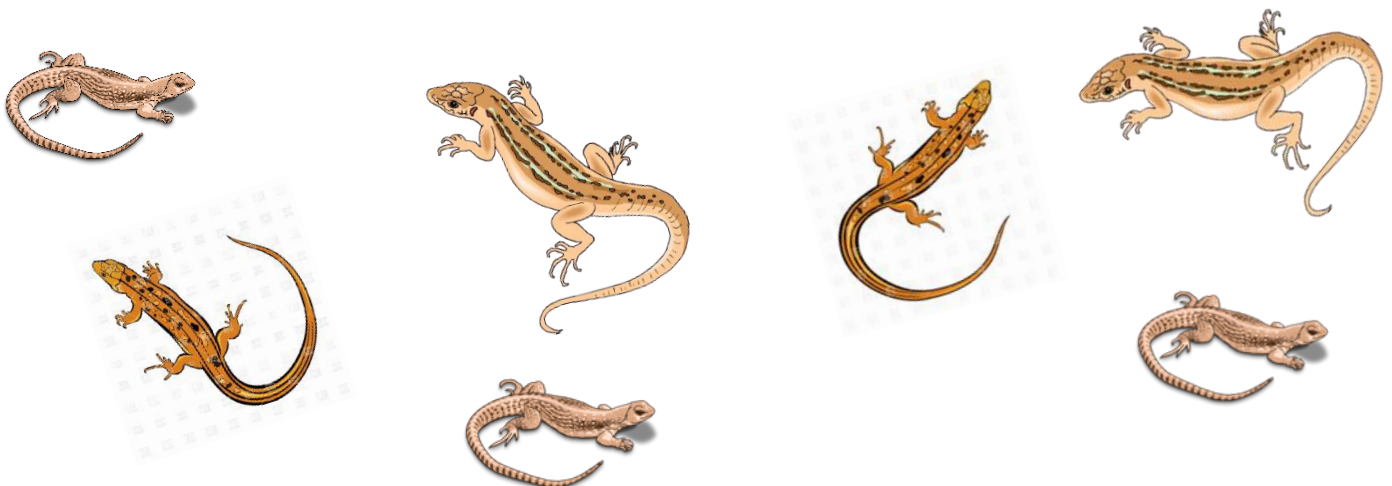
- often diagrams in multiple choice sections.
- be able to read a phylogenetic tree
- be able to construct a simple phylogenetic tree.

Natural Selection: *the selection of those alleles (genes) in a population that give an organism greater survival advantage.*

Q11: The islands in the Caribbean Sea are home to more than 150 species of lizard, all belonging to the genus *Anolis*. It has been hypothesised that all these species are the descendants of two original populations of lizard. Each species has unique features that enable it to live in its habitat. The lizards are found in mountain ranges, woodlands, and rainforests. Many Caribbean islands have only one species of *Anolis* lizard. (SACE 2014)

Describe how natural selection resulted in the evolution of more than 150 species of *Anolis* lizards in the Caribbean Islands. [6 marks]

1.
2.
3.
4.
5.
6.



Q12.

Mutation	Genetic Drift

Extinction and Environmental conservation- see summary booklet

**12 ATAR Biology
ECU Revision Seminar
Unit 4 Workbook**

Websites, Facebook pages and You tube channels

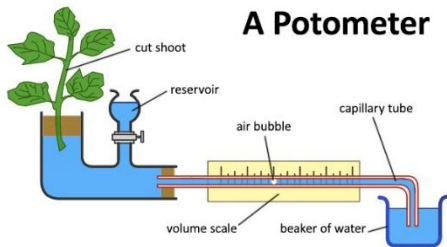
- bioninja : <https://ib.bioninja.com.au/>
- Amoeba Sisters: <https://www.youtube.com/user/AmoebaSisters>
- Crash Course: <https://www.youtube.com/user/crashcourse/featured>
- All About Molecular Biology: <https://all-about-molecular-biology.jimdo.com/> and also on Facebook!

Unit 4: Surviving in a Changing Environment

Learning Outcomes

By the end of this unit students will

- understand the mechanisms by which plants and animals use homeostasis to control their internal environment in a changing external environment
- understand the ways in which infection, transmission and spread of disease occur in vector-borne diseases
- understand how biological models and theories have developed over time
- use science inquiry skills to design, conduct, evaluate and communicate investigations into organisms' responses to changing environmental conditions and infectious disease
- communicate biological understanding using qualitative and quantitative representations in appropriate modes and genres.



<http://www.passmyexams.co.uk/GCSE/biology/measuring-transpiration.html>

Understand the **mechanisms** by which plants and animals **use homeostasis to control their internal environment in a changing external environment.**

PART ONE:

- Homeostasis
 - stimulus-response model
 - negative feed-back loops
- Tolerance limits
- Thermoregulation
- Water and Salt balance
- Nitrogenous waste
- Xerophytes and halophytes

Homeostasis

Example: Mammals regulate their core body temperature through a model which is represented in the diagram being shown on the PowerPoint.

Question 1: Many Australian mammals do not sweat, to cool themselves they will pant. Describe, in detail, the homeostatic mechanism of panting. (10 marks) *Dot point an answer- you only need 10 facts.*

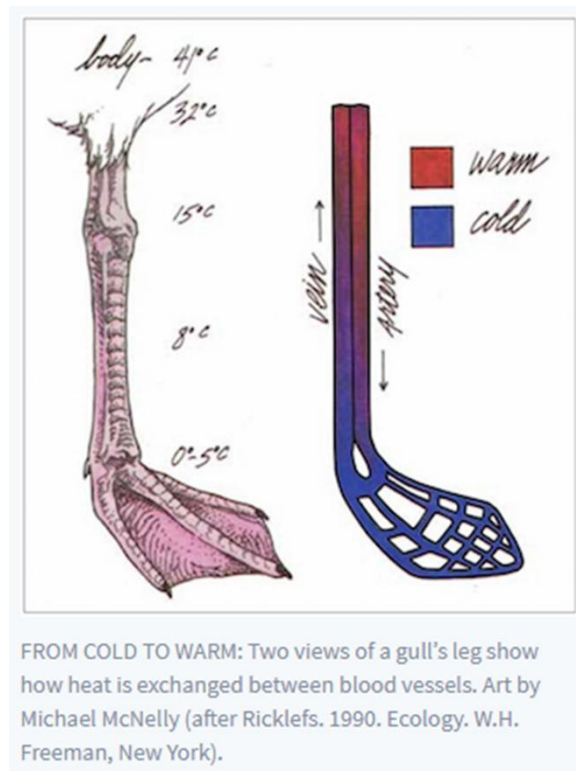
Thermoregulation

Thermoregulation in Red Kangaroos

Thermoregulation in Spinifex mice

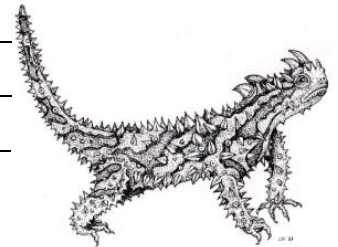
Thermoregulation in seals

Counter-current blood flow



Question 2:

a. i and ii



b.

Osmoregulation: water balance.

Question 3:

a.

b.

Behavioural adaptation:

Explanation:

c.

d.



Question 4:

1.

2.

3.

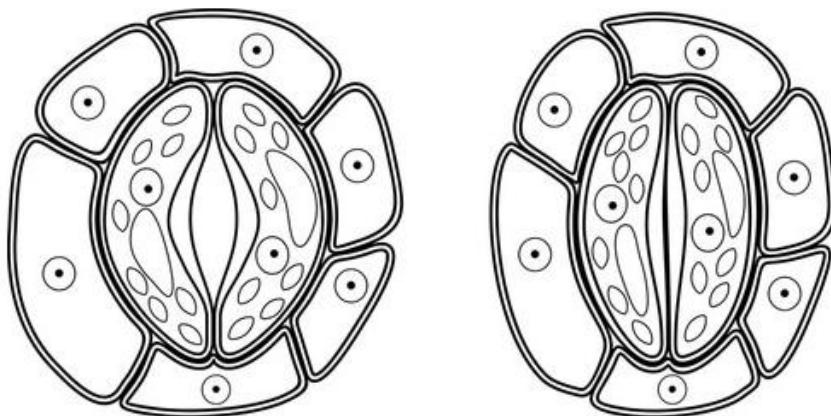
4.

Nitrogenous Wastes

Question 5:

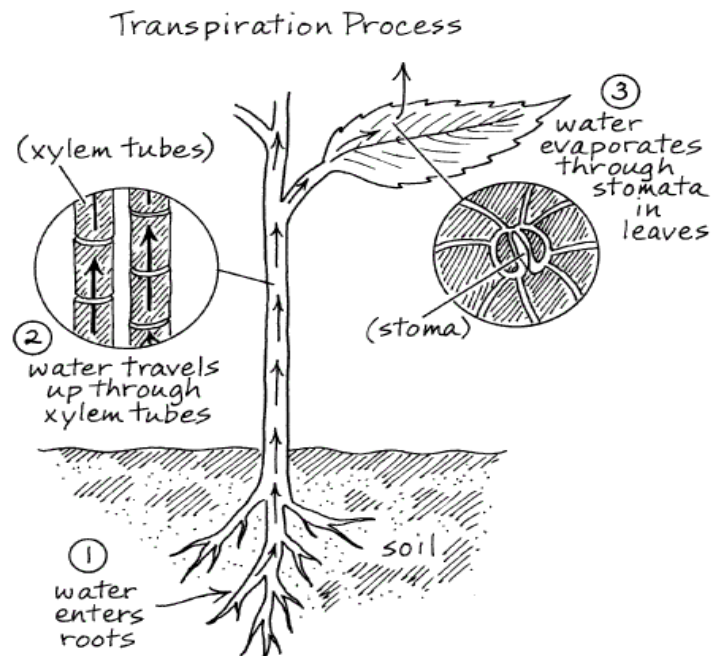
Animal	Type of Nitrogenous waste	Availability of water	Benefit	Cost
Freshwater fish				
Dog				
Desert lizard				

Water movement in plants: STOMATAL FUNCTION

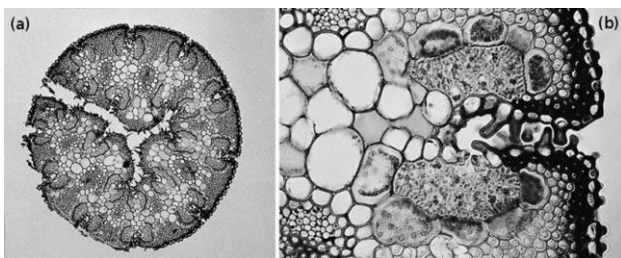


Plant Adaptations to Arid Environments

Question 6:



Question 7:



Question 8: (from WACE 2022) Extended Response 10 marks

Shallow branching roots	Stomata opening at night

Understand the ways in which infection, transmission and spread of disease occur in vector-borne diseases.

- Infectious Disease
- Zoonoses
- Bacteria
- Fungi
- Protists
- Viruses
- Spread of disease
- Management Strategies

What do you know?

Q9. Complete this table:

Disease	Type of organism causing the disease	Type of organism affected by the disease
Tuberculosis		
Crown Gall		
Chytridiomycosis		
Phytophthora dieback		
Influenza		
Malaria		

Malaria

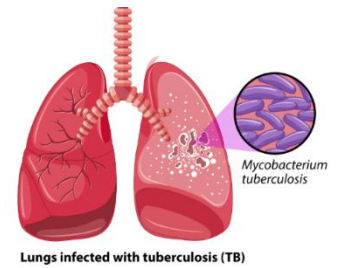
Q10.

[illegible]

Q11.

[illegible]

Q12a.



Q12b.

Q12c.

Influenza- common flu

Q13.

Urban areas	Vaccinations
	Other healthcare provisions





Q15 Management strategies- Ross River virus (and other mosquito-borne disease)

Preventing bites	Disrupt life cycle of pathogen (mosquito control)

Q16. Chytridiomycosis

[illegible]

Viral diseases of Honey bees

Q19a.

(i) Structural features of viruses	(ii) Characteristics that demonstrate they are non-living

b.

(i) Is it an infectious disease?	(ii) What is a disease vector?

c. Management

Congratulations! You have now completed your revision booklet!

Edith Cowan University would like to wish all students the best of luck with their future exams!

