DOT POINT

QCE EARTH AND ENVIRONMENTAL SCIENCE UNITS 1 AND 2

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Contents

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Words to Watch

account, account for State reasons for, report on, give an account of, narrate a series of events or transactions.

analyse Interpret data to reach conclusions.

annotate Add brief notes to a diagram or graph.

apply Put to use in a particular situation.

assess Make a judgement about the value of something.

calculate Find a numerical answer.

clarify Make clear or plain.

classify Arrange into classes, groups or categories.

comment Give a judgement based on a given statement or result of a calculation.

compare Estimate, measure or note how things are similar or different.

construct Represent or develop in graphical form.

contrast Show how things are different or opposite.

create Originate or bring into existence.

deduce Reach a conclusion from given information.

define Give the precise meaning of a word, phrase or physical quantity.

demonstrate Show by example.

derive Manipulate a mathematical relationship(s) to give a new equation or relationship.

describe Give a detailed account.

design Produce a plan, simulation or model.

determine Find the only possible answer.

discuss Talk or write about a topic, taking into account different issues or ideas.

distinguish Give differences between two or more different items.

draw Represent by means of pencil lines.

estimate Find an approximate value for an unknown quantity.

evaluate Assess the implications and limitations.

examine Inquire into.

explain Make something clear or easy to understand.

extract Choose relevant and/or appropriate details.

extrapolate Infer from what is known.

hypothesise Suggest an explanation for a group of facts or phenomena.

identify Recognise and name.

interpret Draw meaning from.

investigate Plan, inquire into and draw conclusions about.

justify Support an argument or conclusion.

label Add labels to a diagram.

list Give a sequence of names or other brief answers.

measure Find a value for a quantity.

outline Give a brief account or summary.

plan Use strategies to develop a series of steps or processes.

predict Give an expected result.

propose Put forward a plan or suggestion for consideration or action.

recall Present remembered ideas, facts or experiences.

relate Tell or report about happenings, events or circumstances.

represent Use words, images or symbols to convey meaning.

select Choose in preference to another or others.

sequence Arrange in order.

show Give the steps in a calculation or derivation.

sketch Make a quick, rough drawing of something.

solve Work out the answer to a problem.

state Give a specific name, value or other brief answer.

suggest Put forward an idea for consideration.

summarise Give a brief statement of the main points.

synthesise Combine various elements to make a whole.

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Introduction

What the book includes

This book provides questions and answers for each dot point in the Queensland Certificate of Education syllabus for the Year 11 Earth and Environmental Science course:

Unit 1 Introduction To Earth Systems

- Topic 1 Earth Systems and Models
- Topic 2 Development Of the Geosphere
- Topic 3 Development Of the Atmosphere and Hydrosphere
- Topic 4 Development Of the Biosphere

Unit 2 Earth Processes – Energy Transfers and Transformations

- Topic 1 Energy For Earth processes
- Topic 2 Energy For Atmospheric and Hydrologic Processes
- Topic 3 Energy For Biogeochemical Processes

Also included are typical experimental results for you to analyse where the syllabus indicates that you should carry out first-hand investigations.

Format of the book

The book has been formatted in the following way:

1.1 Subtopic from syllabus.

1.1.1 Assessment statement from syllabus.

1.1.1.1 First question for this assessment statement.

1.1.1.2 Second question for this assessment statement.

The number of lines provided for each answer gives an indication of how many marks the question might be worth in an examination. As a rough rule, every two lines of answer might be worth 1 mark.

How to use the book

Completing all questions will provide you with a summary of all the work you need to know from the syllabus. You may have done work in addition to this with your teacher as extension work. Obviously this is not covered, but you may need to know this additional work for your school exams.

When working through the questions, write the answers you have to look up in a different colour to those you know without having to research the work. This will provide you with a quick reference for work needing further revision.

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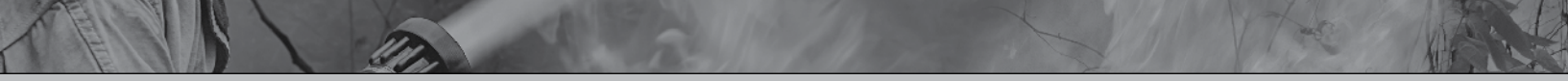

Unit 1 Introduction To Earth Systems

Unit 2 Earth Processes – Energy Transfers and Transformations

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Unit 1

Introduction To Earth Systems

In this unit you will:

- Learn about Earth's four systems – the geosphere, atmosphere, hydrosphere and biosphere.
- Investigate phenomena associated with Earth systems and processes and how they are interrelated.
- Analyse common past and present Earth features, processes and phenomena.
- Participate in a range of experiments and investigations to develop your skills in describing and explaining Earth systems.

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TOPIC 1

Earth Systems and Models

In this topic you will:

- Learn how to define and describe a system, including open, closed and isolated systems.
- Describe how the flow of energy and matter varies between systems.
- Examine each of the four systems – the geosphere, atmosphere, hydrosphere and biosphere.
- Use models to better understand specific Earth and environmental processes.
- Explain the nature of scientific theories and models.

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1.1 Earth systems and models.

1.1.1 Natural systems.

1.1.1.1 The water cycle is said to be a closed system. Define a ‘closed system’.

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1.1.1.2 Outline the main features of an open system.

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1.1.1.3 Complete the table to compare the features of open, closed and isolated systems.

Features	Open	Closed	Isolated
Exchange of matter			
Exchange of energy			
Example			

1.1.1.4 Use examples to explain the difference between a closed and open system.

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1.1.1.5 Describe the geosphere.

1.1.1.6 Construct a table to identify components of the hydrosphere and biosphere.

1.1.1.7

(a) What is a scientific model?

(b) Describe the role of models in science.

(c) Discuss the limitations of using models in science.

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1.1.1.8 Use an example of a scientific model examined in this course to describe the use of models in science. Include a visual representation of the model described.

1.1.1.9 Scientists use both models and theories to explain natural phenomena and make predictions about the future behaviour of the phenomena.

What is the difference between a model and a theory?

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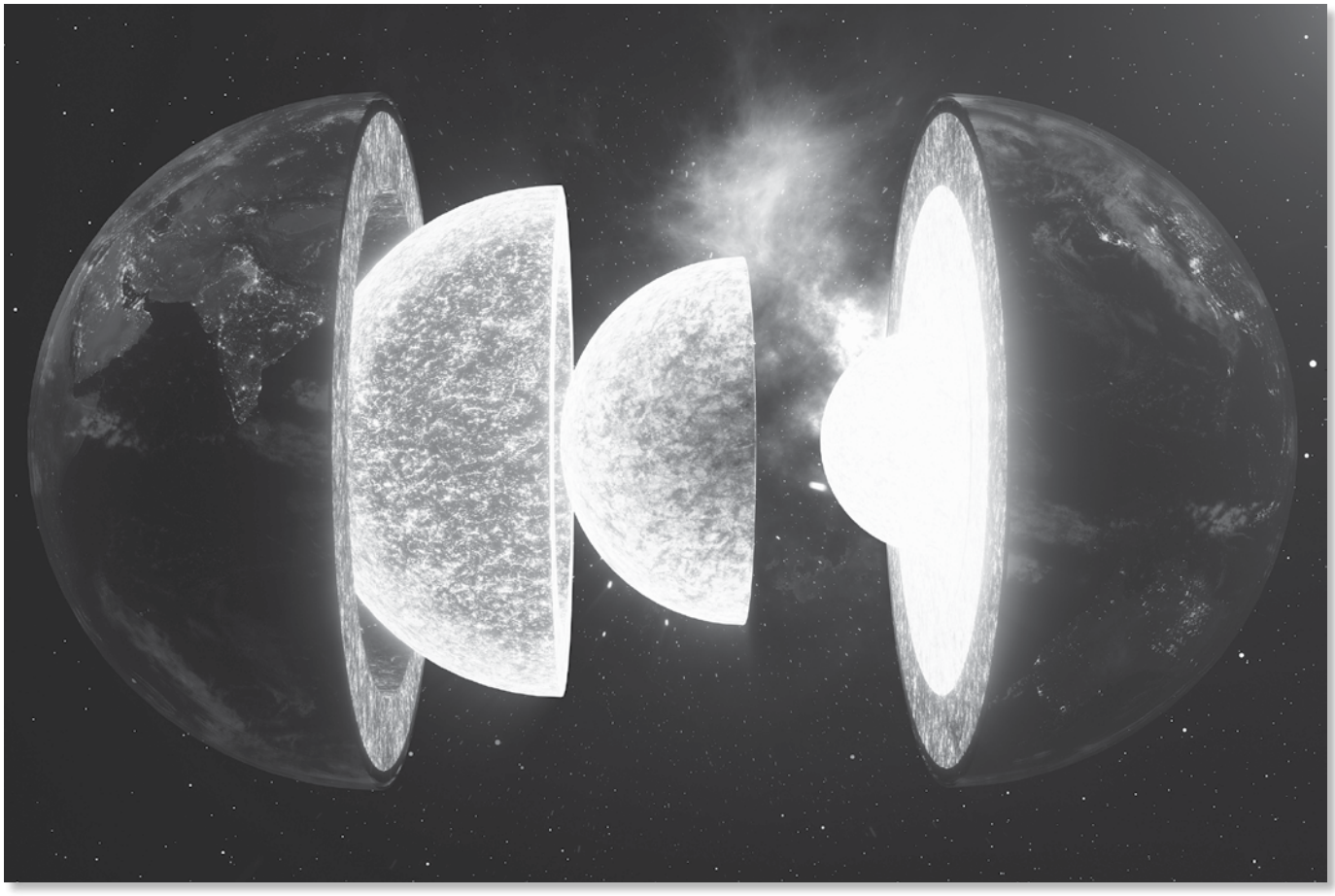
1.1.1.10 Use a model and/or theory examined in this course to explain the dynamic nature of scientific theories and models.



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Answers

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Unit 1 Introduction To Earth Systems

1.1.1.1 A closed system is one in which energy can move into and out of the system, but matter cannot.

1.1.1.2 Matter and energy are both able to move freely across the boundaries of the system.

1.1.1.3

Features	Open	Closed	Isolated
Exchange of matter	Moves into and out of the system.	Does not move into or out of the system.	Does not move into or out of the system.
Exchange of energy	Moves into and out of the system.	Moves into and out of the system.	Does not move into or out of the system.
Example	Ecosystems.	Water cycle.	The Universe.

1.1.1.4 An ecosystem is an open system and the water cycle is a closed system. Both systems require the input of solar energy to drive essential processes such as photosynthesis and evaporation. The amount of matter in a closed system such as water in the water cycle, remains constant, while matter is exchanged with the surroundings in an open system as individuals and raw materials such as soil and water move between ecosystems.

1.1.1.5 The geosphere is made up of rocks, minerals and sediments, as well as the abiotic components of soil. The skeletons and fossilised remains of living things are also part of the geosphere, which extends from the surface of the Earth to its core.

1.1.1.6

Hydrosphere	Biosphere
Oceans Rivers Water vapour Clouds Ice sheets Glaciers Rain, snow, sleet and hail	Plants Animals Fungi Microscopic organisms Atmosphere Hydrosphere Lithosphere

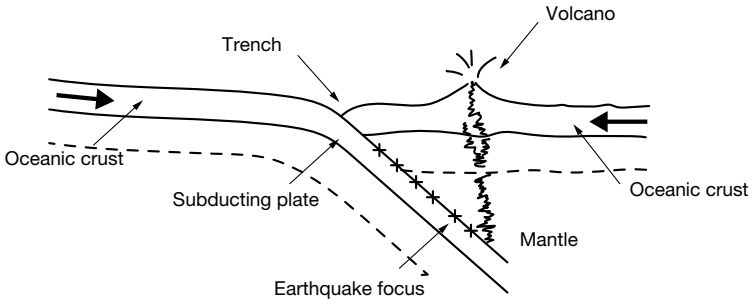
1.1.1.7

(a) A scientific model is a visual, mathematical or descriptive representation of an abstract concept or phenomenon which cannot be seen due to its size or location.

(b) Models are used to enhance understanding through the use of visualisations and explanations. They are also used to test ideas and processes through the prediction of future events or behaviour within systems.

(c) In order to simplify complex systems and phenomena, models lack detail and are often incomplete. This reduces their accuracy and limits understanding. Misconceptions arise when models are used in isolation or without an understanding of their applications and often require an understanding of the underlying concept to be an effective tool.

1.1.1.8 Subduction is a model used to describe the movement of one lithospheric plate below another into the Earth's mantle. Not only does the model explain the location and activity of volcanoes and earthquakes, but it also enhances understanding by providing a visual interpretation of processes that cannot be directly observed and allows for the prediction of future events.



1.1.1.9 A theory is composed of a number of statements which explain a phenomenon and is general in nature. A model on the other hand is quite specific as its purpose is to explain a component or application of the theory through the use of visualisation. This makes the model a tool to be used in conjunction with a theory.

1.1.1.10 Models and theories are constantly changing and becoming more refined as new evidence is found which supports or refutes the models and theories. The theory of continental drift was used to explain the jigsaw fit of the continents, but failed to explain how it occurred. The discovery of mid-oceanic ridges and the ability to date oceanic rocks led to the development of the theory of sea floor spreading. This provided evidence to prove the theory of continental drift and further develop the theory into the more comprehensive theory of plate tectonics.

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