91193

911930

2

SUPERVISOR'S USE ONLY

NEW ZEALAND QUALIFICATIONS AUTHORITY
MANA TOHU MĀTAURANGA O AOTEAROA

QUALIFY FOR THE FUTURE WORLD
KIA NOHO TAKATŪ KI TŌ ĀMUA AO!

Tick this box if there is no writing in this booklet

Level 2 Earth and Space Science 2020

91193 Demonstrate understanding of physical principles related to the Earth System

9.30 a.m. Tuesday 17 November 2020
Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of physical principles related to the Earth System.	Demonstrate in-depth understanding of physical principles related to the Earth System.	Demonstrate comprehensive understanding of physical principles related to the Earth System.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet and clearly number the question.

Check that this booklet has pages 2–16 in the correct order and that none of these pages is blank.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

TOTAL

ASSESSOR'S USE ONLY

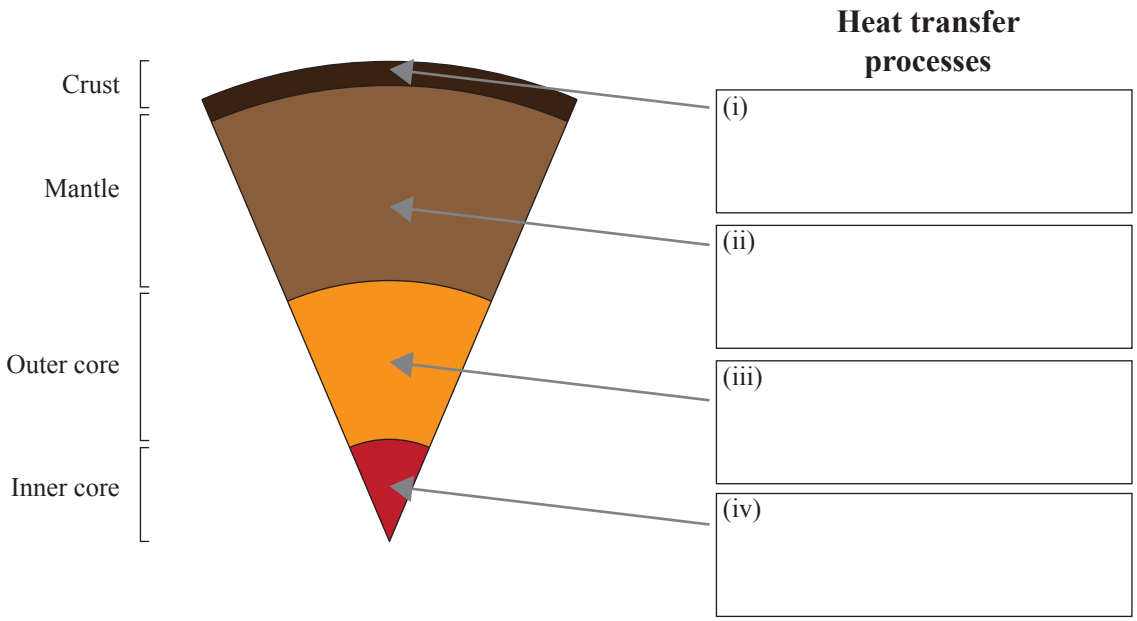
QUESTION ONE: GEOTHERMAL ENERGY

ASSESSOR'S USE ONLY

Source: https://www.thinkgeoenergy.com/how-new-zealand-embraces-geothermal-energy/

Geothermal energy provides approximately 17% of New Zealand's electricity. Heat energy is taken from the crust by drawing a mixture of pressurised water and steam from a geothermal field. This heat energy is used to generate electricity.

(a) Identify the heat-transfer processes taking place in each layer of the geosphere:



Adapted from: http://pluton-dg.com/wp/geothermal-energy/

(b) Explain in detail how these heat-transfer processes carry geothermal energy towards the surface of the Earth.

ASSESSOR'S USE ONLY

(c) The centre of the Earth is thought to be 6000 °C, which gets cooler towards the surface.

ASSESSOR'S USE ONLY

Explain in detail the processes taking place in the Earth's interior that maintain this temperature.

ASSESSOR'S USE ONLY

QUESTION TWO: WHY IS THE SKY BLUE?

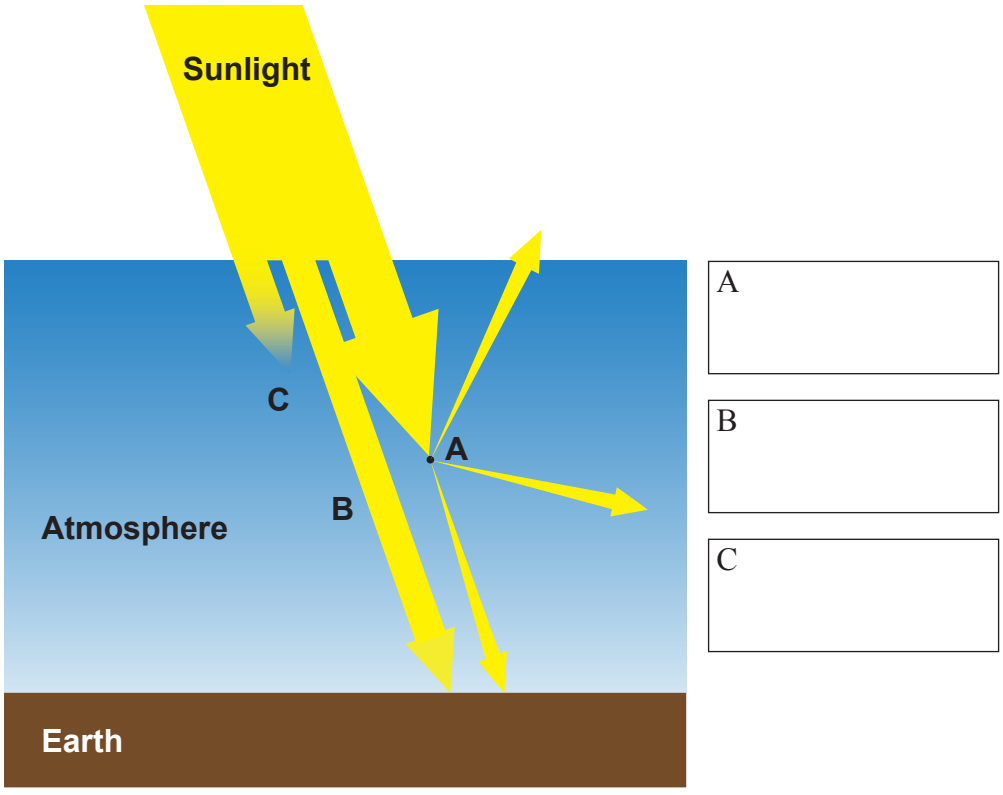
ASSESSOR'S USE ONLY

https://oxfamblogs.org/fp2p/big-demographic-tides-are-sweeping-the-world-how-should-aid-organizations-respond/

Light is a form of wave that is able to transfer energy from one place to another. Light from the Sun contains all of the wavelengths of visible light, which includes all the colours, such as red and blue. During the day, the sky appears blue, while light directly from the sun appears white.

(a) Light from the sun can interact with the atmosphere in a number of ways.

Label the processes occurring in the atmosphere, represented by letters A, B, and C on the diagram below.



A

B

C

(b) Describe the properties of light waves, and explain how they vary in different colours, such as red and blue.

A diagram may assist your answer.

ASSESSOR'S USE ONLY

(c) Explain in detail why light directly from the Sun appears white, while the rest of the sky appears blue on a sunny day.

A diagram may assist your answer.

ASSESSOR'S USE ONLY

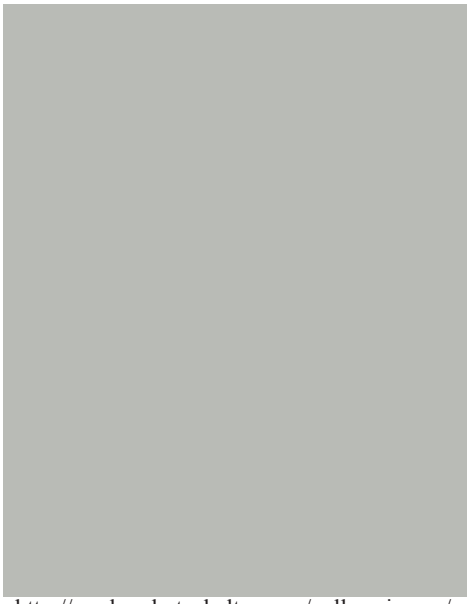
ASSESSOR'S USE ONLY

QUESTION THREE: SEA BREEZES

ASSESSOR'S USE ONLY

On a sunny day in coastal areas around New Zealand, strong onshore winds often develop in the afternoon due to a temperature difference between the land and the sea.

(a) Describe how the Earth's surface is heated.



http://markg.photoshelter.com/gallery-image/Windsurfing-Wellington-New-Zealand/G0000Uux0GK.AwaU/I000004Atz.G9ax8

(b) Explain in detail the reason for the difference in temperature between the land and the sea on a sunny day.

A diagram may assist your answer.

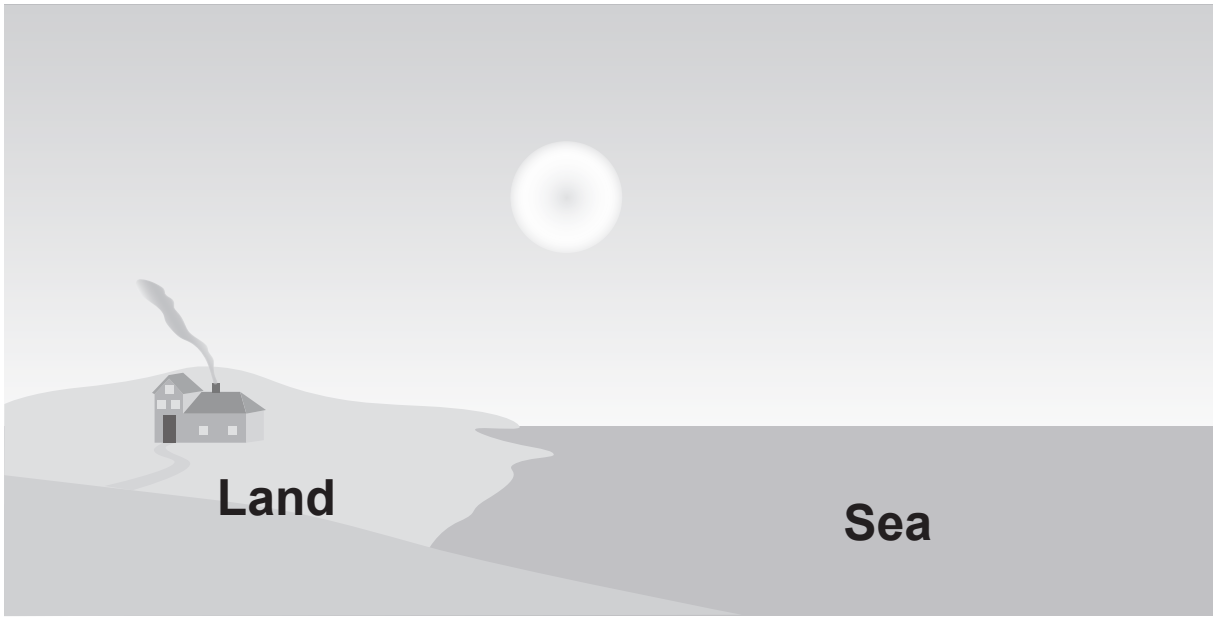
ASSESSOR'S USE ONLY

Question Three continues on the following page.

(c) Explain in detail how an onshore breeze will develop in a coastal region on a sunny day.

Annotating the diagram below will help with your answer.

ASSESSOR'S USE ONLY



ASSESSOR'S USE ONLY

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY

Extra paper if required.
Write the question number(s) if applicable.

QUESTION NUMBER

ASSESSOR'S USE ONLY

91193