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Level 3 Earth and Space Science 2022

91414 Demonstrate understanding of processes in the atmosphere system

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of processes in the atmosphere system.	Demonstrate in-depth understanding of processes in the atmosphere system.	Demonstrate comprehensive understanding of processes in the atmosphere 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.

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

Do not write in any cross-hatched area (). This area may be cut off when the booklet is marked.

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

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QUESTION ONE: THE WATER CYCLE

The water cycle is the movement of water through the environment. While the atmosphere contains only a small amount of water, it enables water to cycle and heat energy to flow around the globe.

Explain the role of the atmosphere in transporting water and heat energy around the Earth.

In your answer, you should:

- add detailed annotations to the following diagram of the water cycle, showing water and energy entering and leaving the atmosphere during the water cycle
- explain, in detail, the processes that add water to the atmosphere
- explain, in detail, the processes that remove water from the atmosphere
- explain, in detail, the role of latent heat and sensible heat in transporting energy through the atmosphere.

Source: www.sutori.com/en/story/the-water-cycle--RD4v8GKWCwg6FpiUAHpb1KWc

There is more space for your answer to this question on the following pages.

QUESTION TWO: AUSTRALIAN BUSHFIRES AND CLIMATE

Source: www.theage.com.au/national/victoria/victoria-bushfires-live-homes-lost-as-town-s-defence-breached-20191231-p53ns1.html

The 2019–20 bushfires in Australia injected huge amounts of carbon dioxide and dark-coloured carbon aerosols into the atmosphere. Scientists have recently been studying the effect of these bushfires on the atmosphere.

Discuss the effects that both carbon dioxide and dark-coloured carbon aerosols could have on the troposphere.

Your answer should focus on processes within the troposphere only.

In your answer, you should:

- explain what an aerosol is
- explain, in detail, two possible effects that dark-coloured carbon aerosols could have on the troposphere
- explain the effect of excessive amounts of carbon dioxide being released into the troposphere
- explain, comprehensively, the relative length of time that the effects of carbon dioxide and aerosols are likely to last.

An annotated diagram may assist your answer.

There is more space for your answer to this question on the following pages.

QUESTION THREE: ATMOSPHERE LAYERS

The Earth's atmosphere can be divided into distinct layers, shown in the diagram below. Temperature, air pressure, and density all vary within and between these layers.

Adapted from: www.visionlearning.com/en/library/Earth-Science/6/Composition-of-Earths-Atmosphere/107

Explain the reasons for the differences in temperature, air pressure, and density between and within the layers of the atmosphere.

In your answer, you should:

- define temperature, air pressure, and density in relation to the layers of the atmosphere
- explain, comprehensively, the reason for the changes in temperature, air pressure, and density with increasing altitude
- compare and contrast the differences within and between the layers of the atmosphere shown in the diagram.

An annotated diagram may assist your answer.

There is more space for your answer to this question on the following pages.

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

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