
2020 HSC Earth and Environmental Science Marking Guidelines

Section I

Multiple-choice Answer Key

Question	Answer
1	C
2	B
3	B
4	A
5	C
6	A
7	B
8	D
9	C
10	B
11	C
12	B
13	D
14	A
15	D
16	C
17	A
18	B
19	D
20	A

Section II

Question 21

Criteria	Marks
<ul style="list-style-type: none"> Demonstrates a sound understanding of how index fossils are used to create divisions of geologic time 	3
<ul style="list-style-type: none"> Outlines the use of index fossils 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Index fossils should have a wide geographic distribution and appear for a short period of time in the fossil record. For this reason, they are useful in assisting geologists to generate the divisions of the geologic timescale as they indicate widespread environmental changes at their appearance in the fossil record.

Question 22

Criteria	Marks
<ul style="list-style-type: none"> Identifies a volcanic eruption/type Clearly presents the cause and effect relationship between aspect(s) of the eruption and TWO either atmospheric changes/biosphere changes 	4
<ul style="list-style-type: none"> Identifies a volcanic eruption/type Clearly presents the cause and effect relationship between aspect(s) of the eruption and ONE atmospheric change/biosphere Outlines another atmospheric/biosphere change resulting from the eruption 	3
<ul style="list-style-type: none"> Identifies TWO general effects volcanic eruptions have on the atmosphere/biosphere <p>OR</p> <ul style="list-style-type: none"> Identifies a volcanic eruption Relates an aspect of the eruption to a relevant effect on the atmosphere/biosphere 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Name of volcanic eruption: Mount Pinatubo (1991)

The 1991 Mount Pinatubo eruption expelled large amounts of sulfur dioxide into the stratosphere producing aerosols and reflecting light causing a decrease in global atmospheric temperatures.

Emissions of sulfur dioxide and water vapour in the atmosphere also produced sulfuric acid rain.

Question 23

Criteria	Marks
<ul style="list-style-type: none"> Describes advantages and/or disadvantages of the impact of the water management strategy 	3
<ul style="list-style-type: none"> Outlines one advantage or disadvantage of the impact of the water management strategy OR <ul style="list-style-type: none"> Demonstrates an understanding of water availability in either area 	2
<ul style="list-style-type: none"> Provides some relevant information about the strategy 	1

Sample answer:

There is very little water available near Broken Hill. The building of a pipeline to transport water from the Murray River in Wentworth to the City of Broken Hill has benefits in that it will provide the City of Broken Hill with a greater and more reliable source of water. However, there are drawbacks to the pipeline including that water is diverted from communities downstream of Wentworth. Even though the Darling River is closer to Broken Hill, the flows are more problematic and thus cannot be relied upon.

Question 24 (a)

Criteria	Marks
<ul style="list-style-type: none"> Demonstrates a thorough understanding of how a change to the circulation of ocean currents can affect climate 	3
<ul style="list-style-type: none"> Shows a basic understanding of the relationship between ocean circulation and climate OR <ul style="list-style-type: none"> Shows an understanding of ocean circulation and/or climate 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Ocean water currents transport heat from the equator to the poles which affects the water cycle as well as atmospheric temperatures. Increased ocean circulation warms the higher latitudes of both the northern and southern hemispheres. Similarly, a reduction in ocean circulation from the equator to the poles will reduce temperatures possibly producing a prolonged cooling event.

Question 24 (b)

Criteria	Marks
<ul style="list-style-type: none"> Describes a possible flow-on effect of a change in ocean current on Earth's weather 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Changes in atmospheric temperature have possible flow-on effects on weather. Increased temperature at the higher latitudes will produce higher evaporation rates over oceans and associated increases in precipitation events.

Question 25

Criteria	Marks
<ul style="list-style-type: none"> Provides TWO factors that allowed animals to move from the aquatic environment onto land Uses cause and effect relationships to connect both factors to the challenges associated with living on land 	3
<ul style="list-style-type: none"> Provides ONE factor that allowed animals to move onto land Uses a cause and effect relationship to connect the factor to the challenges associated with living on land <p>OR</p> <ul style="list-style-type: none"> Describes TWO factors associated with the movement onto land by animals 	2
<ul style="list-style-type: none"> Identifies at least ONE factor associated with the movement onto land by animals 	1

Sample answer:

Increasing oxygen levels in the atmosphere led to the formation of the ozone layer that in turn reduced incident UV radiation levels making it possible for life forms, including animals, to conquer the terrestrial environment.

The development of a hard outer shell retained water, enabling animals to spend time on land without drying out.

Answers could include:

- Development of ozone layer
- Abundant resources
- Lack of predators
- Less competition
- Evolution of various body structures eg skeletal structures, lungs, impermeable skin, internal fertilisation, eggs with protective covering preventing desiccation, lack of buoyancy.

Question 26 (a)

Criteria	Marks
<ul style="list-style-type: none"> Provides a judgement on the effectiveness of the image in terms of its ability to communicate scientific information Relates specific features of the image to its ability to communicate 	3
<ul style="list-style-type: none"> Provides a judgement on the effectiveness of the image in terms of its ability to communicate Refers to a feature of the image 	2
<ul style="list-style-type: none"> Provides an unsupported judgement of the image in terms of its ability to communicate OR <ul style="list-style-type: none"> Refers to a feature of the image without making a judgement 	1

Sample answer:

The intent of this image is to communicate what waste items should be placed in the organic waste bin. The use of photos, text and large ticks and crosses is very effective in communicating what can and what cannot be placed in these bins. Divisions of organic and non-organic waste which may not be obvious to the general public are clearly represented in this image.

Overall, this is a highly effective image for its intended purpose.

Question 26 (b)

Criteria	Marks
<ul style="list-style-type: none"> Uses cause and effect relationships to connect organic waste bin use to TWO aspects of sustainability 	3
<ul style="list-style-type: none"> Uses cause and effect relationships to connect organic waste bin use to ONE aspect of sustainability OR <ul style="list-style-type: none"> Describes TWO sustainability related aspects of organic waste bin use without clear cause and effect 	2
<ul style="list-style-type: none"> Identifies at least ONE sustainability related aspect of organic waste bin use 	1

Sample answer:

The use of organic waste bins would significantly reduce the volume of waste going into landfill, which increases the longevity of the landfill site. The composting of the materials in the organic waste bin would lead to the production of compost resources which, when used, return nutrients to the soil improving the sustainability of agriculture.

Answers could include:

- Reduction of methane emissions
- Economic sustainability of waste management through production of saleable compost.

Question 27 (a)

Criteria	Marks
<ul style="list-style-type: none"> Identifies a relevant risk and outlines a suitable precaution 	2
<ul style="list-style-type: none"> Identifies a relevant safety precaution OR	1
<ul style="list-style-type: none"> Identifies a relevant risk 	

Sample answer:

Students should wear gloves to prevent the possibility of contamination from waste materials.

Answers could include:

- Face masks
- Enclosed shoes.

Question 27 (b)

Criteria	Marks
<ul style="list-style-type: none"> Proposes and supports a strategy to ensure accuracy of data AND	4
<ul style="list-style-type: none"> Proposes and supports a strategy to ensure reliability of data 	
<ul style="list-style-type: none"> Proposes and supports a strategy to ensure accuracy or reliability of data 	3
<ul style="list-style-type: none"> Proposes ONE strategies to ensure accuracy and/or reliability of data 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

For this investigation, accuracy is ensured by clearly defining the classification of different waste types and using scales to measure the mass of each waste type to the nearest kilogram.

To ensure the reliability of the data, multiple repeats would be carried out on different days and the results analysed and averaged, with any possible outliers being identified and investigated further to determine whether they should be removed from the dataset.

Question 28

Criteria	Marks
<ul style="list-style-type: none"> Identifies a mine Demonstrates a thorough knowledge and understanding of the involvement of traditional owners in mining and restoration 	4
<ul style="list-style-type: none"> Identifies a mine Demonstrates sound knowledge and understanding of the involvement of traditional owners in mining and/or restoration 	3
<ul style="list-style-type: none"> Outlines the involvement of traditional owners in mining or restoration in general terms 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Northparkes Mine

In planning expansions of the Northparkes copper mine in the Goonumbla area north of Parkes, traditional owners, the Wiradjuri people, provide insight into areas of cultural significance such as meeting places and burial sites that may be impacted by the mine site, ensuring future mine operations avoid such areas which effectively preserves significant places.

When the Northparkes mine restores areas affected by mining operations the traditional owners, the Wiradjuri people, will be consulted on their extensive knowledge of native flora and fauna present in the area prior to mining processes and effectively ensure that the restoration re-establishes its previous ecological status.

Northparkes Mines has quarterly meetings with Wiradjuri elders to identify employment opportunities to support Wiradjuri people effectively in their communities.

Question 29 (a)

Criteria	Marks
<ul style="list-style-type: none"> Identifies TWO trends and accounts for both 	3
<ul style="list-style-type: none"> Identifies TWO trends <p>OR</p> <ul style="list-style-type: none"> Identifies and accounts for ONE trend 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

The apparent increase in all eruptions over the time period specified may have been due to improvements in technology which has allowed us to identify and report on volcanic eruptions especially those that occur some distance from established human populations which previously would have gone unreported.

The major volcanic eruptions data has remained relatively constant because the events are sufficiently noticeable for all to have been reported and recorded over the past two centuries.

Question 29 (b)

Criteria	Marks
• Recognises TWO ways to aid the interpretation of the graph	2
• Recognises ONE way to aid the interpretation of the graph	1

Sample answer:

- Include a key to identify the various events indicated by acronyms on the 'All eruptions' curve
- Include a label for the secondary vertical axis.

Question 30

Criteria	Marks
• Demonstrates an extensive knowledge and understanding of how a change in the geosphere resulted from a development in the biosphere including references to a valid example	6
• Demonstrates thorough knowledge of how a change in the geosphere resulted from a development in the biosphere including references to a valid example	5
• Demonstrates sound knowledge of how a change in the geosphere resulted from a development in the biosphere including references to a valid example	4
• Describes a change in the geosphere that resulted from a development in the biosphere	3
• Outlines a change in the Earth's geosphere related to a development in the biosphere OR	2
• Outlines a relevant effect on the geosphere	
• Provides some relevant information	1

Sample answer:

Fossil evidence suggests that approximately 3.8 billion years ago stromatolites were abundant in many shallow seas. These stromatolites contain cyanobacteria which had the capacity to use CO₂ in a photosynthetic process, releasing oxygen gas.

The oxygen released into the aquatic environment initially reacted with the dissolved iron in the oceans to produce iron oxides which deposited and settled at the bottom of the oceans producing an iron oxide band in the strata. Alternating layers of iron oxide rich and silica rich sediments produced what is known as banded iron formations for prolonged periods of time.

The pollution of the oceans caused by cyanobacteria producing oxygen significantly affected the geosphere by the production of millions of tons of banded iron formations.

Answers could include:

- Coal formation
- Bio-sedimentary rocks
- Erosion formed by animals or plants.

Question 31

Criteria	Marks
<ul style="list-style-type: none"> Explains in detail how a specific method may reduce the impact of a related natural disaster Provides a judgement on the effectiveness of the method 	4
<ul style="list-style-type: none"> Explains how a specific method may reduce the impact of a related natural disaster Provides a judgement on the effectiveness of the method 	3
<ul style="list-style-type: none"> Outlines a method associated with minimising the impacts of natural disasters Provides a judgement 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

In earthquake prone regions, modern building codes require design elements enabling structures to withstand the ground-shaking motion caused by surface waves, for example the use of flexible materials such as steel for frameworks. These structures will bend when shaken by earthquake waves without breaking, and return to their original position following the earthquake, thus minimising infrastructure damage. By maintaining the structural integrity of a building it prevents structures from collapsing and causing injury or death.

These methods have been highly effective in minimising infrastructure damage and the loss of life associated with earthquakes compared to the use of rigid concrete structures.

Answers could include:

- Volcanism – predictive methods such as: satellite imagery, SO₂ detectors, seismometers, spectrometers, temperature probes in water bodies.
- Volcanism – building away from prevailing wind directions to reduce impact of ash falls, not building on topographic lows to avoid lava flows/pyroclastic flows; building a suitable distance from possible dangers associated with volcanism.
- Earthquakes – detection methods including: seismometers (pre-quakes), anomalous animal behaviours, modern building codes.

Question 32

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive knowledge and understanding of how Australia's land use has changed since human settlement • Includes significant detail of the cause and effect relationship between changes in land use and the enhanced greenhouse effect • Refers to the data 	5
<ul style="list-style-type: none"> • Demonstrates thorough knowledge and understanding of how Australia's land use has changed since human settlement • Includes some detail of the cause and effect relationship between changes in land use and the enhanced greenhouse effect • Refers to the data 	4
<ul style="list-style-type: none"> • Demonstrates sound knowledge of how Australia's land use has changed since human settlement • Includes some detail of the cause and effect relationship between a change in land use and the enhanced greenhouse effect 	3
<ul style="list-style-type: none"> • Outlines a change in Australia's land use • Makes some connection to the enhanced greenhouse effect 	2
<ul style="list-style-type: none"> • Provides some relevant information 	1

Sample answer:

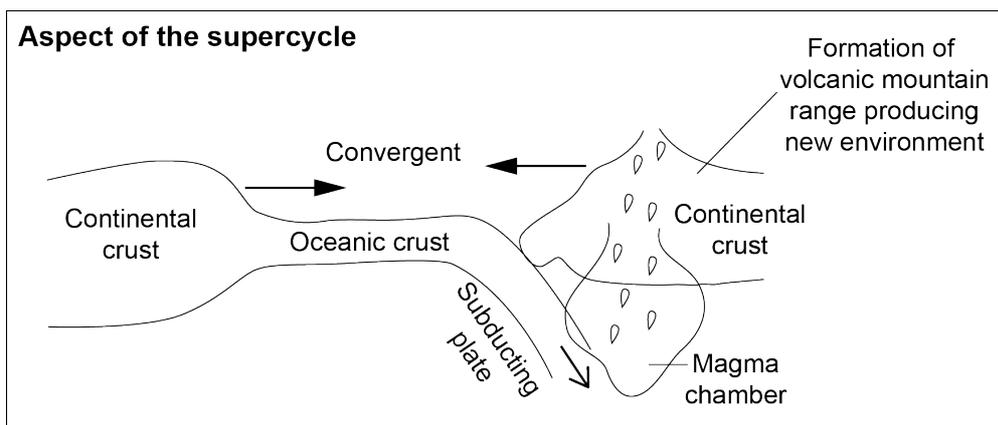
The data shows that a significant area of land up to 45% is currently being used for grazing. Croplands, forestry and urban functions also make up approximately another 7–8% in total. An increase in grazing land for cattle leads to the production of methane, which is a very potent greenhouse gas. The removal of vast forests, to create grazing land, and urban development would significantly reduce the carbon dioxide sink leading to increased CO₂ levels in our atmosphere and contributing to the enhanced greenhouse effect.

While some horticulture and domestication of animals occurred following settlement by Aboriginal and Torres Strait Islander peoples, the extent was much less than today, and the impact on the enhanced greenhouse effect would have been minimal.

Question 33

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive knowledge and understanding of an aspect of the plate tectonic supercycle and how it may influence evolution • Includes a detailed and well annotated diagram of a relevant aspect of the plate tectonic supercycle in support of the explanation 	5
<ul style="list-style-type: none"> • Demonstrates thorough knowledge and understanding of an aspect of the plate tectonic supercycle and how it may influence evolution • Includes a clearly labelled diagram of a relevant aspect of the plate tectonic supercycle in support of the explanation 	4
<ul style="list-style-type: none"> • Demonstrates sound knowledge of an aspect of the plate tectonic supercycle and how it may influence evolution • Includes a relevant diagram 	3
<ul style="list-style-type: none"> • Outlines how an aspect of the plate tectonic supercycle may influence evolution OR	2
<ul style="list-style-type: none"> • Includes a relevant diagram 	
<ul style="list-style-type: none"> • Provides some relevant information 	1

Sample answer:



During the formation of a supercontinent, oceanic crust is subducted leading to the formation of a volcanic mountain range. These mountains form a barrier, isolating populations, creating new environments and forcing the organisms to evolve in response to the respective environmental conditions. This ultimately results in the divergence of the populations such that they would become separate species.

Question 34

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive knowledge and understanding of Aboriginal and Torres Strait Islander peoples' practices • Relates the practices to possible environmental implications • Draws out the usefulness of incorporating such practices • Constructs a logical and coherent response 	7
<ul style="list-style-type: none"> • Demonstrates thorough knowledge and understanding of Aboriginal and Torres Strait Islander peoples' practices • Relates the practices to possible environmental implications • Draws out the usefulness of incorporating such practices • Constructs a coherent response 	5–6
<ul style="list-style-type: none"> • Demonstrates sound knowledge of Aboriginal and Torres Strait Islander peoples' practices <p>AND EITHER</p> <ul style="list-style-type: none"> • Relates the practices to possible environmental implications <p>OR</p> <ul style="list-style-type: none"> • Draws out the usefulness of incorporating such practices 	3–4
<ul style="list-style-type: none"> • Demonstrates limited knowledge of Aboriginal and Torres Strait Islander peoples' practices 	2
<ul style="list-style-type: none"> • Provides some relevant information 	1

Answers could include:

- The use of fire-stick farming involves Aboriginal peoples purposefully and regularly lighting fires both for the hunting of animals and for promoting regrowth of native vegetation. Its main purpose relates to caring for Country – environmental management including reducing fuel load, mitigation of bushfire, regeneration, nutrient recycling and seed germination. Adopting this practice into environmental management plans by routine hazard reduction burning would effectively reduce fuel loads and reduce net carbon dioxide outputs because small frequent fires do not burn the entire plant and thus encourage the storage of carbon resources under the ground such as in tubers. It also ensures that animals can escape danger and then return to their habitats.
- The way in which Aboriginal and Torres Strait Islander peoples used seasonal occupation, whereby they moved from one region to another, reduced pressures on local food sources so that each ecosystem could regenerate when they moved on. This is not evident in European agricultural techniques where pastures are established on a permanent basis, often depleting soil nutrients and leading to erosion and salinity problems. While more sustainable, the adoption of practices such as cyclical/seasonal rotation of populations into modern agricultural techniques is not very practical given the size of populations which need to be sustained, practices such as crop rotation are more practical.

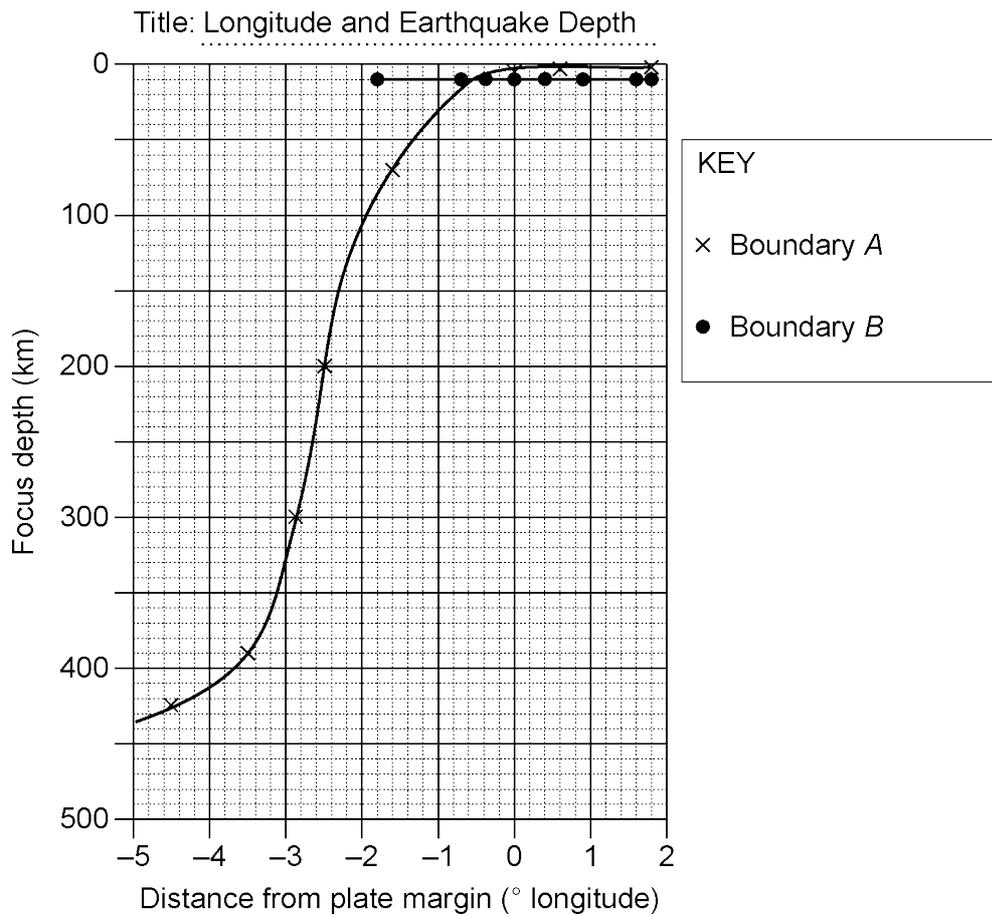
Answers could include Aboriginal and Torres Strait Islander peoples' practices such as:

- Reduction of large scale crops in favour of smaller ones, eg market gardens, community farm gardens
- Mosaic burning
- Fish traps.

Question 35 (a)

Criteria	Marks
<ul style="list-style-type: none"> Plots BOTH datasets accurately as a line graph Graph includes: <ul style="list-style-type: none"> Key for both data sets Vertical axis completed Trendline for each data set 	3
<ul style="list-style-type: none"> Plots at least ONE dataset accurately Graph includes at least THREE of: <ul style="list-style-type: none"> Title Key Vertical axis completed Trendline Second dataset plotted accurately 	2
<ul style="list-style-type: none"> Completes some elements correctly 	1

Sample answer:



Note: the vertical scale may be inverted.

Question 35 (b)

Criteria	Marks
<ul style="list-style-type: none"> Identifies BOTH boundary types correctly Justifies boundary types with reference to the data 	3
<ul style="list-style-type: none"> Identifies BOTH boundary types correctly with no justification OR <ul style="list-style-type: none"> Identifies ONE boundary type correctly Justifies boundary type with reference to the data 	2
<ul style="list-style-type: none"> Provides some relevant information 	1

Sample answer:

Boundary *A* is an ocean/continent convergent plate boundary. The graph shows the distribution and depth of earthquakes on either side of the plate margin typical of a subduction zone. The subducting ocean plate will penetrate deeper into the mantle as shown by the data.

Boundary *B* is an ocean/ocean divergent plate boundary. The graph shows the uniformity of earthquake depth on either side of the plate margin and that depth is not penetrating deep into the mantle.

Answers could include:

- Boundary *A* is an ocean/ocean convergent plate boundary.
- Boundary *B* is a transform fault associated with a mid ocean ridge plate boundary.
- Boundary *B* is a continental/continental divergent boundary.

Question 36

Criteria	Marks
<ul style="list-style-type: none"> • Demonstrates an extensive knowledge and understanding of the effect of climatic phenomena on both the frequency AND magnitude of bushfires • Demonstrates an extensive knowledge and understanding of the effect of human activity on both the frequency AND magnitude of bushfires • Constructs a logical and coherent response leading to a clear judgement for both criteria 	8
<ul style="list-style-type: none"> • Demonstrates thorough knowledge and understanding of the effect of climatic phenomena on the frequency and magnitude of bushfires • Demonstrates thorough knowledge and understanding of the effect of human activity on the frequency and magnitude of bushfires • Constructs a logical and coherent response leading to a clear judgement for both criteria 	6–7
<ul style="list-style-type: none"> • Demonstrates sound knowledge of the effect of climatic phenomena on the frequency AND/OR magnitude of bushfires • Demonstrates sound knowledge of the effect of human activity on the frequency AND/OR magnitude of bushfires • Includes at least one clear judgement 	4–5
<ul style="list-style-type: none"> • Demonstrates basic knowledge of the effect of climatic phenomena on the frequency OR magnitude of bushfires <p>AND/OR</p> <ul style="list-style-type: none"> • Demonstrates basic knowledge of the effect of human activity on the frequency OR magnitude of bushfires 	2–3
<ul style="list-style-type: none"> • Provides some relevant information 	1

Answers could include:

Frequency criteria may include:

- The duration of a fire season
- Annual trends
- Number of simultaneous fires etc.

Magnitude criteria may include:

- Speed of propagation
- Area of fire ground
- Intensity etc.

Climatic phenomena may include:

- Droughts
- Increased frequency
- Severity of weather events such as thunderstorms, strong winds or heatwaves
- El Nino.

Human activities may include:

- Backburning or lack thereof
- Firefighting
- Infrastructure development
- Educational awareness
- Law making and enforcement
- Anthropogenic ignition sources eg cigarette butts and metal working.

2020 HSC Earth and Environmental Science Mapping Grid

Section I

Question	Marks	Content	Syllabus outcomes
1	1	Mod 5 Fossil Formation and Stratigraphy	EES12-12
2	1	Mod 5 Fossil Formation and Stratigraphy	EES12-12
3	1	Mod 5 Development of the Biosphere	EES12-12
4	1	Mod 8 Using Australia's Natural Resources	EES12-15
5	1	Mod 5 Fossil Formation and Stratigraphy	EES12-12
6	1	Mod 5 Development of the Biosphere	EES12-12
7	1	Mod 6 Geological Natural Disasters	EES12-13
8	1	Mod 7 Evidence for Climate Variation	EES12-14
9	1	Mod 6 Geological Natural Disasters	EES12-13
10	1	Mod 6 Geological Natural Disasters	EES12-13
11	1	Mod 8 Sustainability	EES12-15
12	1	Mod 7 Evidence for Climate Variation	EES12-14
13	1	Mod 7 Influence of Human Activities on Changes to Climate	EES12-4, EES12-14
14	1	Mod 7 Influence of Human Activities on Changes to Climate	EES12-5, EES12-14
15	1	Mod 6 Geological Natural Disasters	EES12-4, EES12-13
16	1	Mod 8 Waste Management	EES12-6, EES12-15
17	1	Mod 6 Geological Natural Disasters	EES12-4, EES12-13
18	1	Mod 6 Evidence for Climate Variation	EES12-4, EES12-13
19	1	Mod 8 Planning Investigations	EES12-2, EES12-15
20	1	Mod 8 Using Australia's Natural Resources	EES12-5, EES12-15

Section II

Question	Marks	Content	Syllabus outcomes
21	3	Mod 5 Fossil Formation and Stratigraphy	EES12-12
22	4	Mod 6 Impact of Natural Disasters on the Biosphere	EES12-13
23	3	Mod 8 Using Australia's Natural Resources	EES12-5, EES12-15
24 (a)	3	Mod 7 Natural Processes of Variations in Climate	EES12-5, EES12-14
24 (b)	2	Mod 7 Influence of Human Activities on Changes to Climate	EES12-6, EES12-14
25	3	Mod 5 Development of the Biosphere	EES12-7, EES12-12
26 (a)	3	Mod 8 Waste Management	EES12-5, EES12-15
26 (b)	3	Mod 8 Waste Management	EES12-7, EES12-15
27 (a)	2	Mod 8 Waste Management	EES12-2, EES12-3
27 (b)	4	Mod 8 Waste Management	EES12-2, EES12-3
28	4	Mod 8 Using Australia's Natural Resources	EES12-7, EES12-15

Question	Marks	Content	Syllabus outcomes
29 (a)	3	Mod 6 Geological Natural Disasters	EES12-5, EES12-13
29 (b)	2	Mod 6 Geological Natural Disasters	EES12-5, EES12-13
30	6	Mod 5 Changes in the Geosphere, Atmosphere and Hydrosphere	EES12-7, EES12-12
31	4	Mod 6 Prediction and Prevention of Natural Disasters	EES12-6, EES12-13
32	5	Mod 7 Mitigation and Adaptation Strategies	EES12-4, EES12-6, EES12-7, EES12-14
33	5	Mod 5 Plate Tectonic Supercycle	EES12-7, EES12-12
34	7	Mod 7 Mitigation and Adaptation Strategies	EES12-6, EES12-7, EES12-14
35 (a)	3	Mod 5 Plate Tectonic Supercycle	EES12-4, EES12-13
35 (b)	3	Mod 6 Geological Natural Disasters	EES12-4, EES12-6, EES12-13
36	8	Mod 6 Impact of Natural Disasters on the Biosphere Mod 7 Influence of Human Activities on Changes to Climate	EES12-6, EES12-7, EES12-13, EES12-14