Assessment Report

On this page

Level 2 Earth and Space Science 2020

Standards 91191 91192 91193

Part A: Commentary

Candidates who were more successful:

- attempted all questions
- made use of resource materials provided
- applied appropriate scientific principles to the context of the question
- responded to the question in the examination, rather than providing rote learned responses based on evidence statements from previous years' papers
- provided annotated diagrams to support their written answers.

Part B: Report on standards

91191: Demonstrate understanding of the causes of extreme Earth events in New Zealand

Candidates who were awarded **Achievement** commonly:

- labelled diagrams
- drew labelled diagrams
- identified the characteristics of rhyolitic magma
- identified features of caldera/dome formation
- described features of an earthquake
- identified a fault type
- understood New Zealand plate boundary changes.

Candidates whose work was assessed as **Not Achieved** commonly:

- gave irrelevant answers
- could not identify the plate movement and direction within New Zealand
- could not explain energy transfer in earthquakes and tsunamis.

Candidates who were awarded **Achievement with Merit** commonly:

- drew well annotated diagrams
- explained the formation of rhyolitic magma from subduction
- linked the characteristics of rhyolitic magma to its explosiveness
- linked plate movement to earthquake formation
- explained energy transfer or movement in a tsunami
- explained the correct fault type that caused the uplift.

Candidates who were awarded **Achievement with Excellence** commonly:

- linked rhyolitic magma characteristics to caldera and dome formation
- linked correct plate boundaries to earthquake formation and factors such as depth
- related energy transfer in a megathrust earthquake to displacement of water, forming a tsunami

- explained energy requirements and fault movement for uplift.

Standard specific comments

It is recommended that candidates become familiar with the map of New Zealand that shows the plate boundaries, as this will assist with understanding the location and direction of plate movement at plate boundaries.

When answering questions candidates should refer back to the names and the direction of movement of tectonic plates in their diagrams and written answers.

It is important at all levels of achievement for candidates to be able to identify the different types of faults – normal, reverse and transform.

91192: Demonstrate understanding of stars and planetary systems

Candidates who were awarded **Achievement** commonly:

- correctly read the absolute magnitude scale of the HR diagram
- identified brown dwarfs as being too low in temperature/luminosity to fit on the HR diagram
- correctly identified which dwarf star had the largest/smallest initial mass
- knew that massive stars that are 20 to 30 solar masses form black holes
- identified the location of high mass stars on the HR diagram
- stated the main methods of moon formation..

Candidates whose work was assessed as **Not Achieved** commonly:

- confused brown dwarfs (failed stars) with black dwarfs (cooled white dwarfs)
- could not relate the formation of a black hole to the end of nuclear fusion
- could not distinguish between a planet and a moon.

Candidates who were awarded **Achievement with Merit** commonly:

- understood that absolute magnitude of a star is a measure of its brightness
- related the initial mass of a dwarf star to its lifecycle

- explained the fuel use in at least one dwarf star
- understood that a supergiant forms once hydrogen runs out
- explained why iron formation cannot occur in a star
- correctly linked gravity to the collapse of the star
- explained the formation of an accretion disk around a planet
- explained the formation of the moon from a circumplanetary disc
- explained the impact theory of moon formation.

Candidates who were awarded **Achievement with Excellence** commonly:

- explained the reasons for the differences in fuels used by different dwarf stars
- explained the role of gravity in the fusion of successive elements in the core of a massive star
- explained how the end of fusion in a massive star leads to a supernova and subsequent collapse of star
- explained the formation of the moon from a circumplanetary disc, and the impact theory.

Standard specific comments

It is recommended that candidates become familiar with the HR diagram provided, and understand what each of the different scales represents, and how to read them.

91193: Demonstrate understanding of physical principles related to the Earth System

Candidates who were awarded **Achievement** commonly:

- identified heat transfer processes occurring within the Earth, in terms of states of matter and location
- recognised at least two heat sources within the Earth
- identified the visible spectrum as a mixture of colours combining to form white light
- identified the wavelength of blue light

- linked scattering to the sky's colour
- understood that solar radiation heats the Earth's surface
- understood that land heats up faster than water in the same conditions
- described sea breezes.

Candidates whose work was assessed as **Not Achieved** commonly:

- linked changes in particle density to convection current formation
- did not understand the particle kinetic theory in relation to heat
- used particle light theory to explain scattering and a blue sky
- could not explain the behaviour of light as it passes through a medium
- did not understand heat capacity.

Candidates who were awarded **Achievement with Merit** commonly:

- explained heat transfer processes occurring in the Earth
- explained the physical processes associated with a heat source within the Earth
- explained the nature of electromagnetic radiation from the Sun
- explained Rayleigh scattering
- explained why land heats up more quickly in terms of heat capacity
- explained the formation of sea breezes.

Candidates who were awarded **Achievement with Excellence** commonly:

- linked the heat transfer processes occurring in the earth's core to the crust to the material properties of each layer
- explained the physical processes associated with all heat source within the Earth
- explained Rayleigh scattering with reference to interactions between particle size and wavelength
- linked heat transfer processes and air pressure to sea breeze formation.

Standard specific comments

Many candidates could not correctly explain how the surface of the Earth was heated, commonly stating that sunlight/ultraviolet radiation heats the Earth, or that the internal heat sources heated the surface. Many also believed that the inner core was the only source of internal heat within the Earth.

Candidates commonly confused various terms, meanings, and applications, in particular those associated with light, such as reflection, refraction, absorption, transmission and scattering.

A lack of understanding of the relationship between latent heat and phase change, and knowledge of specific heat capacity, appeared evident in many candidates' responses.

Science subject page

Previous years' reports

2019 (PDF, 103KB)

2018 (PDF, 105KB)

2017 (PDF, 43KB)

2016 (PDF, 217KB)