

# Earth and Environmental Science Exam

This exam focuses on testing skills rather than knowledge recall. We assess student's ability to read and comprehend questions, think critically and solve problems logically. Because the Earth and Environmental Science Olympiad (EESO) program is based on an Earth Systems Science approach we seek students with an excellent all-round understanding of science. For this exam (and the Summer School program) we assume student familiarity with the following areas within the Australian Curriculum v9.0 (<https://tinyurl.com/4urdh7wj>):

- All the Biology, Chemistry, Earth & Space and Physics topics within the Science KLA to Year 9 level plus some Year 10 topics. Topics outlined below are especially important:

#### Biology:

- The role of classification in ordering and organising information, especially the biological classification of organisms (including fossils).
- The basics of evolution (a Year 10 topic).

#### Chemistry:

- Chemical symbols and terminology.
- The periodic table (a Year 10 topic).
- The states of matter, elements, isotopes, compounds and chemical equations.
- The role of energy transfer in chemical processes.

#### Earth & Space

- The basics of Earth & Moon planetary motions with respect to the Sun. This includes the relationship of these motions to tides, eclipses and lunar phases.
- The basics of the origin of stars and planets and the elements that compose them (a Year 10 topic).
- The basics behind the formation of sedimentary, igneous and metamorphic rocks.
- Minerals are chemical compounds.
- The general structure within the Earth (Core, Mantle, Crust).
- The basics of Plate Tectonics and that plate motion, earthquakes and volcanoes are all connected by tectonic processes.
- The basics of Earth Systems (biosphere, geosphere, hydrosphere & atmosphere) and Cycles (a Year 10 topic).

#### Physics

- Forces, including gravity.
- Energy, energy transfer and waves.

- Maths is an essential tool in all sciences. For this exam (and the EESO Summer School program) advanced mathematics is not required but the following understandings are expected:
  - Basic algebra.
  - Basic geometry & trigonometry.
  - Basic statistics.
  - The use of scientific notation.
  - Significant figures.
  - Understanding and interpreting graphs and other forms of data representation.

We do not expect students to have any familiarity with any Year 11 or 12 science subject content.

## Exam format

The online exam is composed of multiple-choice questions plus some true/false questions. Multiple-choice questions may be presented in a variety of ways (eg: select from a list, drag and drop, match from a list) but each question has only one completely correct answer. There are no short answer questions. There is no negative marking for incorrect answers. The exam is timed for 2 hours, excluding pre-exam set up of permitted browser tabs and log in. It is essential students can work on the exam for the full 2 hours if needed.

The exam is built on a story line so it is advisable students work through the questions from the start in the first instance. That said, any question can be returned to at any time. Also, the answer to a question is never dependent upon correct answers in previous questions. Students should attempt all questions.

Questions will range across topics loosely encapsulated by the Earth Systems Science headings of atmosphere, biosphere, geosphere, hydrosphere and exosphere (space science). However, many questions will rely on integrating analysis of novel information in novel or unusual settings with general understandings of the sciences. In such cases sufficient information to answer the question is always provided in the question and/or in the additional data provided with the exam.

Past EESO exams and answers are available here: <https://tinyurl.com/4sex6w7s> (in a PDF format, not online). The 2020, 2021 & 2022 exams reflect our current curriculum level expectations and are also the most relevant to the format for 2023.

Finally: Exams are stressful but they can be fun and educational. It is not unusual for students sitting the EESO exam to be smiling or even stifling laughter during the 2-hour experience. Hopefully, they will finish the exam happy and having learned something along the way!