**Stage 2 Earth and Environmental Science**

**Program 1: Assessment Type 1: Investigations Folio**

Formative Science as a Human Endeavour Investigation – Climate Change

This task has a focus on science as a human endeavour; how science interacts with society.

Select and explore a recent discovery, innovation, issue, or advancement linked to our understanding and management of contemporary variations in Earth’s climate. Examples include climate modelling, non-carbon energy technologies, carbon capture and storage, global policies.

Use one or more of the key concepts of science as a human endeavour to develop a focus for your investigation. Make your topic quite specific to enable you to analyse information in depth. For example:

Can global policies be effective in reducing the levels of greenhouse gases? (Communication and collaboration)

How has evidence from proxy data (such as isotopic ratios, ice-core data, palaeobotany, and the fossil record) contributed to the development of models of climate change? (Influence)

How could geosequestration provide sustainable solutions for reducing atmospheric levels of carbon dioxide? (Development)

How can the efficient use of (a renewable energy resource) reduce levels of greenhouse gases? (Application and limitation)

How effective is the international collaboration of scientists through the Intergovernmental Panel on Climate Change (IPCC) in determining achievable targets for the reduction of global warming? (Communication and collaboration)

How effective are general circulation models (GCMs) in predicting future climate change? (Development and Communication and Collaboration)

Can we accurately predict the effects of combustion of fossil fuels on global warming? (Development and Communication and Collaboration)

Select, analyse and synthesise information from different sources to:

* explain the science relevant to the focus of your investigation
* show its connections to science as a human endeavour

Prepare a scientific report, which must include the use of scientific terminology and:

* an introduction to identify the focus of the investigation and the key concept(s) of science as a human endeavour that it links to (KA 3)
* relevant earth and environmental science concepts or background (KA 2)
* an explanation of how the focus of the investigation illustrates the interaction between science and society (KA 3)
* a discussion of the potential impact or application of the focus of the investigation, e.g. further development, effect on quality of life, environmental implications, economic impact, intrinsic interest (KA 3, IAE 3)
* a conclusion that summarises how your topic is connected to the selected key concept(s) of science as a human endeavour (IAE 3)
* citations and referencing (KU 4)

KA 4 will be assessed throughout the report.

The report, which can be in a format of your choice, should be a maximum of 1500 words if written, or a maximum of 10 minutes for an oral presentation, or the equivalent in multimodal form.

Development of capabilities

**Critical and Creative Thinking**

* devising imaginative solutions and making reasonable predictions
* envisaging consequences and speculating on possible outcomes
* recognising the significance of creative thinking on the development of earth and environmental science knowledge and applications.

**Personal and Social**

* sharing and discussing ideas about earth and environmental science issues and developments, while respecting the perspectives of others
* recognising the role of their own beliefs and attitudes in gauging the impact of earth and environmental science in society

**Ethical Understanding**

* using data and reporting the outcomes of investigations accurately and fairly
* acknowledging the need to plan for the future and to protect and sustain the biosphere
* recognising the importance of their responsible participation in social, political, economic, and legal decision-making.

**Performance Standards for Stage 2 Earth and Environmental Science**

| - | **Investigation, Analysis, and Evaluation** | **Knowledge and Application** |
| --- | --- | --- |
| **A** | Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification. | Develops and applies earth and environmental science concepts highly effectively in new and familiar contexts.  Critically explores and understands in depth the interaction between science and society.  Communicates knowledge and understanding of earth and environmental science coherently, with highly effective use of appropriate terms, conventions, and representations. |
| **B** | Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification. | Develops and applies earth and environmental science concepts mostly effectively in new and familiar contexts.  Logically explores and understands in some depth the interaction between science and society.  Communicates knowledge and understanding of earth and environmental science mostly coherently, with effective use of appropriate terms, conventions, and representations. |
| **C** | Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification. | Develops and applies earth and environmental science concepts generally effectively in new or familiar contexts.  Explores and understands aspects of the interaction between science and society.  Communicates knowledge and understanding of earth and environmental science generally effectively, using some appropriate terms, conventions, and representations. |
| **D** | Describes data and undertakes some basic interpretation to formulate a basic conclusion. | Develops and applies some earth and environmental science concepts in familiar contexts.  Partially explores and recognises aspects of the interaction between science and society.  Communicates basic earth and environmental science information, using some appropriate terms, conventions, and/or representations. |
| **E** | Attempts to describe results and/or interpret data to formulate a basic conclusion. | Attempts to develop and apply earth and environmental science concepts in familiar contexts.  Attempts to explore and identify an aspect of the interaction between science and society.  Attempts to communicate information about earth and environmental science. |