 Model of a plate boundary – Assessment task

Stage 6 Science Earth and Environmental Science

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Key inquiry question

* How and why do geological disasters occur?

Outcomes

In addition to the outcomes which are mandated for Module 6: Hazards, an additional Working Scientifically outcome of Communicating has been presented for this task. Each skill outcome has a corresponding skill descriptor which can be incorporated into a rubric. A sample marking rubric has been included.

Working Scientifically

Students:

* Develops and evaluates questions and hypotheses for scientific investigation EES11/12-1
  + develop and evaluate inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and secondary data (ACSES001, ACSES061, ACSES096)
* Designs and evaluates investigations in order to obtain primary and secondary data and information EES11/12-2
  + develop and evaluate inquiry questions and hypotheses to identify a concept that can be investigated scientifically, involving primary and secondary data (ACSES001, ACSES061, ACSES096)
* Conducts investigations to collect valid and reliable primary and secondary data and information EES11/12-3
  + select and extract information from a wide range of reliable secondary sources and acknowledge them using an accepted referencing style
* selects and processes appropriate qualitative and quantitative data and information using a range of appropriate media
  + select qualitative and quantitative data and information and represent them using a range of formats, digital technologies and appropriate media (ACSES004, ACSES007, ACSES064, ACSES101)
* Communicates scientific understanding using suitable language and terminology for a specific audience or purpose EES11/12-7
  + select and use suitable forms of digital, visual, written and/or oral forms of communication

Knowledge and Understanding

EES12-13 describes and evaluates the causes of the Earth’s hazards and the ways in which they affect, and are affected by, the Earth’s systems

Students:

* using data, predict the zones along which earthquakes and both effusive and explosive volcanic eruptions are likely to occur and relate these to plate boundaries (ACSES094)
* using secondary sources, investigate and model the changing depth of the focus of earthquakes at convergent and divergent boundaries (ACSES100)
* using secondary sources, investigate and explain the hazards associated with earthquakes, including ground motion and tsunamis (ACSES100)
* using secondary sources, investigate and explain the hazards associated with volcanoes, for example:
  + ash eruptions and lava flows
  + lahars and poisonous gas emissions
* account for the types of magma in each of the above types of volcanoes, and analyse how this affects the explosivity of their eruptions

Teaching and learning activities

Inquiry questions

For the key inquiry question, students are encouraged to design their own inquiry questions as a subset in order, which forms the bases of these teaching and learning sequences.

Assessment

This assessment requires the student to present a model of a plate boundary. The plate boundary presentation is to follow this format:

1. There is significant earthquake, volcanic and other tectonic activity around the globe, for example around the Pacific Ocean (Pacific Plate). Evaluate this statement.
2. Choose ONE particular plate boundary (convergent OR divergent not transform fault)
3. Construct a model of your chosen boundary out of any appropriate material (food is inappropriate)
4. Your boundary must be appropriately labelled and have all features present
5. Your boundary must come complete with documentation that:
   1. identify and describe the plate boundary features and characteristics
   2. describe the types of activity that occurs with this particular plate boundary
   3. justify the choice of materials used, why they are best suited to represent the boundary you have chosen
   4. investigate the technology used by scientists to gather information on your chosen plate boundary; such as Benioff Zones, depth of subduction, rock/plate thickness etc.
   5. locate and plot examples of this boundary on a global map
   6. justify whether this investigation is best undertaken as an individual or as part of a team
   7. the length of the documentation should be at least 1 A4 page of size 10 font and should include a list of references you have used to complete the task.

Marking rubric

Part 1: Model (15 marks)

| **Marking** | **Outstanding**  **5 marks** | **High**  **4 marks** | **Sound**  **3 marks** | **Basic**  **2 marks** | **Limited**  **1 mark** |
| --- | --- | --- | --- | --- | --- |
| Model of a chosen boundary | 3D model demonstrating all features of boundary.  Moveable parts clearly representing parts of boundary e.g. fault lines  All features appropriately coloured. | 3D model  Moveable parts, not entirely correct  Most aspects of boundary coloured | 3D model  Not moveable  Appropriate use of colour | 3D model with limited information and features | Poorly constructed model with limited features |
| Scale | Appropriate scale of all topography.  Appropriate scale of all boundary and crustal thickness | Most aspects and topography of boundary to scale | Topography and boundary to scale, some errors | Boundary to scale, errors in topography | Errors in boundary and topography scale |
| Labelling | Minimum 8 features of plate boundary clearly labelled including but not limited to; crustal layers, fault lines, direction of movement, subduction zone features, mountains. | 6 features labelled | 4 features labelled | 4 features labelled | 1 feature labelled |

Part 2: Report (30 marks)

| **Marking** | **Outstanding**  **5 marks** | **High**  **4 marks** | **Sound**  **3 marks** | **Basic**  **2 marks** | **Limited**  **1 mark** |
| --- | --- | --- | --- | --- | --- |
| Plate boundary features | Report names and defines the features of a plate boundary; including: crust type and asthenosphere, trench and accretionary wedge, mountain range produced, correct naming of parts of earthquake zone and identifies where magma is produced. | Extensive criteria with two errors or omissions. | Extensive criteria with four errors or omissions | Report names and defines some of the features of the boundary | Report names and some features of the boundary |
| Rocks and Minerals | Names five rocks and the major minerals present in the crust and produced at the boundary. | Four rocks and major minerals | Three rocks and some major minerals | Two rocks and some major minerals | One rock and some minerals mentioned |
| Plate boundary characteristics /types of activity | Extensive explanation of earthquake and/or volcanic activity including magma and/or lava produced. Reasons for activity. | Extensive criteria with one error or omission | Extensive criteria with two errors and/or omissions | Extensive criteria with three errors and/or omissions | Basic explanation of earthquake or volcanic activity. |
| Materials | Extensive justification of choice of all materials used for model  Including why they are best suited to the chosen boundary. | Report names all materials and justifies the use of most materials | Report names all materials and justifies the use of some materials. | Only some materials names and justified | Materials of model named but not justification provided |
| Technology | Report identifies and describes technology used to map Benioff zones, depth of subduction, rock/plate thickness including but not limited to seismic data, remote sensing, GPS and satellite imagery. | Extensive criteria with two errors or omissions | Extensive criteria with three errors or omissions | Mentions technology and basic description | Limited mention of technology |
| Critical thinking | Report identifies and describes earthquake, volcanic and other tectonic activity around the Pacific Ocean including frequency, intensity of activity, correlate the location of earthquakes and volcanoes to plate boundaries | Report identifies and describes earthquake, volcanic and other tectonic activity around the Pacific Ocean including frequency, intensity of activity, correlate the location of either earthquakes or volcanoes to plate boundaries | Report identifies and briefly describes some earthquake, volcanic and other tectonic activity around the Pacific Ocean including frequency, intensity of activity, and briefly describe the location of either earthquakes or volcanoes to plate boundaries | Report identifies earthquake, volcanic and other tectonic activity around the Pacific Ocean and correlates the location of earthquakes and volcanoes to plate boundaries | Report identifies only some earthquake, volcanic and other tectonic activity around the Pacific Ocean |

Part 3: Bibliography and all your own work (8 marks)

| **Marking** | **High**  **4 marks** | **Sound**  **3 marks** | **Basic**  **2 marks** | **Limited**  **1 mark** |
| --- | --- | --- | --- | --- |
| Presentation | Students own words and sentences. No cut and paste. No spelling and grammatical mistakes. Neat and well presented. | Students own words and sentences. No cut and paste. Minimal spelling and grammatical mistakes. | Some words or phrases not from the student. Font changes through document. | Some evidence of students own work. |
| Bibliography | Extensive bibliography list for each part of the assignment. | List of books, websites, YouTube clips and journals used for assignment. | Few incomplete references. | One information source mentioned. |