



Government of **Western Australia**  
School Curriculum and Standards Authority



# EARTH AND ENVIRONMENTAL SCIENCE

GENERAL COURSE

---

Marking key for the Externally set task

Sample 2016

**Copyright**

© School Curriculum and Standards Authority, 2014

This document – apart from any third party copyright material contained in it – may be freely copied, or communicated on an intranet, for non-commercial purposes in educational institutions, provided that the School Curriculum and Standards Authority is acknowledged as the copyright owner, and that the Authority's moral rights are not infringed.

Copying or communication for any other purpose can be done only within the terms of the *Copyright Act 1968* or with prior written permission of the School Curriculum and Standards Authority. Copying or communication of any third party copyright material can be done only within the terms of the *Copyright Act 1968* or with permission of the copyright owners.

Any content in this document that has been derived from the Australian Curriculum may be used under the terms of the [Creative Commons Attribution-NonCommercial 3.0 Australia licence](#)

**Disclaimer**

Any resources such as texts, websites and so on that may be referred to in this document are provided as examples of resources that teachers can use to support their learning programs. Their inclusion does not imply that they are mandatory or that they are the only resources relevant to the course.

# Earth and Environmental Science

## Externally set task – marking key

1. A mining company has obtained a lease on an area of land in Western Australia where it plans to conduct exploration for possible ore deposits. **(26 marks)**
- (a) Preliminary investigation of the area could yield some valuable information about the likelihood of ore deposits underground. Describe **two (2)** surface features that would provide information that a geologist could use from walking of a possible mineral deposit site

Description	Marks
Surface rocks, stream beds, vegetation, any reasonable feature 1 each	2 x 1
<b>Total</b>	<b>2</b>

- (b) Name and describe **two (2)** exploration techniques that the company might use in its search for an ore body.

Description	Marks
Name method: magnetic survey, gravity survey, soil sampling, stream sampling or other 1 each x 2	2
Describe method x 2	2
Identify the type of information that is yielded x 2	2
<b>Total</b>	<b>6</b>

- (c) If a large ore body is discovered close to the surface, name and describe the type of mining operation that is most likely to be undertaken.

Description	Marks
Open cut mine	1
A large open hole is dug and ore removed by trucks	1
<b>Total</b>	<b>2</b>

- (d) Describe **three (3)** impacts that this type of mining operation is likely to have on the local environment.

Description	Marks
Land clearing destroys habitat Removes food sources Kills indigenous plants Alters water table Creates dust Any 3 x 1	3
<b>Total</b>	<b>3</b>

- (e) Identify **three (3)** procedures that could be undertaken before mining commences which will assist with the rehabilitation of the area after mining ceases.

Description	Marks
Collect seeds, relocate animals, scrape topsoil and set aside for later, survey the existing ecosystem 1 each x 3	3
<b>Total</b>	<b>3</b>

Mining activities can also impact on communities living close to where the mine and mining activities are located.

- (f) Describe **three (3)** impacts that mining operations could have on the people living in the nearby town.

Description	Marks
Noise, dust, traffic congestion, demand for services or resources such as water, any reasonable impact associated with mining 1 mark each x 3	3
<b>Total</b>	<b>3</b>

- (g) Describe **three (3)** strategies that could be used to limit the impact on people living near the mining operations.

Description	Marks
Noisy operations such as blasting only conducted between certain hours	1
Dust watered down on a regular basis	1
Construction of alternative routes for trucks	1
Provision of services (accommodation, food, fuel) for employees or other reasonable strategy maximum 3 x 1 mark each	
<b>Total</b>	<b>3</b>

- (h) After a mine has become uneconomical, it is closed. List **four (4)** steps involved in the rehabilitation of a mine site after the permanent closure of the mine.

Description	Marks
Waste is removed	1
Site is levelled	1
Topsoil is replaced	1
Vegetation is planted, or other reasonable step	1
<b>Total</b>	<b>4</b>

2. Plan an investigation which will enable the horticulturist to decide whether it is worth the expense to apply smoke water to the seeds. **(13 marks)**

- (a) Write a hypothesis for the investigation.

Description	Marks
Smoke water will make more seeds germinate (or less), or	1
Smoke water will make the seeds germinate faster (or slower)	1
1 for smoke water; 1 for germination effect	
<b>Total</b>	<b>2</b>

- (b) Write a step by step procedure for carrying out the investigation.

Description	Marks
1. plant hundreds of seeds under the same conditions	1
2. water half of them with normal water	1
3. water the rest with smoke water	1
4. observe each day for at least 4 weeks	1
5. record the numbers of seeds germinating in each	1
<b>Total</b>	<b>5</b>

- (c) Variables

Description	Marks
Independent variable: smoke water	1
Dependent variable: germination rate	1
Controlled variables: soil type, depth of planting, amount of water, light, temperature, other reasonable factors 1 each x 4	4
<b>Total</b>	<b>6</b>

- (d) Draw and label a table for recording your results.

Description	Marks
1 column for time	1
1 column for controlled condition seed germination	1
1 column for smoke water seeds germination	1
<b>Total</b>	<b>3</b>

3. Mel and Ben are on a field trip and they come across a shaley rock that breaks into parallel layers. On close examination, Mel notices an impression of a leaf on the surface of the rock. **(8 marks)**

- (a) Describe how this leaf impression was formed. Use a flow diagram to illustrate your answer.

Description	Marks
It is a fossil	1
Formed when leaf fell onto a surface and was quickly covered by sediment	1
After further burial and time passing	1
Sediment solidified	1
Flow diagram showing leaf being covered by sediments	2
<b>Total</b>	<b>6</b>

- (b) What information could scientists gain from this rock in terms of the conditions that prevailed when the rock was formed?

Description	Marks
Land plants were growing in this area	1
If plant is identified, scientists can tell whether conditions were tropical or cold climate.	1
<b>Total</b>	<b>2</b>

4. Barrow Island has an oil and gas extraction facility in a Class A nature reserve. The mining operations and its associated activities are carefully managed to protect the flora and fauna in the reserve.

**(13 marks)**

- (a) There is a concern that if food waste is put out in normal bins, it will affect the behaviour of native animals in the area. Describe how this would occur.

Description	Marks
Animals could be attracted to bins	1
Then become dependent on scraps	1
Would stop eating their normal diet	1
<b>Total</b>	<b>3</b>

- (b) Food waste is dried in industrial ovens before it is removed from the island by boat. Give **two (2)** reasons why this process is followed.

Description	Marks
Prevents bacteria growing in the waste	1
So decreases health risks	1
Also makes the waste less bulky and lighter	1
So it is less expensive to transport to the mainland	1
<b>Total</b>	<b>4</b>

- (c) The mining industry is important to the State's economy. List **three (3)** job types that are directly involved in the mining industry.

Description	Marks
Geologist, engineer, mechanic, electrician, environmental scientist, health and safety, operator, driller, truck driver, field hand or any other appropriate job 1 each x 3	3
<b>Total</b>	<b>3</b>

- (d) Identify **three (3)** industries that supply services to the mining industry.

Description	Marks
Cleaners, caterers, clerical and administrative, trucking, airlines, accommodation, mechanics, construction, health provision, occupational safety or other appropriate services 1 each x 3	3
<b>Total</b>	<b>3</b>