

External assessment 2025

Stimulus book

Earth & Environmental Science

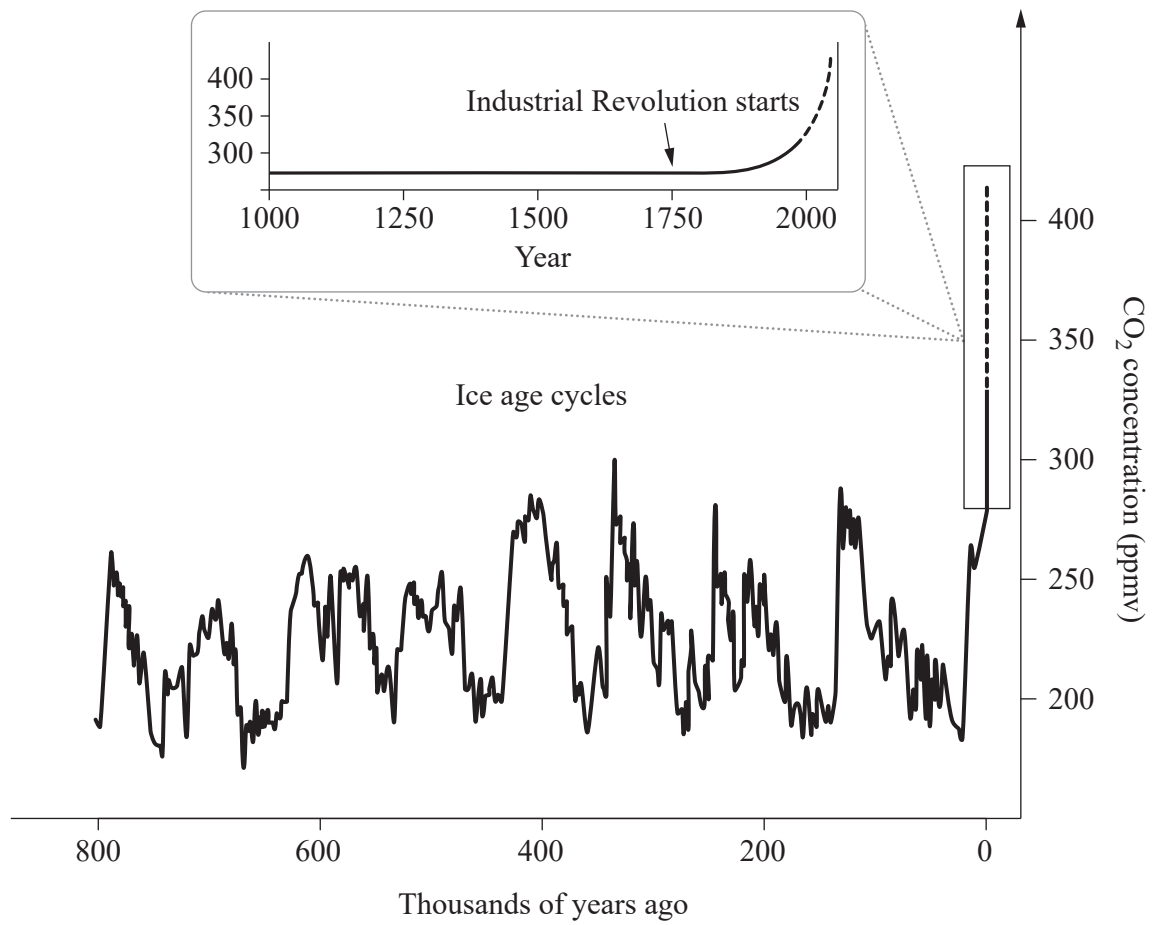
Paper 2

General instruction

- Work in this book will not be marked.

Stimulus 1

The figure shows atmospheric CO₂ concentrations over the past 800 000 years.



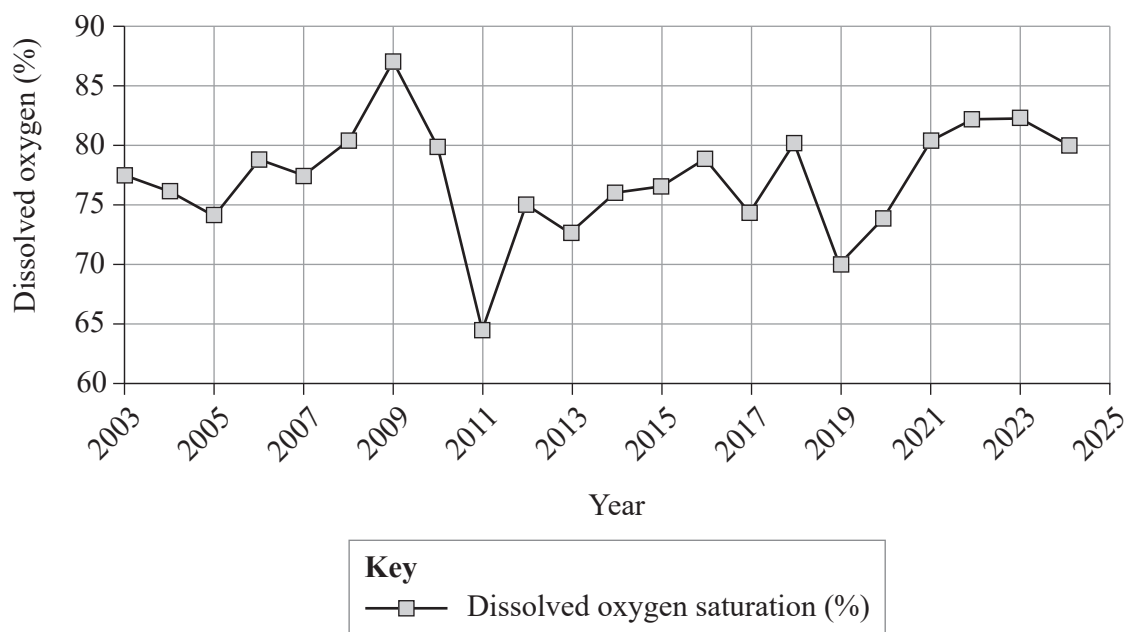
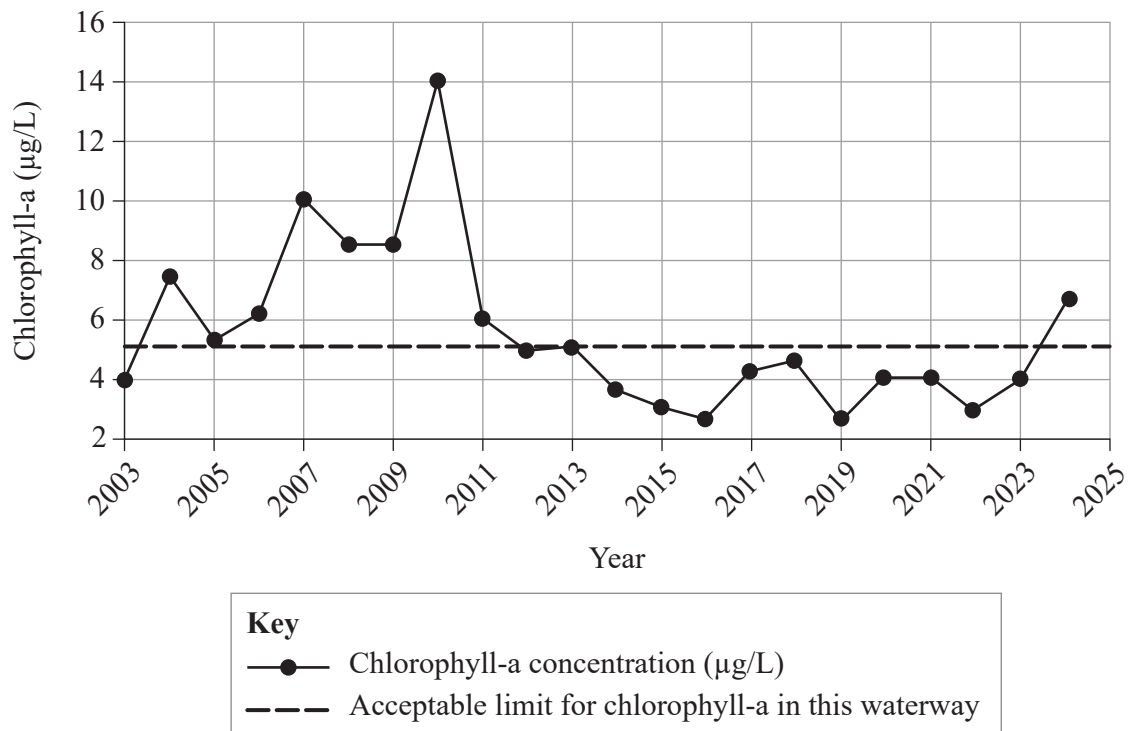
Key

— Data obtained from ice cores

- - - Data obtained from direct atmospheric measurements at Mauna Loa, Hawaii

Stimulus 2

The graphs show algal biomass (measured by the concentration of chlorophyll-a) and dissolved oxygen (% saturation) in a waterway between 2003 and 2024.



Stimulus 3

The table shows the impact of significant earthquakes in four different regions.

Region	Earthquake magnitude	Cost (US\$B)	Number of fatalities	Population (millions)	Population density (people/km ²)	Mortality rate (%)	Cost per capita (\$)
A	6.1	21	27	4.4	196	0.00060	4773
B	6.2	52	185	4.7	8.4	0.00400	11 064
C	6.6	43	68	126.2	456.2	0.00005	341
D	7.8	12	8964	28.6	187.6	0.03000	420

Stimulus 4

The tables show information about energy generation in Australia.

Table 1: Sources of electricity generation (MW) in Australia per state point-in-time supply on 30 January 2025

Region	Black coal	Brown coal	Gas	Liquid fuel	Hydro	Wind	Large solar	Small solar	Battery storage	Other	Total
Queensland	4802	—	1009	—	152	77	1868	2142	—	12	10 062
New South Wales	6320	—	1132	21	2293	30	292	826	50	—	10 964
Victoria	—	4735	—	—	—	385	99	488	14	—	5721
South Australia	—	—	586	—	—	336	71	624	24	—	1641
Tasmania	—	—	—	—	914	72	—	142	—	—	1128
Western Australia	714	—	868	—	—	187	6	1464	—	9	3248
Total	11 836	4735	3595	21	3359	1087	2336	5686	88	21	32 764

Table 2: Efficiency of energy generation per energy type

Energy type	Efficiency (%)
solar	20
wind	40
hydro	90
gas	55–60
coal	20–40
oil	20–40

Stimulus 5

A national park is home to three populations of an endangered wallaby species.

As part of a conservation plan, one population was surrounded by protective fencing in 2012.

A housing development next to the national park began construction in 2016.

The state's environment department conducts an annual census to monitor the abundance of wallabies in the national park.

Figure 1: Map of national park showing wallaby population distribution

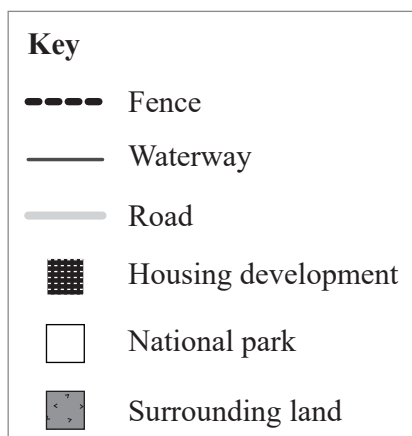
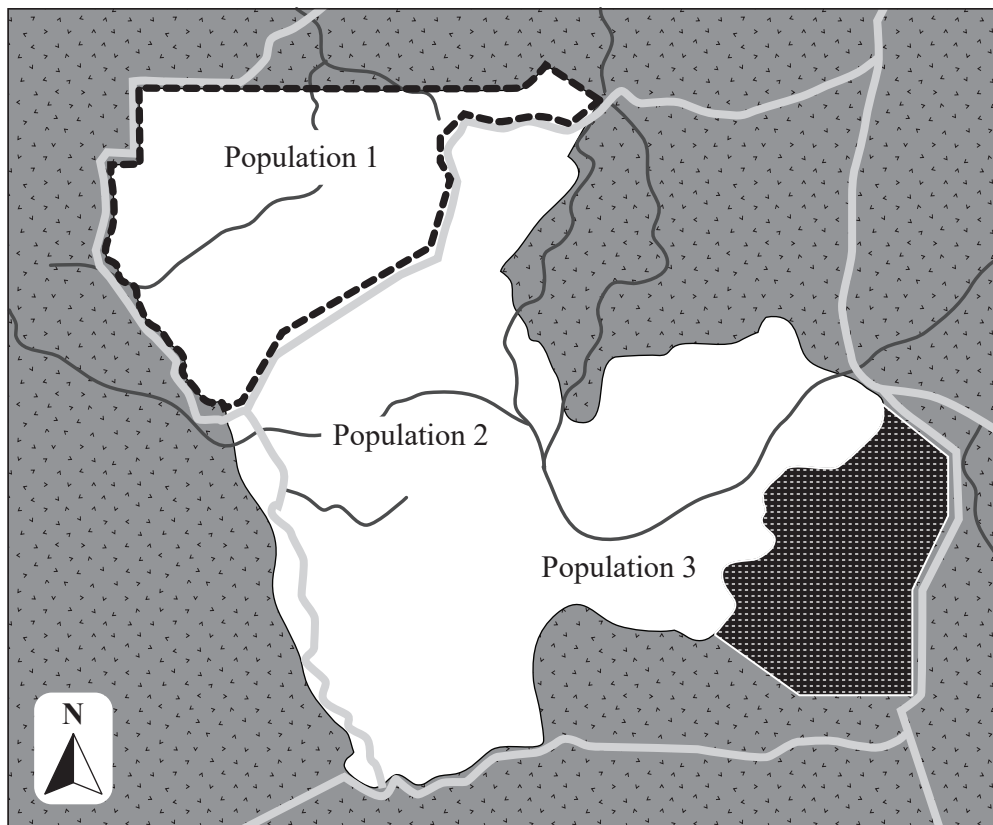
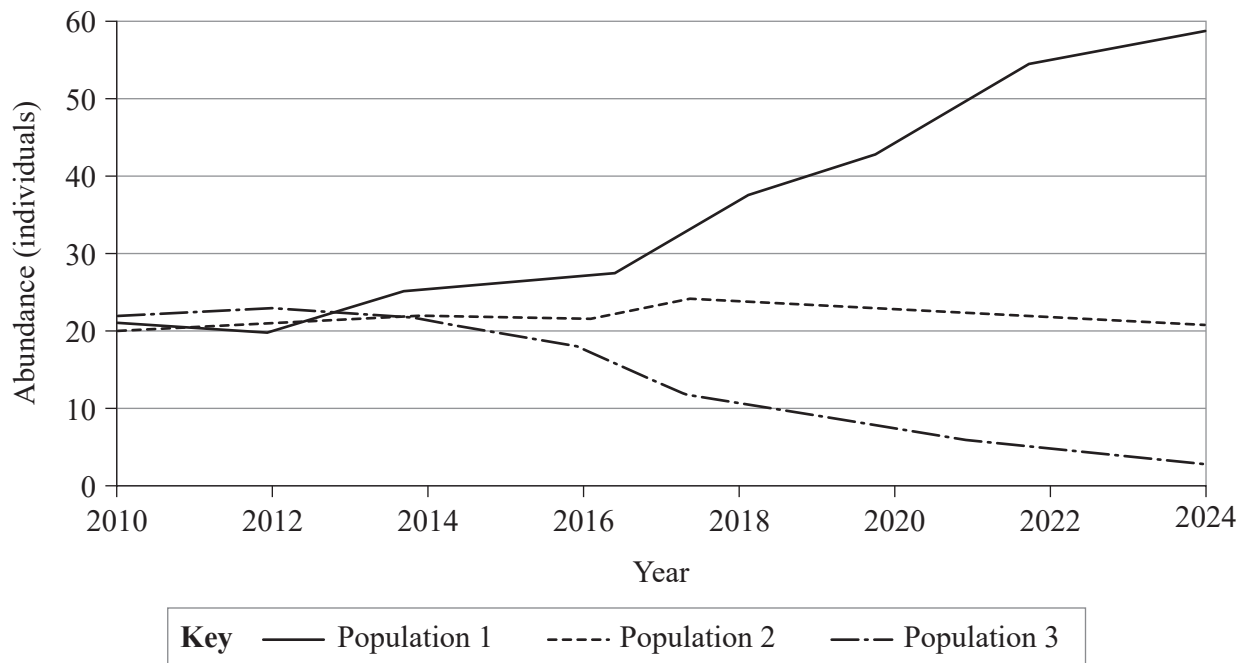


Figure 2: Wallaby abundance in the national park



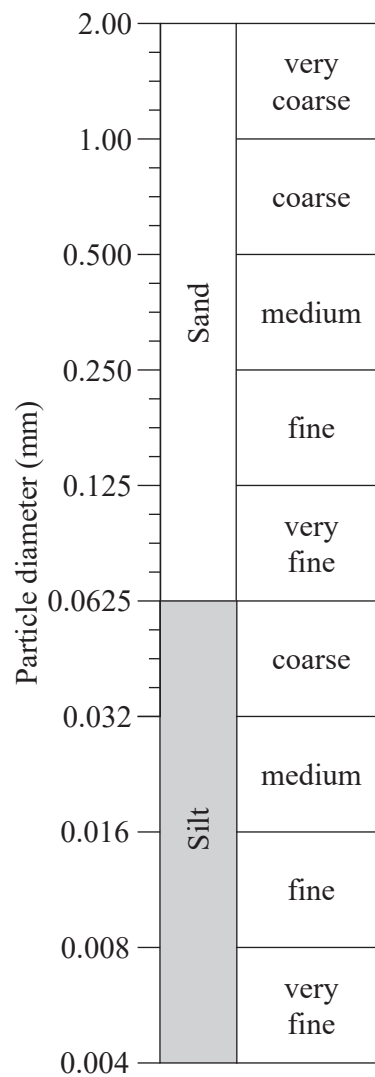
Stimulus 6

Information about sediment size and management at a mine site is shown.

Table 1: Particle size of four sediment samples from mine site

Sample	1	2	3	4
Size of particles (μm)	178	191	172	175

Figure 1: Sediment classification by particle size



Note: 1 mm = 1000 μm

Figure 2: Sediment settling rates in a settling pond

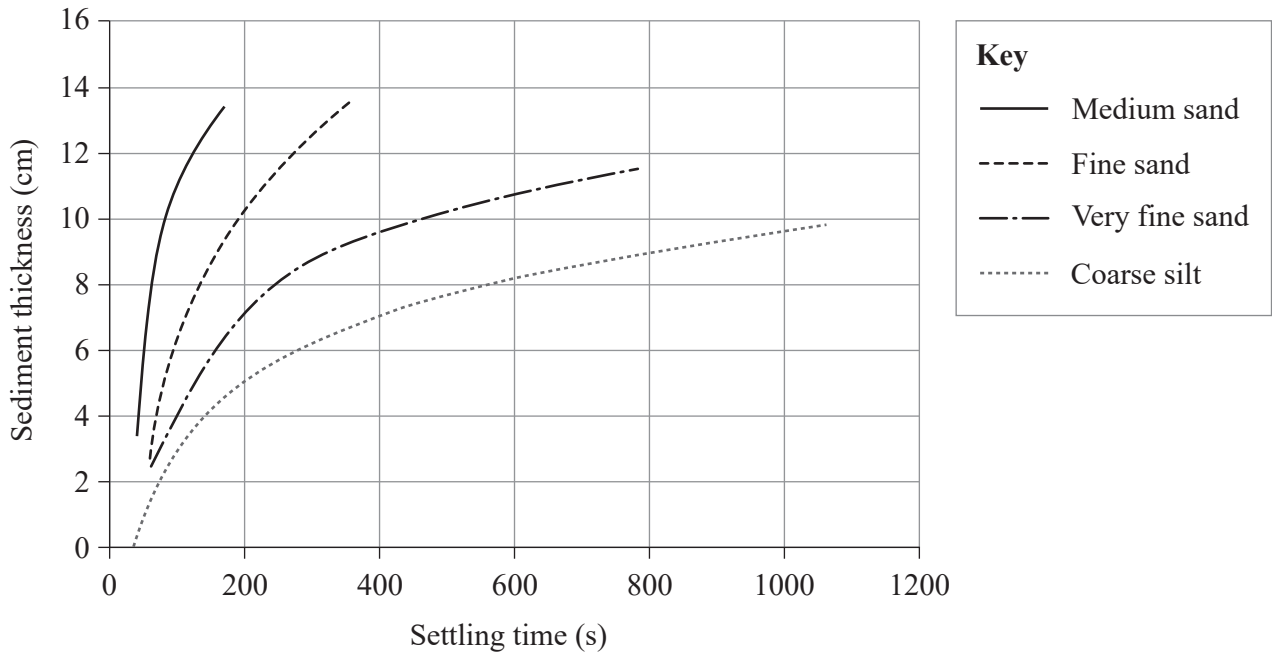


Table 2: Summary of three sediment processing techniques

Technique	Process	Particle size affected	Duration
baffle	introducing obstructions to slow fluid flow through the settling pond	all	24 to 48 hours
coagulation	introducing chemicals to neutralise the charge on particles and increase particle size	> 120 μm	1 to 3 minutes
flocculation	agitating the fluid to increase collision of particles so they stick together, which increases particle size	< 20 μm	20 minutes to 2 hours

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References

Stimulus 1

Adapted from *Femke Nijse Carbon Dioxide 800kyr* (2018). https://en.wikipedia.org/wiki/File:Carbon_Dioxide_800kyr.svg CC BY-SA 3.0

Stimulus 2

Data based on Healthy Land & Water (2026). Report Card generator Hlw.org.au. <https://reportcard.hlw.org.au/graphs-by-catchment>

Stimulus 4

Data sourced from *Live Supply & Demand Widget*, NEM-Watch <https://www.nem-watch.info/widgets/reneweconomy/>

Data and information provided in this paper may have been developed or adjusted for exam purposes and should not be taken as factual.



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