

External assessment

Stimulus book

Earth & Environmental Science

Paper 1

General instruction

- Work in this book will not be marked.

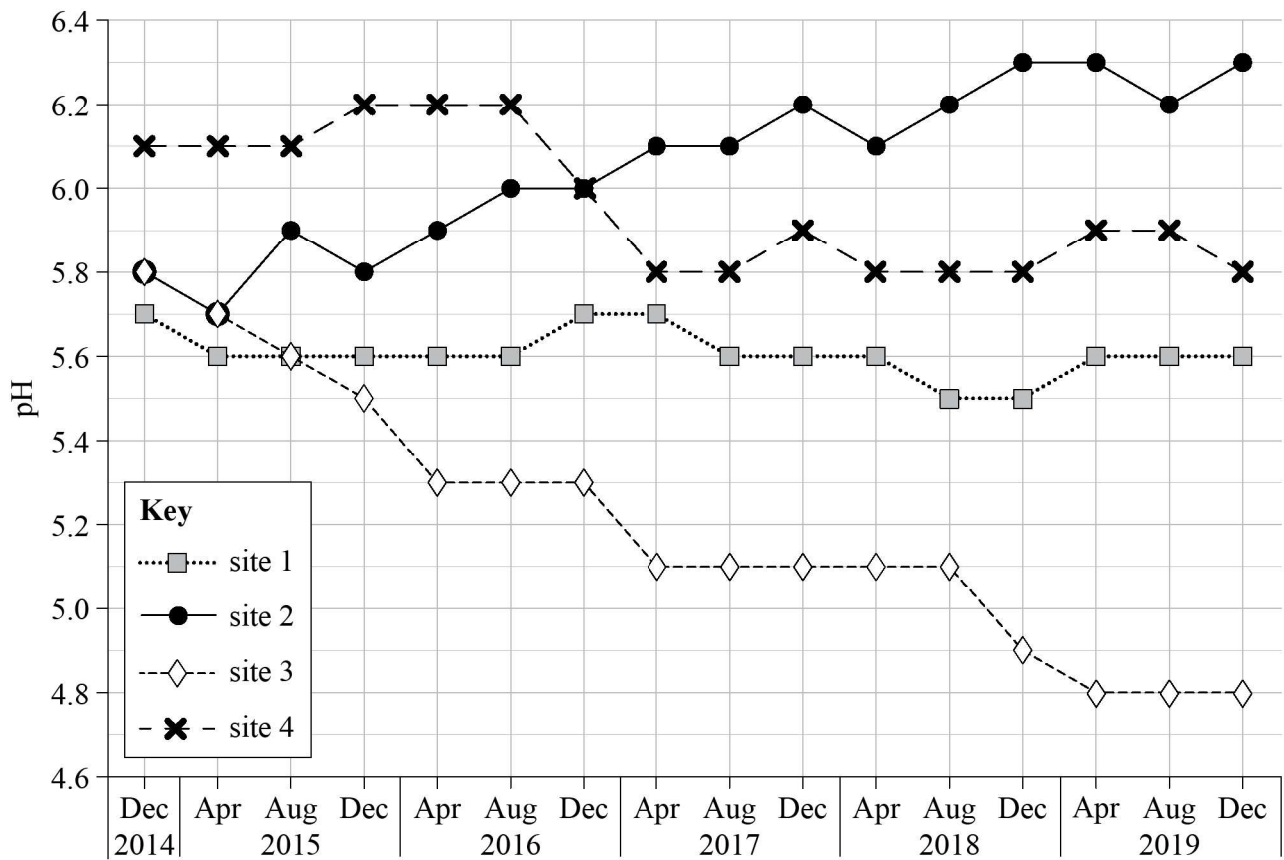
Stimulus 1

This table identifies the gradient slope of the land, the depth to the water table and vegetation type for four separate locations. Weather forecasts predict that each of these locations is expecting a significant rainfall event of over 100 mm of rain in the coming week.

Location	Slope (%)	Depth to the water table (m)	Vegetation type
A	0.5	1.6	grassland
B	2.0	0.2	urban
C	0.3	0.3	forest
D	0.2	0.3	grassland

Stimulus 2

This graph shows changes in soil pH at four different monitoring sites across a mining lease.



Stimulus 3

This table shows recorded measurements for the distribution of woodland species at a monitoring site as part of the mine's environmental plan.

Year	Month	Distribution (%)				
		Grass species 1	Grass species 2	Grass species 3	Woody weed species	Annual weed species
2014	December	15	21	6	5	8
2015	April	16	22	5	5	8
	August	14	18	5	5	11
	December	15	21	6	6	8
2016	April	17	20	7	7	10
	August	12	16	7	7	11
	December	14	18	8	8	10
2017	April	13	19	9	9	10
	August	11	15	9	9	12
	December	12	16	10	10	11
2018	April	13	16	11	11	13
	August	9	12	10	11	14
	December	12	14	13	12	12
2019	April	12	13	14	13	13
	August	8	12	13	13	15
	December	11	13	15	14	14

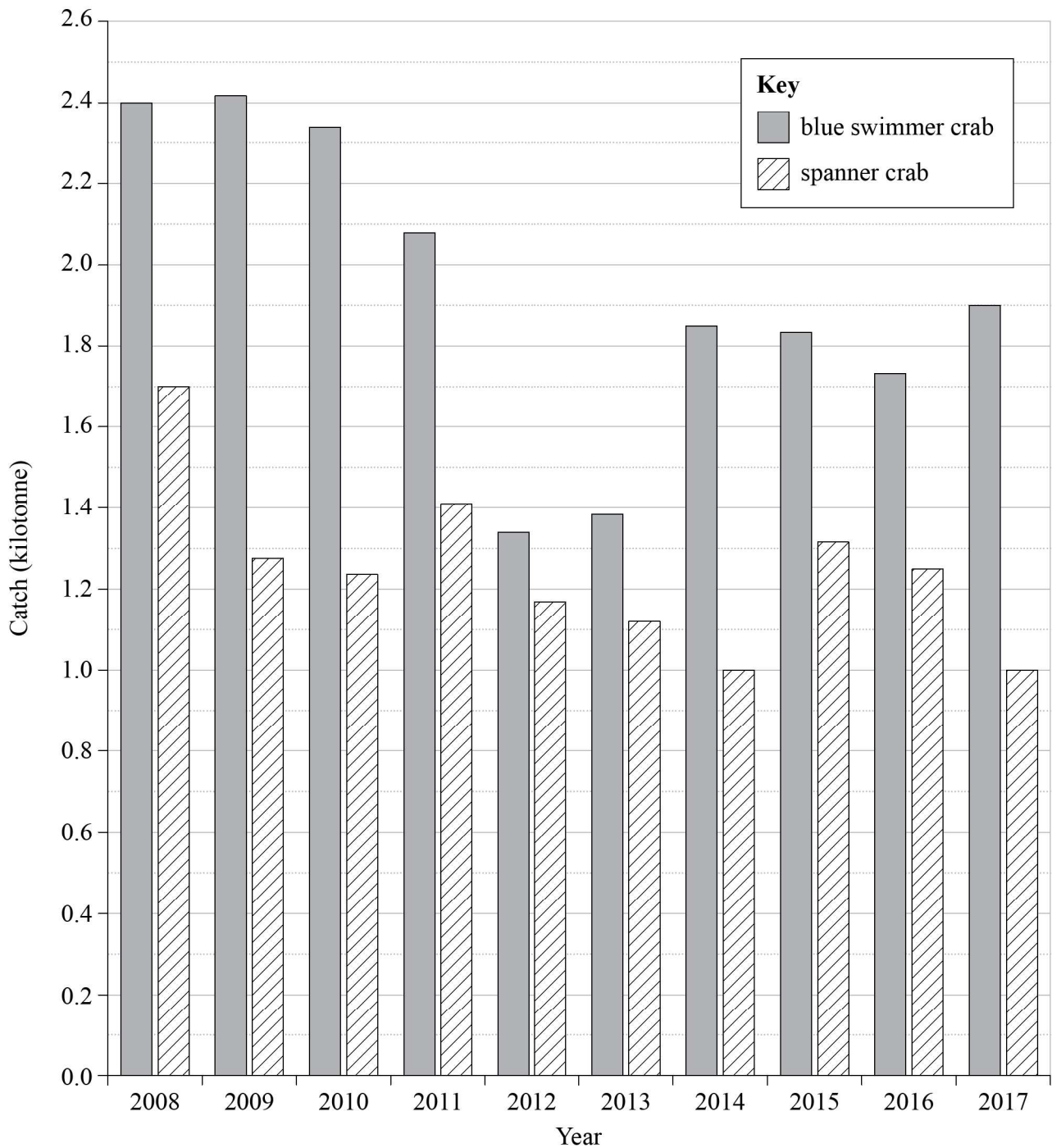
Stimulus 4

This table compares a hydroponic system of lettuce production to a conventional agricultural method based on annual yield per unit area, and water and energy requirements.

Production method	Yield (kg/m ²)	Water use (L/kg)	Energy use (kJ/kg)
Conventional	4	250	1100
Hydroponic	41	20	90 000

Stimulus 5

This graph shows the commercial catch of blue swimmer crabs and spanner crabs from the beginning of 2008 to the end of 2017.



Stimulus 6

This table shows information about the reproductive processes of blue swimmer crabs and spanner crabs.

Species	Female egg production per season	Time for the body to grow to harvesting size (years)	Time to sexual maturity (years)
blue swimmer crabs	2 000 000	3–4	0.5–1
spanner crabs	240 000	10–15	2–3

Stimulus 7

This table shows common fishing management methods for blue swimmer crabs and spanner crabs.

	Charter		Commercial		Recreational	
	Blue swimmer crab	Spanner crab	Blue swimmer crab	Spanner crab	Blue swimmer crab	Spanner crab
Gear restrictions ¹	✓	✓	✓	✓	✓	✓
Protection of female crabs	✓	✓	✓	✓	✓	✓
Size limit ²	✓	✓	✓	✓	✓	✓
Spatial closures ³	✓	✓	✓	✓	✓	✓
Bag ⁴ and possession limits ⁵		✓				✓
Temporal closures ⁶		✓				✓
Vessel restrictions			✓	✓		
Limited entry			✓	✓		
Total allowable catch				✓		
Catch limit			✓			
Daily catch limit				✓		

- 1 Only certain fishing equipment is allowed for catching an identified marine species.
- 2 Some fish have a maximum and minimum size limit.
- 3 All forms of fishing in a specified area are prohibited.
- 4 This is the maximum number of fish allowed per person per day.
- 5 This is the maximum number of fish that a person can have in their possession at any one time.
- 6 All forms of fishing in a specified area are prohibited for certain times of the year or season.

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References

Stimulus 4

Derived (minor data change) from Barbosa, G L, Gadelha, F D A, Kublik, N, Proctor, A, Reichelm, L, Weissinger, E, Wohlleb, G M & Halden, R U 2015, 'Comparison of land, water, and energy requirements of lettuce grown using hydroponic vs. conventional agricultural methods', *International Journal of Environmental Research and Public Health*, vol. 12, pp. 6879–6891, <https://doi.org/10.3390/ijerph120606879>. Used under Creative Commons Attribution licence (<http://creativecommons.org/licenses/by/4.0/>)

Stimulus 5, 6 & 7

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Johnson, D, Chandrapavan, A, Garland, A, Beckmann, C & Johnson, D 2018, 'Commercial catch of blue swimmer crab' in *Blue Swimmer Crab 2018*, www.fish.gov.au/report/179-Blue-Swimmer-Crab-2018.

McGilvray, J & Johnson, D 2018, 'Commercial catch of spanner crab' in *Spanner Crab 2018*, www.fish.gov.au/report/178-Spanner-Crab-2018.



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