Marine Science 2019 v1.1

IA1 sample assessment instrument

April 2018

Data test (10%)

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

2. apply understanding of the reef and beyond or changes on the reef to given algebraic, visual or graphical representations of scientific relationships and data to determine unknown scientific quantities
3. analyse evidence about the reef and beyond or changes on the reef to identify trends, patterns, relationships, limitations or uncertainty in datasets
4. interpret evidence about the reef and beyond or changes on the reef to draw conclusions based on analysis of datasets.

Note: Objectives 1, 5, 6 and 7 are not assessed in this instrument.

CORALWATCH

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Subject	Marine Science	**Instrument no.**	IA1
Technique	Data test DRAFT		
Unit	Unit 3: Marine systems — connections and change		
Topic	Not Specific - DRAFT		

Conditions			
Response type	Short response Supervised exam conditions		
Time	60 minutes	**Perusal**	10 minutes
Other	• Length: up to 500 words in total, consisting of – short responses, i.e. sentence or short paragraphs – written paragraphs, 50–250 words per item – other types of item responses, e.g. interpreting and calculating, should allow students to complete the response in the set time • Queensland-approved graphics calculator permitted • Unseen stimulus		

Instructions

Use the datasets to respond to the associated items in the spaces provided. Each item is associated with the dataset that immediately precedes it.

Criterion	Marks allocated	Result
Data test Assessment objectives 2, 3, 4	10	
Total	**10**	

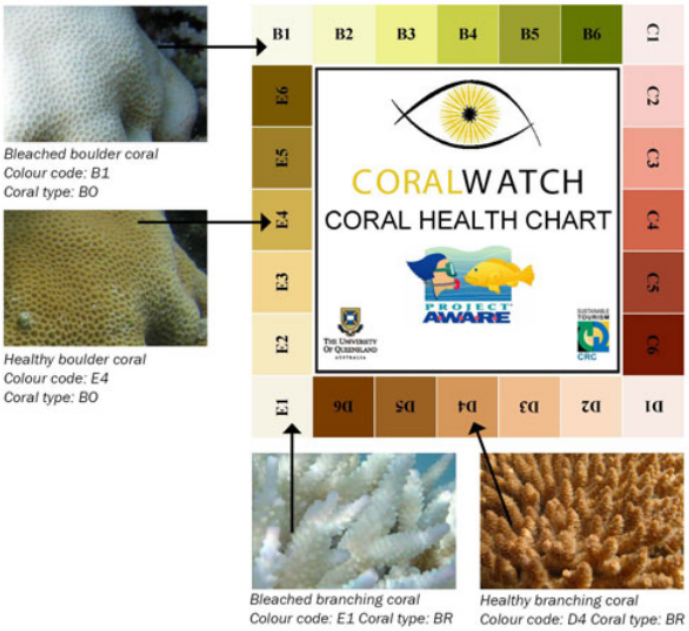
Data test summary

Dataset	Item	Objective			
		Apply understanding	Analyse evidence	Interpret evidence	
1	1	2			
	2		2		
	3			2	
2	4		2		
	5			2	
	6			2	
	7	2			
3	8	2			
	9		2		
	10			2	
Total		**6**	**6**	**8**	**20**
Percentage		**30%**	**30%**	**40%**	**100%**

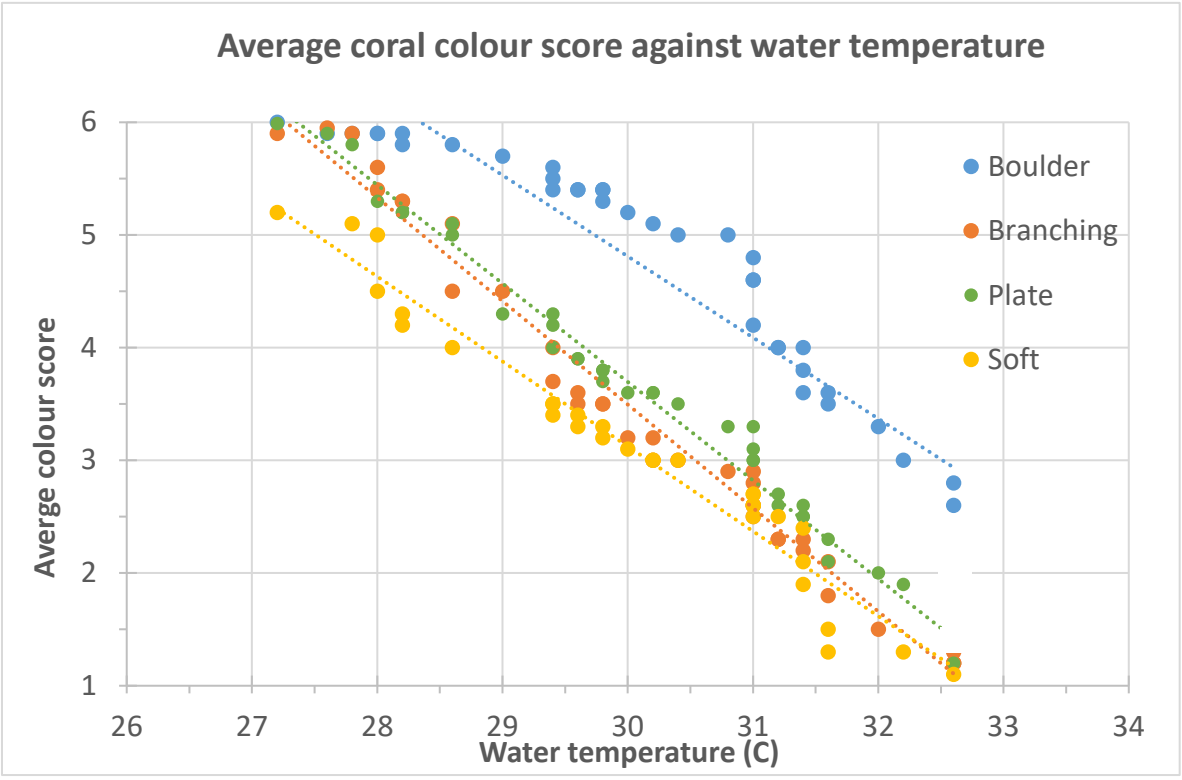
Figure 1

Coral Health Chart

Students used the colour chart in Figure 1 to record the health of different types of corals. On a scale of 1 (bleached) to 6 (healthy) the average coral colour score is plotted against temperature in Graph1.



Graph 1



Source: https://www.coralwatch.org/web/guest;jsessionid=BE64714E7EAA93A2FA3ECB9845DAE5BD

Item 1 (apply understanding) **2 marks**

Determine the:

a. average colour score of a plate coral at 28.5 degrees Celsius (to 1 decimal place).

Answer:
(1 decimal place)

b. temperature at which soft coral has an average colour score of 2 (to 1 decimal place).

Answer:
(1 decimal place) ^{0}C

Item 2 (analyse evidence) **2 marks**

Identify the relationship between coral colour score and temperature:

Item 3 (interpret evidence) **2 marks**

Predict the relative bleaching of plate coral and boulder coral at 33.5 degrees Celsius. Give reasons for your prediction.

Dataset 2

Acropora Sp.

The growth rate of 3 different species of *Acropora* coral was measured in centimetres per year at two reef locations. Reef A was 50 metres from a dredged channel, reef B was 5 km from a dredged channel.

The growth rates measured are presented in the table below along with the calculated P – Values for the data sets for each coral species.

Acropora Sp.	Reef A Growth (cm per year)	Reef B Growth (cm per year)	P- Value
1	10	15	0.1
2	12	16	0.01
3	8	10	0.001

Source: University of Queensland

Item 4 (apply understanding) **2 marks**

Determine which *Acropora Sp.* shows the least difference in growth rate between reef A and reef B. Give reasons for your answer

Species Number _____

Calculate the difference in the average annual growth rate for all corals on Reef A and Reef B. Show your working.

Answer:
cm/year

Item 5 (analyse evidence) **2 marks**

Contrast the growth rate of the three *Acropora* species at Reef A and Reef B.

Item 6 (interpret evidence) **2 marks**

Infer from the table above what affect dredging has on species 1 and species 3. Give reasons for your answer.

Species 1.

Species 3.

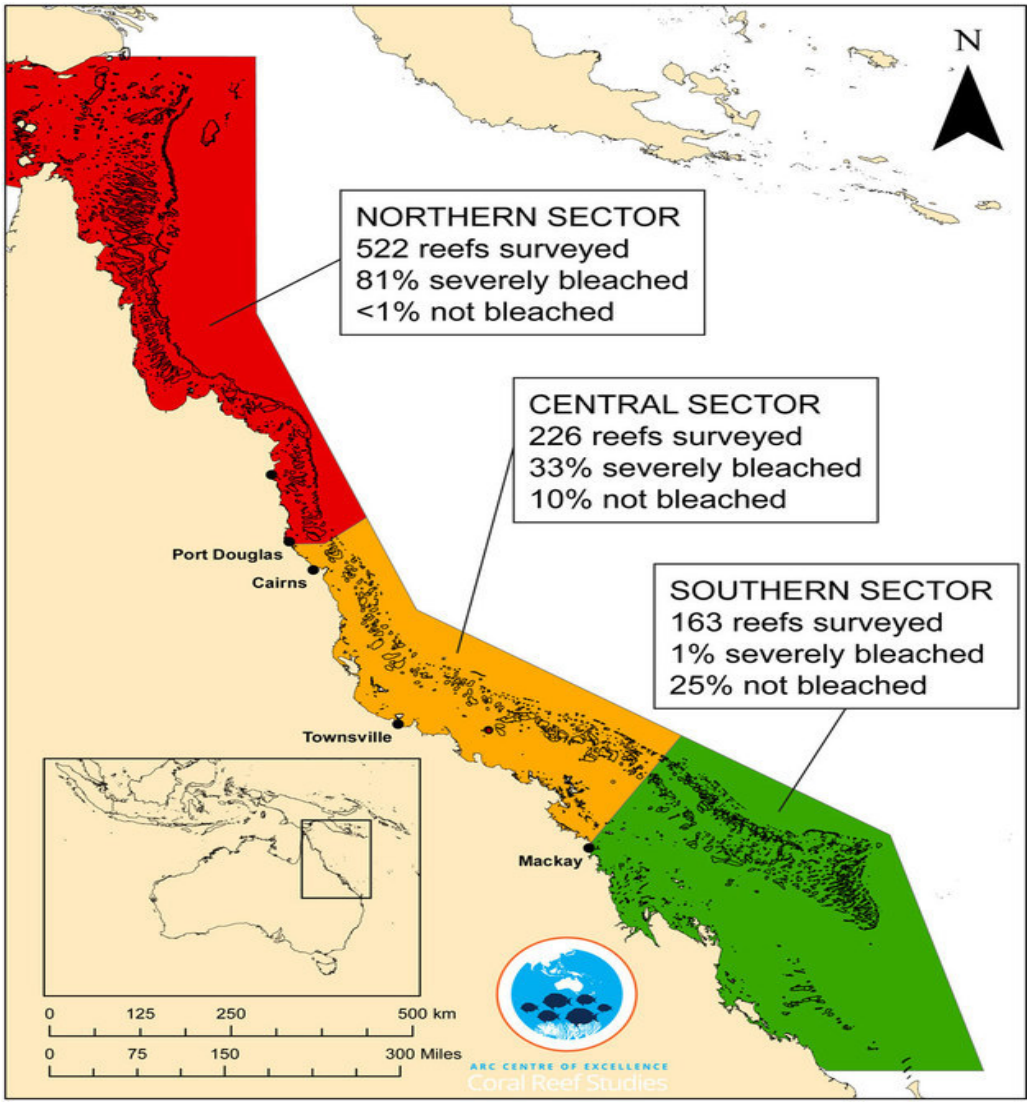
Item 7 (interpret evidence) **2 marks**

Draw a conclusion about what the different p-values show with regard to the effects of dredging on Species 2 and Species 3. Give reasons for your conclusion.

Dataset 3

Figure 2.

Map of the Great Barrier Reef showing results of aerial surveys on reefs affected by the 2016 coral bleaching event- JCU



Item 8 (apply understanding) **2 marks**

Calculate the following:

a. The % of all surveyed reefs that were severely bleached. Show your working.

Answer:
_____%

b. The number of reefs not bleached in the Southern and Central Sectors.

Answer:

Item 9 (analyse evidence) **2 marks**

Contrast the % of reefs severely bleached and not bleached across the 3 sectors.

Answer:
%_____

ITEM 10 (interpret evidence) **2 marks**

Draw a conclusion about why the levels of severely bleached corals differ across the three survey regions. Give reasons for your conclusion**.**

_____

_____

_____

_____

_____

_____

END OF PAPER

Instrument-specific marking guide (ISMG)

Criterion: Data test

Assessment objectives

2. apply understanding of the reef and beyond or changes on the reef to given algebraic, visual or graphical representations of scientific relationships and data to determine unknown scientific quantities
3. analyse evidence about the reef and beyond or changes on the reef to identify trends, patterns, relationships, limitations or uncertainty in datasets
4. interpret evidence about the reef and beyond or changes on the reef to draw conclusions based on analysis of datasets

The student work has the following characteristics:	Cut-off	Marks
• consistent demonstration, across a range of scenarios about the reef and beyond or changes on the reef, of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct and appropriate use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions.	> 90%	10
	> 80%	9
• consistent demonstration, in scenarios about the reef and beyond or changes on the reef, of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions.	> 70%	8
	> 60%	7
• adequate demonstration, in the reef and beyond or changes on the reef, of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications – correct calculation of quantities through the use of algebraic, visual and graphical representations of scientific relationships and data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations and uncertainty – correct interpretation of evidence to draw valid conclusions.	> 50%	6
	> 40%	5
• demonstration, in scenarios about the reef and beyond or changes on the reef, of elements of – selection and correct application of scientific concepts, theories, models and systems to predict outcomes, behaviours and implications	> 30%	4

– correct calculation of quantities through the use of algebraic, visual or graphical representations of scientific relationships or data – correct use of analytical techniques to correctly identify trends, patterns, relationships, limitations or uncertainty – correct interpretation of evidence to draw valid conclusions.	> 20%	3
The student work has the following characteristics:	**Cut-off**	**Marks**
• demonstration, in scenarios about the reef and beyond or changes on the reef, of elements of – application of scientific concepts, theories, models or systems to predict outcomes, behaviours or implications – calculation of quantities through the use of algebraic or graphical representations of scientific relationships and data – use of analytical techniques to identify trends, patterns, relationships, limitations or uncertainty – interpretation of evidence to draw conclusions.	> 10%	2
	> 1%	1
• does not satisfy any of the descriptors above.	≤ 1%	0