



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MARINE SCIENCES P2

NOVEMBER 2021

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 pages.

PRINCIPLES RELATED TO MARKING MARINE SCIENCES

1. **If more information is given than marks allocated**
Stop marking when the maximum number of marks is reached and draw a wavy line and write 'max' in the right-hand margin.
2. **If, for example, three reasons are required and five are given**
Mark the first three reasons irrespective of whether these first three are correct or not.
3. **If a whole process is given when only a part of the process is required**
Read the whole process given and credit the relevant part.
4. **If comparisons are asked for, but descriptions are given**
Accept the description if the differences or similarities are clearly stated.
5. **If diagrams are given with annotations when descriptions are required**
Mark the description.
6. **If flow charts are given instead of descriptions**
Mark the description only.
7. **If a described sequence is muddled and links do not make sense**
Where sequence and links are correct marks are given. Should a logical sequence resume, marks are given.
8. **Non-recognised abbreviations**
Accept the abbreviation if it is first defined in the answer. If the definition is not defined, do not give credit for the unrecognised abbreviation, but credit the rest of the answer if correct.
9. **Wrong numbering**
If the answer fits into the correct sequence of questions, but the wrong number is given, credit the answer if the answer is in the correct order.
10. **If the language that is used changes the intended meaning**
Do not accept the answer.
11. **Spelling errors**
If a word is recognisable (if read out loud), accept the answer, provided it does not mean something else in Marine Sciences terminology or if it is out of context.
12. **In SECTION A if only the letter is asked for, but the correct option is given (and vice versa)**
Give credit to the answer.

13. **Be sensitive to the sense of an answer, which may be stated in a different way.**
14. **Title**
All illustrations (e.g. diagrams, graphs and tables) must have a title written above or below.
15. **Code-switching of official languages (terms and concepts)**
A term or concept written in any official language other than the learner's assessment language used in their answers should be credited, if it is correct. A marker that is proficient in Marine Science content and the official language used should be consulted. This is applicable to all official languages.
16. **Changes to the marking guidelines**
No changes must be made to the marking guidelines. The provincial internal moderator must be consulted, who in turn will consult with the national internal moderator (and the Umalusi moderators where necessary).
17. **Official marking guidelines**
Only marking guidelines bearing the signatures of the national internal moderator and the Umalusi moderators and distributed by the National Department of Basic Education via the provinces must be used.

SECTION A**QUESTION 1**

1.1	1.1.1	C✓✓		
	1.1.2	D✓✓		
	1.1.3	D✓✓		
	1.1.4	B✓✓		
	1.1.5	C✓✓		
	1.1.6	B✓✓		
	1.1.7	B✓✓		
	1.1.8	D✓✓		
	1.1.9	A✓✓	(9 x 2)	(18)
1.2	1.2.1	Ossicles✓		
	1.2.2	Deuterostomes✓		
	1.2.3	Cloaca✓		
	1.2.4	Countershading✓		
	1.2.5	Myoglobin✓		
	1.2.6	Plastron✓		
	1.2.7	Bioluminescence✓		
	1.2.8	Otoliths✓	(8 x 1)	(8)
1.3	1.3.1	B only✓✓		
	1.3.2	Both A and B ✓✓		
	1.3.3	None ✓✓		
	1.3.4	None✓✓		
	1.3.5	A only✓✓	(5 x 2)	(10)
	1.4.1	(a) Quill ✓feather		(1)
		(b) To create light/strong/broad surface for flying✓ To provide lift✓ MARK FIRST ONE		(1)
	1.4.2	(a) Contour OR Down feather✓		
		(b) Contour streamlines body shape/ insulates ✓ Down feather insulates ✓		(2)
				(4)
			TOTAL SECTION A:	40

SECTION B

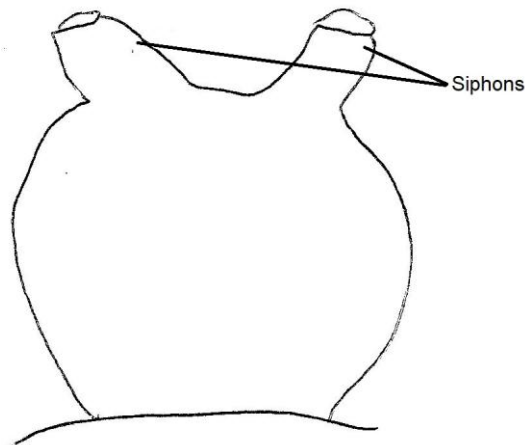
QUESTION 2

- 2.1 A Sea cucumber✓ Holothuroidea✓ (2)
 - B Sea urchin✓ Echinoidea✓ (2)
 - C Feather star✓ Crinoidea✓ (2)
- (6)**

- 2.2 2.2.1 A✓ (1)
 - 2.2.2 Sensitive to chemicals/ sense of smell ✓ To detect food✓ (2)
 - 2.2.3 Gill pores✓ (1)
 - 2.2.4 (a) Slime gland pores/openings ✓ (1)
 - (b) Large amount of slime/mucus✓* is produced when the hagfish is threatened.
The slime is unpleasant/ unpalatable/causes discomfort ✓ to the predator
and can clog its gills✓ (if it's a fish). (2)
 - (1* and 1 max for how it protects)
 - 2.2.5
 - It has two rows of teeth/ring of teeth ✓
 - These can attach/fasten firmly to the flesh ✓ of the dead animal it is feeding on.
 - It then twists or knots its body to tear away ✓ the flesh and swallow it. (3)
- (10)**

- 2.3 2.3.1 Chordata✓ (1)

2.3.2

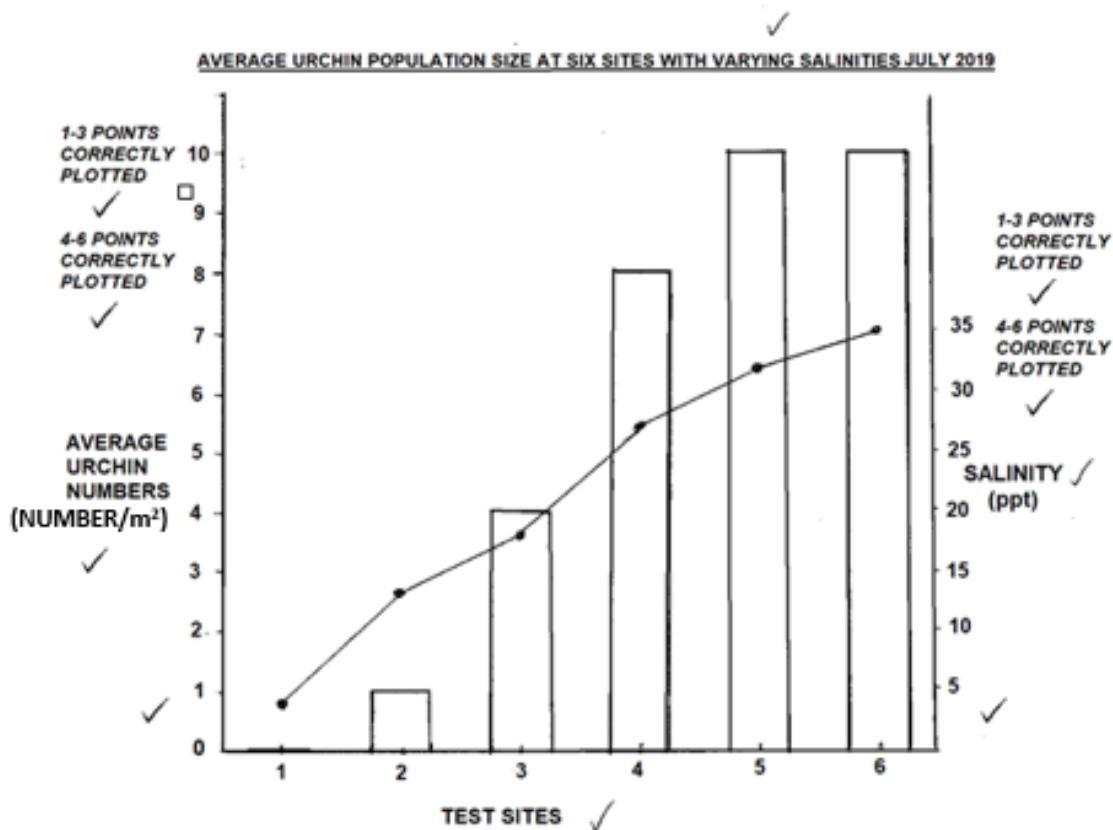


One mark for drawing ✓
One mark for label✓ (2)

2.3.3 A dorsal nerve cord ✓ associated with a notochord/ a rod of connective tissue ✓ (mark first 2 only) (2)

The larvae of sea squirts feature these characteristics (1) (6)

2.4 2.4.1 (10)



MARKING GUIDELINES	
CRITERIA	MARK ALLOCATED
Title (C) (need to include both variables)	1
Label (variable) for X-axis (XL)	1
Labels (variables) and units for Y-axes (YL)	2
Scale for X-axis	N/A
Scales of Y-axes (YS)	2
Plotting (P):	
0 points/ bars correct (for line and for bars)	
Points:	
1-3 points correct	0
4-6 points correct	1
Bars:	
1-3 bars correct	2
4-6 bars correct	
TOTAL MARKS	10

- 2.4.2 - The salinity increases from the river mouth ✓, to being normal sea water around the point at site 6.
 - As salinity increases, number of urchins increased (relationship) ✓
 - Indicates understanding that freshwater causes mortality ✓
 - Urchin mortalities are highest in the lower salinities ✓
 - and are unaffected from 32ppm ✓
 (credit any other logical observations). **(any 3)** (3)
- 2.4.3 - They have no specific structures for osmoregulation ✓
 - and have to keep their cell contents isotonic/(same as) with normal sea water ✓
 - Any change in the concentration of water around them causes osmosis into or out of the cells/ causes water movement imbalance ✓
 - They can only control that in a fairly narrow concentration margin/ narrow tolerance ✓. (3)
- 2.4.4 - Some will have a better ability ✓
 - to cope with water entering their cells than others ✓ OR
 - Genetic variability ✓
 - makes some better adapted/ better able to survive ✓. (2)
(18)
[40]

QUESTION 3

- 3.1 3.1.1 - They are sensitive to chemicals/ touch (OR) to enable the shark to find food ✓.
 - The extract says they are nocturnal (OR) so may not be able to see their food/ to find their food ✓ (2)
- 3.1.2 - They have a cartilage back bone/ vertebral column ✓
 - which is very flexible/ can bend (**marks are linked**) ✓ (2)
- 3.1.3 (a) Their pupils can change size/ constrict OR pupillary mechanism ✓
 so their eyes function well in any light intensity ✓ (2)
- (b) The pupil of a bony fish cannot change its size ✓ (1)
- 3.1.4 (a) Bony fish have a breeding season ✓ OR
 Catsharks do not have a breeding season ✓
 Bony fish do not mate/have internal fertilisation ✓ OR
 Catsharks mate/internal fertilisation ✓
 Bony fish spawn/lay a lot more than 2 eggs ✓ OR
 Catsharks do not spawn/do not lay a lot of eggs ✓ (1)

NSC – Marking Guidelines

- (a) Ovoviviparous ✓ get nutrition from egg ✓ until they hatch.
Some sharks are viviparous ✓, nurturing the embryos via a placenta ✓
Oophagy ✓ intrauterine cannibalism ✓ (4)
- 3.1.5 a.) It preys on many other animals but has few, if any, predators OR It is at the top of the food chain ✓. (1)
- b.) The Great white shark is considered by most people to be the ultimate apex predator. Something which preys on it must be quite significant. Reasoning critical (or similar reasoning) ✓ (1)
(14)
- 3.2 3.2.1 This is known as counter current heat exchange network / rete mirabile ✓ (1)
- 3.2.2 - Capillaries carrying **warm blood from the core** muscles ✓
- are **closely associated** ✓
- with capillaries carrying **cold blood from the gills** ✓
- and sets up a temperature gradient ✓
- The close association and **opposite direction** of blood flow enables **most of the heat to be transferred/conserved/maintained** to the incoming blood ✓ (3)
(or similar reasoning) max **(4)**
- 3.3 3.3.1 A ✓ (1)
- 3.3.2. A- Broad and serrated ✓ for cutting/ slicing ✓
B- Thin and curved/ hook-like ✓ for grabbing /holding (2x2) (4)
(5)
- 3.4 3.4.1(a) Providing (the foetus) with nutrition/ Acts as a source of food ✓ (1)
- 3.4.1(b.) Oviparous ✓ (1)
- 3.4.2 - Where the blood moves from the heart to the gills ✓ and then body ✓
- in one circuit/ no separate pulmonary and systemic circuit ✓
- driven by two-chambered heart ✓ **(any 3)** (3)
(5)
- 3.5 3.5.1 A lowering ✓ of **blood pressure OR heart rate** ✓ (2)
- 3.5.2 Either of those results will calm the person down ✓ (1)
- 3.5.3 - lungs collapse ✓
- heart rate decreases ✓
- blood is diverted to essential organs/ diverted from non-essential organs ✓
- metabolism slows down ✓
- muscles and vital organs can function with less oxygen/ even anaerobically ✓. **(mark first 3 only)** (3)

NSC – Marking Guidelines

- 3.5.4
- Turtles are ectothermic ✓
 - which means that they have a lower metabolic rate/ use less energy for thermoregulation ✓
 - and thus have more oxygen/ energy available for the diving process ✓.
- (3)
- 3.5.5
- Birds and mammals can survive in very cold conditions ✓
 - because they are endothermic ✓
 - meaning they are adapted to generate and insulate their body heat ✓
- (3)
(12)
[40]

TOTAL SECTION B: 80

SECTION C

When marking essays, be aware of maximum marks per subsection (indicate with the designated letter to keep track) and compulsory marks per section (indicate with C). The breakdown of the synthesis marks is indicated for each question. Credit valid points content points which may come from external reading, but keep to maximum allocations per subsection.

ASSESSING THE PRESENTATION OF THE ESSAY

USE OF PARAGRAPHS (PAR)	INTRODUCTORY PARAGRAPH (INTR)	RELEVANCE (REL)	LOGICAL SEQUENCE (L.SEQ)	CONCLUDING PARAGRAPH (CONC)
Separating the information into logical subsets.	Original and logical statement of intent. Not a repetition of the question.	All information provided is relevant to the question.	Ideas arranged in a logical/ cause-effect sequence.	Logical and succinct summing up of the body. Not a repetition of the question.
1 mark	1 mark	1 mark	1 mark	1 mark

QUESTION 4

General (Indicate with G) "Bonus mark"

- One mark for stating the general characteristic/s of an ideal gaseous exchange surface ✓

Osteichthyes (Indicate with O)

- Fishes have **gills** as gaseous exchange surfaces. ✓
- They are protected by the **operculum**. ✓
- The posterior edge of the operculum is fleshy and ends with a fine, flexible membrane called the **branchiostegal membrane**. ✓
- Water **enters the mouth**, ✓ flows over the
- **broad** surface provided by the gill **filaments and lamellae**, ✓
- well supplied with **blood** vessels ✓
- and out through the single large gill slits on either side of the head. ✓
- Fishes have a variety of **ventilation mechanisms** OR specialised valves ✓

max:

(6)

Amphibia (Indicate with A)

- Air enters body through mouth and nostrils ✓
- Gaseous exchange surfaces – consisting of **rudimentary** lungs, ✓
- the **mouth** cavity ✓,
- the **skin** ✓
- and **gills** (sometimes) ✓
- The breathing surfaces must be kept **moist** ✓
- and are well supplied with **blood vessels**. ✓
- Ventilation of the lungs is a complicated process ✓

max:

(4)

- This arrangement **restricts** amphibians to damp or humid habitats, ideally close to water * ✓ ***Compulsory:** (1)

Reptiles (*Indicate with R*)

- Air enters body through mouth and nostrils ✓
- They breathe by means of **spongy lungs**. ✓
- The air sacs inside the lung are similar to, but generally larger than, the **alveoli** in the lungs of mammals. ✓
- The inner surfaces of the small sacs in the lungs are thin, moist and well supplied with **blood vessels**. ✓
- Breathing is brought about by the **muscular rib cage** ✓
- which can **expand and contract** the size of the body cavity ✓
- and **protects** the lungs ✓ max: (4)
-
- This gaseous exchange system, eliminates the problem of an exposed surface which needs to be kept moist * ✓ **Compulsory** (1)

Aves/ Birds (*Indicate with B*)

- Air enters body through mouth and nostrils ✓
- Birds have an extremely high **oxygen demand while flying/ endothermic metabolism**. ✓
- They have **lungs** ✓
- with **densely packed tubules** ✓
- leading to separate **air sacs** in the body cavity. ✓
- The tubes are thin walled and supplied with a dense **capillary network**. ✓
- The rib cage is **expanded and contracted** by muscles to enable ventilation ✓
- and protects lungs ✓
- A series of one-way **valves** ensures a single parcel of air flows into air sacs and then forward through the lungs ✓
- In this way, air flows forward through the lung tubules, **both on inhalation and exhalation**, ✓
- thus providing optimal ventilation. ✓ max: (8)
- This gaseous exchange strategy is **much more efficient** than the other land vertebrates * ✓. ***Compulsory** (1)

CONTENT: (25)
SYNTHESIS: (5)
[30]

QUESTION 5**Osteichthyes** (*Indicate with O*)

- Most fishes are **oviparous** ✓
- with **spawning/ a large amount** of small eggs being released ✓
- and fertilised externally ✓.
- The resulting fertilised eggs will sink to the ocean floor or enter the planktonic cycle ✓
- **No** parental care. ✓
- Many fish species are **hermaphroditic/** others undergo a **change in sex** at a certain life stage ✓

max: (4)

Amphibia (*indicate with A*)

- Similar to fish- **spawn** large amounts of eggs ✓,
- normally **in water** ✓
- to avoid the dessication of the eggs. ✓
- **external** fertilisation ✓
- **No** parental care. ✓
- Tadpoles hatch out of the eggs and then undergo a **metamorphosis** ✓ (4)

max:

- *Still **reliant on water** for reproduction, but change into land living adult ✓ (1)
- compulsory***

Reptilia (*indicate with R*)

- Reptiles have **internal fertilisation** ✓
- and lay **amniotic eggs**. ✓
- **on land**. ✓
- These eggs have **embryo enclosed in fluid/** amnion ✓
- and a leathery or calcareous, **water-proof shell** ✓
- Precocial. ✓
- Generally, **no** parental care. ✓

max: (4)

- *This means that the embryo can develop inside the egg, as if it was an embryo or larva developing in the ocean/ reptiles do not need to find water for laying eggs ✓
- compulsory*** (1)

Aves/ Birds (*indicate with B*)

- Have **internal fertilisation** ✓
- and produce only a **few amniotic eggs** ✓
- Hatchlings can be **altricial OR precocial**, depending on the lifestyle of the species (mark altricial or precocial) ✓.
- **Good parental care** ✓

max: (4)

- *Parental care ✓ and smaller amounts of offspring ✓ the only advancement over reptiles. **compulsory*** (1)

Mammalia (*indicate with M*)

- Most mammals are **viviparous** ✓
- **internal fertilisation** required ✓
- the embryo develops in a **uterus** OR is nurtured **via a placenta** ✓
- Offspring may be **altricial** as in seals OR **precocial** as in cetaceans (mark altricial or precocial) ✓
- In all cases, the **few offspring** born ✓
- are fed **milk** ✓
- and **well cared for.** ✓

max: **(5)**

- *Being protected and nourished in uterus ✓ is a major advantage. ✓

compulsory* (1)**CONTENT:** (25)• **SYNTHESIS:** (5)**[30]****TOTAL SECTION C: 30**