



Samoa School Certificate

BIOLOGY

2020

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours & 10 minutes

INSTRUCTIONS

1. You have 10 minutes to read **before** you start the exam.
2. Write your **Student Education Number (SEN)** in the space provided on the top left hand corner of this page.
3. **Answer ALL QUESTIONS.** Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets at the appropriate places in this booklet.

	STRANDS	Page	Time (min)	Weighting
STRAND 1:	VARIETY OF LIFE	2	30	16
STRAND 2:	CELL BIOLOGY	5	10	6
STRAND 3:	GENETICS	6	20	12
STRAND 4:	PLANTS	8	55	30
STRAND 5:	ANIMALS	13	45	24
STRAND 6:	ENVIRONMENT	17	20	12
	TOTAL		180	100

Check that this booklet contains pages 2-19 in the correct order and that none of these pages are blank.

HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION

1. You learnt in class that biology is the study of life and that life is made up of living things which have a number of special features. You were advised to remember the letters MRS C GREN, an acronym useful for remembering important features of living things.

Choose ONE of the letters and identify the life process it represents.

SL 1

2. Living things have been arranged into a classification system to make it easier to identify them. The classification system starts with the separation of all living things into 5 kingdoms.

List these 5 kingdoms.

SL 3

3. Describe TWO important features of members of the class Mammalia of the Phylum Chordata.

SL 2

4. Describe the process of '**extracellular digestion**'.

SL 2

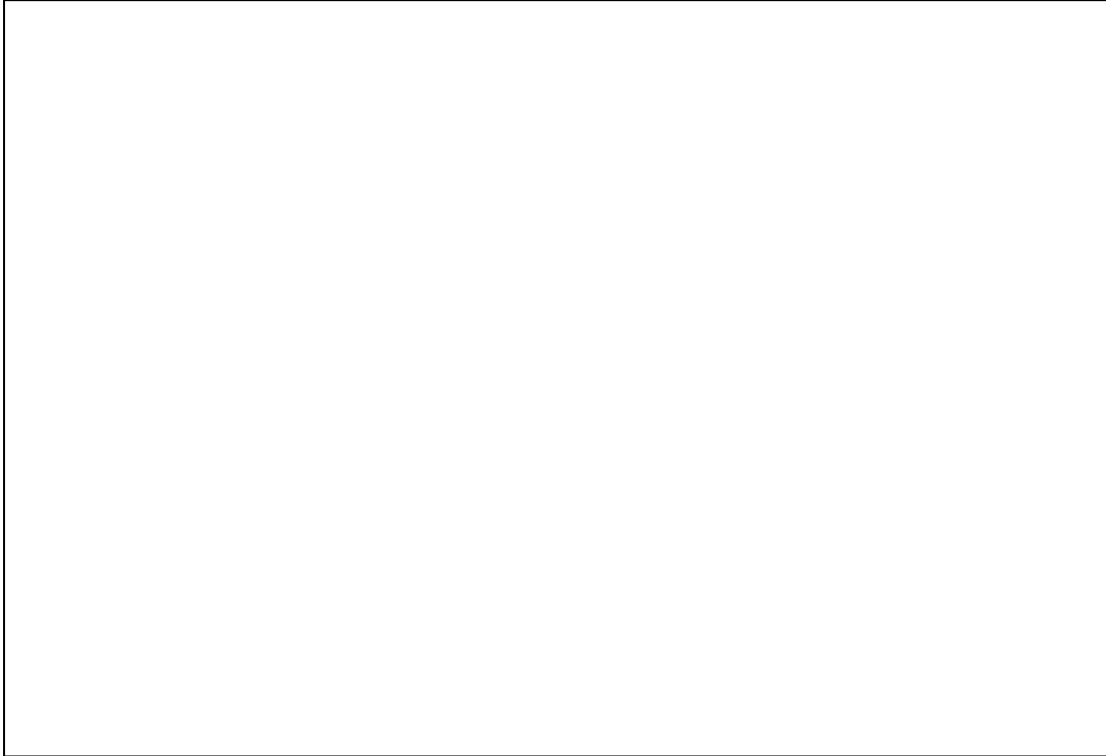
5. State the method used by fungi to reproduce.

SL 1

6. Acute coryza is the medical term for '**cold in the head**', the common cold caused by viruses. Use this example to discuss how a viral infection causes coughing, nose blowing and sneezing.

SL 4

7. One advantage of many bacteria microorganisms is their role as decomposers of dead matter. Construct an appropriate diagram to show how this happens in the nitrogen cycle of a food chain. Make sure your diagram includes examples of a producer, consumer and decomposer.



SL 3

8. Respiration is an important feature of living things. DISCUSS the TWO types of respiration – aerobic and anaerobic. Make sure you include in your answer the following:

- the essential function of respiration in living things;
- the chemical equations of the two processes of aerobic and anaerobic;
- a main difference between aerobic respiration and anaerobic respiration;
- an example of an organism that uses aerobic respiration and one of anaerobic respiration.

SL 4

9. Describe how the structure of a cell membrane allows the movement of molecules into the cell.

SL 2

10. Define mitosis.

SL 1

11. What is the main advantage of meiosis?

SL 1

12. In beans, the two alleles are:

R (round seed dominant)
r (wrinkled seed recessive)

The two parents with genotypes Rr and rr are to be crossed.
 The punnet square below indicates the probable ratio of the round-seed and wrinkled-seed plants that will be produced from the cross.

	r	r
R	Rr	Rr
r	rr	rr

State the probable ratio of the round seed to the wrinkled seed as indicated in the punnet square.

SL 1

13. Describe the process of monohybrid inheritance and give an example.

SL 2

14. Compare continuous and discrete variables. Use examples such as data and tables to help explain your answer.

SL 3

15. Reflect on genetic inheritance by summarizing the processes that connect ALL of the following terms in such a way, that someone not familiar with the topic will get a basic understanding.

traits, genes, alleles, dominant and recessive alleles, genotype, phenotype, homozygous and heterozygous gene pairs

SL 4

16. An important part of the leaf structure is the vascular bundle (also called vein) which consists of xylem vessels and phloem tubes. PICK either the xylem or phloem and state its function.

SL 1

17. Describe TWO functions of roots.

SL 2

18. List the products of photosynthesis.

SL 2

19. Explain why photosynthesis is important to plants and all living things on earth.

SL 3

20. Explain the process of transpiration and state the importance of this process.

SL 3

21. State an advantage of asexual reproduction.

SL 1

22. Define pollination.

SL 1

23. Describe the functions of plant hormones and how they operate.

SL 2

24. Name the plant hormone that causes fruits to ripen.

SL 1

25. Describe TWO methods that some plants use to disperse their seeds.

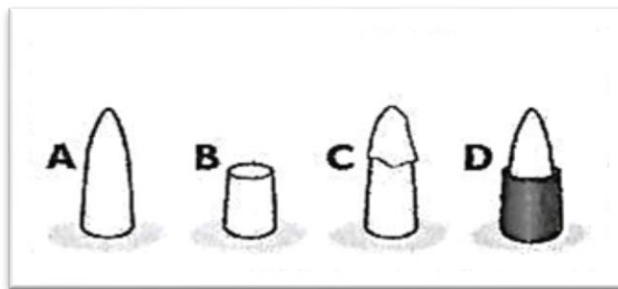
SL 2

26. In an experiment on phototropism to test whether bean plants grow towards the direction of light, some bean seeds were germinated in a container. When the shoots were 1cm above the soil, they were treated as follows:

- A. tip untouched;
- B. tip removed;
- C. foil cap on tip;
- D. lower part of shoot wrapped in foil.

This is illustrated below.

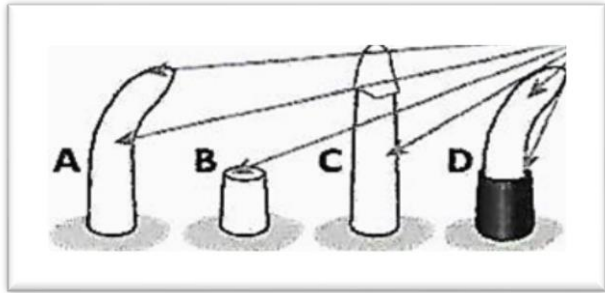
For 3 days, the container of plants will be placed in a black box which will only let in light from one end.



Evaluate and discuss what each shoot (A, B, C and D) is trying to prove/test in the experiment.

SL 4

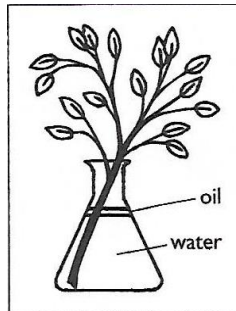
27. After 3 days in a black box which only let in light from the top right hand corner, the seedlings had grown as shown below.



Discuss the results based on the performances of shoot A, B, C and D and make appropriate conclusions.

SL 4

28. A photometer experiment was carried out to measure the transpiration rate of a leafy twig under different environmental conditions. The photometer was placed in different conditions for 30 minutes. In each case it was carefully weighed before and after. An illustration of the photometer is given below. Note that the water in the container cannot evaporate directly to the outside air due to the layer of oil on the water surface; so the weight loss must be from transpiration.



The table below records the results.

Weight of water loss through transpiration under varying environmental conditions		
Condition	Start	Finish
still air/shade/dry air	162g	156
still air/sun/dry air	157	147
wind/shade/dry air	147	138
wind/sun/dry air	139	123
still air/shade/humid	123	119

Use the information recorded in the table to determine which condition caused the highest rate of transpiration and explain the reasons why.

SL 4

29. What is the function of carbohydrates in the diet of animals?

SL 1

30. As consumers, all animals must eat food to get the nutrients to survive. These nutrients include carbohydrates, proteins, lipids, minerals, vitamins and fiber. Pick TWO nutrients and describe the main functions of each.

SL 2

31. State the most important role of the red blood cells in the circulation system of the human body.

SL 1

32. Explain THREE important uses of the lymphatic system in the human body.

SL 3

33. Explain the importance of the human respiratory system by summarizing the process of breathing. Include in your answer the organs used and pathway of air.

SL 3

34. List TWO excretory organs in the human body and describe what the organ is removing from the body.

SL 2

35. State the function of the hormone produced by the pancreas.

SL 1

36. Discuss what reflex action is and its importance to everyday situations.

SL 4

37. Name the main gland that secretes oestrogen.

SL 1

38. Describe the process of human reproduction. Use any of the following terms in your answer.

gametes, sperm, testes, ovum, ovary, oviduct, uterus, fertilize, zygote, embryo, baby.

SL 2

39. Discuss the effects of exercise on the pulse rate of the heart, the muscles, lungs and weight.

SL 4

40. Define the term environment with reference to a species.

SL 1

41. Define the term food chain.

SL 1

42. Define mutualism.

SL 1

43. Describe TWO environmental problems caused by deforestation.

SL 2

44. Explain why it is important to recycle carbon and nitrogen. Use your knowledge of the carbon and nitrogen cycles to support your response.

SL 3

45. Discuss TWO advantages and TWO disadvantages to the lives of humans and other living things or ecosystems in Samoa as a result of an introduced species of either a plant, an animal, an insect or a microorganism.

SL 4

STUDENT EDUCATION NUMBER									

BIOLOGY

2020

(For Scorers only)

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