

STUDENT EDUCATION NUMBER									

Samoa School Certificate

BIOLOGY 2022

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 right 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.

STR	ANDS	Pages	Time (min)	Weighting
STRAND 1:	VARIETY OF LIFE	2-5	30	16
STRAND 2:	CELL BIOLOGY	6-7	10	6
STRAND 3:	GENETICS	8-10	20	12
STRAND 4:	PLANTS	11-19	55	30
STRAND 5:	ANIMALS	20-25	45	24
STRAND 6:	ENVIRONMENT	26-29	20	12
	TOTAL		180	100

Check that this booklet contains pages 2-30 in the correct order and that none of these pages are blank.

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

SL 1

SL 1

SL 2

For Questions 1 and 2, choose and write the LETTER of the correct answer in the box provided.

- 1. In the classification of living organisms, which of the following is the **CORRECT** order of ranks?
 - A. Kingdom \rightarrow Class \rightarrow Phylum
 - B. Class \rightarrow Family \rightarrow Order
 - C. Phylum \rightarrow Class \rightarrow Order
 - D. Family \rightarrow Kingdom \rightarrow Species
- 2. Which of the following statements is **NOT CORRECT** about the nature of viruses?
 - A. They can reproduce.
 - B. They have cytoplasm.
 - C. They have a covering made from protein and some genetic material.
 - D. They do not have organelles found in plant and animal cells.
- 3. Biotechnology uses living organisms to develop products for specific purposes.

Describe TWO uses of micro-organisms.

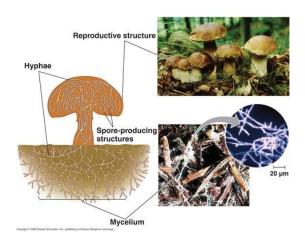
4. In the year 2019, the Ministry of Health in Samoa declared a Measles outbreak, in which children under 5 years died.



 $\frac{https://www.rnz.co.nz/international/pacific-news/408045/samoa-s-measles-crisis-wanes-but-questions-remain-unanswered}{}$

the disease.	
	SL 2

5. The picture below shows the appearance of mushrooms and toadstools produced by some groups of fungi. Fungi break down dead matter and play an important role in recycling nutrients.



https://biology4isc.weebly.com/kingdom-fungi.html

Explain the process by which fungi digest their food outside the cell.

SL 3

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8.	Describe TWO similarities or differences between cells , tissues and organs in living organisms.	
		SL 2

9. The Light Microscope is a biology laboratory instrument or tool that uses visible light to investigate plant and animal cells. To use a Light Microscope, you need to follow a series of steps.



https://microbenotes.com/light-microscope/



https://www.scienceprofonline.org/cell-biology/how-to-prepare-wet-mount-slide-eukaryotic-cells.html

Discuss **FOUR of the steps to be followed** in order to correctly view wet mounts and prepared plant and animal slides using a Light Microscope.

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For Questions 10 to 12, choose and write the LETTER of the correct answer in the box provided.

- 10. In genetics, the observable characteristics or traits of an organism are known as the>
 - A. Genotype
 - B. Homozygous
 - C. Heterozygous
 - D. Phenotype
- 11. Different characteristics within a population include **height**, **weight**, **intelligence**, **fast** and **slow**. These characteristics are controlled by a large number of genes.



https://gigazine.net/gsc_news/en/20160802-comparing-heights/ https://www.active.com/running/articles/a-goodbye-from-cool-running

What type of genetic variation has been described above?

- A. Continuous Variations
- B. Discrete Variations
- C. Traits
- D. Dominant Variations
- 12. One of two or more versions of a gene that is located at the same position on a specific chromosome is called:
 - A. Gamete.
 - B. Zygote.
 - C. Allele.
 - D. Homozygous.

	SL 1

SL 1

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Sex chromosomes are types of chromosomes t Humans and other mammals have the X and Y		
Humans and other mammals have the X and Y	chromosomes.	
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Colo	ur-blindness is a sex-linked recessive trait.	
	na is not colour-blind (Cc) , but her father is. Moana is married to Sefo who is ur-blind (cc) . Moana and Sefo are expecting children.	
(a)	Design a punnet square to illustrate the information above.	
(b)	Identify the distinct genotypes and what the chances will be of getting each (ratios) .	
(c)	Identify which allele is dominant and which is recessive.	
(d)	State the phenotypes and the ratios of the expected children.	
		SL 4

For Questions 16 to 19, choose and write the LETTER of the correct answer in the box provided.

- 16. What transports glucose in plants?
 - A. Xylem
 - B. Phloem
 - C. Cambium
 - D. Meristems
- 17. Transpiration is the process of water movement through a plant and its evaporation from leaves, stems and flowers. The rate of transpiration is affected by certain environmental factors.



https://tapstar.shoalwater.nsw.gov.au/The-water-cycle/Transpiration

Which of these environmental factors increases the transpiration rate by increasing the concentration gradient inside and outside of the leaf?

- A. Food
- B. Oxygen
- C. Parasites
- D. Humidity
- 18. What is the result of testing a leaf for starch when iodine solution is added?
 - A. Dark brown colour change of the leaf.
 - B. Blue-black colour change of the leaf.
 - C. Reddish colour change of the leaf.
 - D. Dark green colour change of the leaf.

SL 1

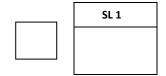
19. Samoa is known to have large mangrove forests. Mangrove roots grow up into the air and have special adaptations for living in mud that lacks oxygen.



https://study.com/academy/lesson/aerial-roots-definition-function-examples.html

What type of roots are shown in the above picture?

- A. Taproots
- B. Fibrous roots
- C. Adventitious roots
- D. Pneumatophore roots



20. Seed dispersal is the process by which plant seeds are transported to new sites for germination. The picture below shows different seeds which have different methods of dispersal.

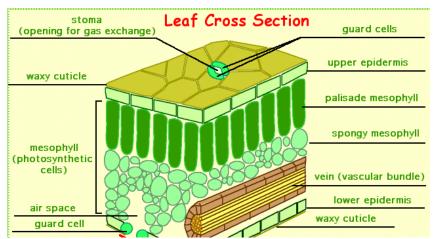


https://www.blendspace.com/lessons/-ePCpXFBxoAtwg/copy-of-seeds

escribe TWO methods of seed dispersal stating ONE example in each method.	
	SL 2

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Plants need essential/primary nutrients like Carbon , Oxygen , Hydrogen , Nitrogen , Phosphorus and Potassium to help them to grow or complete their life cycle.	
Choose TWO of the nutrients listed above and state ONE purpose of each nutrient for plant growth.	
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Mention TWO methods/types of asexual reproduction in plants.	
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24. The picture below shows the internal structure of a leaf.



 $\frac{\text{https://sites.google.com/site/scientificgreenmachine/microscopic-level/structure-of-a-leaf---internal-}{\text{external}}$

Explain how the internal structure of leaves contribute to the processes of gas

exchange, photosynthesis, food and water transport.

SL 3

25. Plants are able to detect and respond to light, gravity and touch.



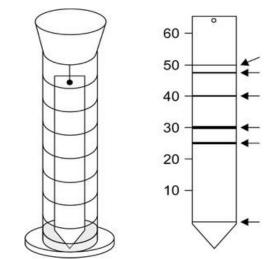
https://www.blendspace.com/lessons/FRmD9q-JdH8y-A/tropism-and-plant-reproduction

Using the above picture, explain how plants respond to light, gravity and touch.

SL 3

26. Scientists use chromatography papers to separate leaf pigments obtained from chloroplasts. During experiments, leaf extracts containing a mixture of pigments are put in test tubes and marks are placed near the bottom edge of strips of chromatography papers.

Solvents are then added to the test tubes and chromatography papers are carefully placed into the tubes. The solvents and the pigments in the leaf extracts then begin to move up the chromatography papers.



https://www.crackap.com/ap/biology/question-389.html

Using the figure above, report on how leaf pigments are distributed on a chromatography paper.

Your answer should include;

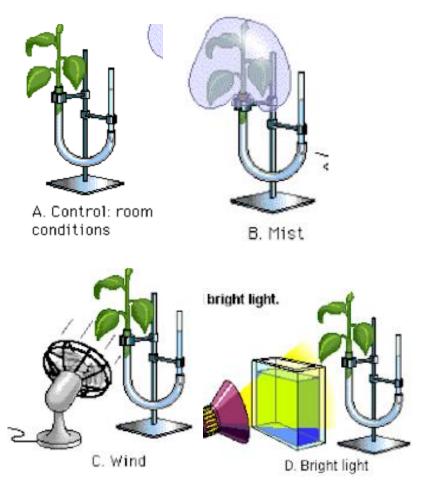
- (i) the order (**from top to bottom**) of the pigments on the chromatography paper.
- (ii) the colours of the leaf pigments.
- (iii) the names of the leaf pigments.

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Meristems are t of the plant.	issues found in plants which have cells that divide throughout the life	
or the plant.		
In your own woi	rds, discuss the roles of the meristematic tissues (apical and lateral	
In your own woi		- Si
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The rate of transpiration is affected by various environmental conditions.

The figure below shows four photometers assembled and placed under different environments to measure the loss of water. The different environmental conditions include;

- A. Control-room conditions
- B. Mist or Humidity
- C. Wind
- D. Bright light



https://www.sites.google.com/site/sed695b3/projects/longitudinal-research/transpiration-scantlin

•	nental condition (A , B , C and D) affects the rate of
anspiration.	
	

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STRAND 5:	ANIMALS	Weighting 24
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For Questions 29 to 32, choose and write the LETTER of the correct answer in the box provided.

- 29. Minerals are ions needed in small amounts to help animals grow and stay healthy. What is the function of **Iron** in animals?
 - A. For strong healthy bones and teeth.
 - B. Makes the thyroid gland function properly.
 - C. For the production of haemoglobin to transport oxygen.
 - D. For good eyes and good night vision.
- 30. Which organ of the digestive system reabsorbs water from undigested food, stores water in the body and makes waste food solid?
 - A. Gall bladder
 - B. Large intestine
 - C. Small intestine
 - D. Stomach
- 31. The picture below shows a lady exercising and taking steps forward.



https://blog.myfitnesspal.com/the-difference-between-forward-and-reverse-lunges/

What type of muscles is she using to do this activity?

- A. Skeletal muscles
- B. Cardiac muscles
- C. Involuntary muscles
- D. Tendons

SL 1

SL 1

Whi	ch part of the blood vessel carries blood back to the heart?	
A.	Capillaries	SL:
B.	Cardiac muscles	
C.	Arteries	
D.	Veins	
	lymphatic system is an organ in vertebrates that is part of the immune system is made up of a complex network of tissues, vessels and other organs.	
Desc	ribe TWO functions of the lymphatic system.	
		SL
Nerv	re cells are the cells that make up the brain and the nervous system.	
State	e the TWO types of nerve cells.	
		SL

After fertilization, the zygote divides and forms a small ball of cells. The ball of cells goes into the soft uterus wall and grows to form an embryo.	
https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/13.68/primary/lesson/fetal-development-and-the-placenta-bio/	
In your own words, explain how materials are exchanged between the mother and	
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Hormones are chemical messengers between cells. They travel in the bloodstream, have different functions and are produced by one cell, but cause changes in cells or organs in different parts of the body.	
Mention THREE hormones found in animals and describe their functions.	
	SL
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38. Food molecules contain nutrients and are the source of energy for life including growth and repair of damaged tissues. Some of the nutrients include; **Carbohydrates**, **Lipids**, **Vitamins**, **Proteins**, **Minerals**, **Fibre** and **Water**. Lack of nutrients, incorrect diet and eating disorders can be harmful to the human body.



https://www.topdoctorsonline.com/articles/beauty-and-fitness/diet-and-nutrition/41008 https://www.thedp.com/article/reality-eating-disorders-quarantine-covid

Using **FOUR** of the **nutrients** mentioned above;

(i)	discuss the effects of nutrient deficiencies in the human body.
(ii)	explain effects of incorrect diet and eating disorders on the human body.

	SL 4
	

It is well known that smoking , alcohol and drugs can be harmful to the human body and the community. They are associated with higher risks of non-communicable diseases (NCDs), and are responsible for the deaths of many in Samoa.	
Using examples, discuss the combined harmful effects of smoking, alcohol and drugs on human health (human body system), as well as the Samoan community.	

For Questions 40 to 42, choose and write the LETTER of the correct answer in the box provided.

40. Humans have introduced many exotic (non-native) plant and animal species on purpose and accidentally. Exotic species such as the **taro leaf blight**, a highly infectious plant disease has caused harmful effects on taro plants in Samoa.



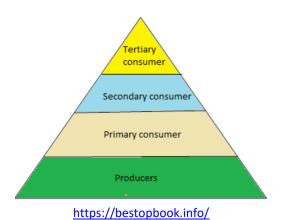
https://www.nab.vu/sites/default/files/nab/documents/10/07/2013%20-%2009%3A32/taro_leaf_blight_manual1.pdf

Which scientific term can be used to describe this problem?

	A.	Population issues.		SL 1
	B.	Food issues.		
	C.	Environmental issues.		
	D.	Rainforest issues.	•	
41.		ogical interaction where one living organism kills another living organism known as: Commensalism.	for	
				SL 1
	B.	Predation.		
	C.	Mutualism.		
	D.	Parasitism.		

42.	such	Ministry of Agriculture and Fisheries in Samoa has shown that the effect of pests as the Rhinoceros beetle on coconut palms can be reduced by using natural nies like fungi and viruses. What scientific term can be used to describe this nod?	
	A.	Global control	
	В.	Chemical control	SL 1
	C.	Scavenger control	
	D.	Biological control	
43.	defor	orests are being destroyed at a high rate. Below is a picture of the effect of restation. The station of the effect of restation of the effect of restation. The station of the effect of restation of the effect of restation. The station of the effect of the effect of restation of the effect of restation.	
	State	and explain TWO factors that contribute to deforestation .	
			SL 2
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44. **Food chains and food webs** refer to the order of events in an ecosystem, where one living organism consumes another living organism to transfer energy. Living organisms of food chains are classified into **different trophic groups** (**producers, primary consumers, secondary consumers, and tertiary consumers**) on the basis of their feeding behaviour.



Using examples, illustrate the **different roles** of **different trophic groups** in food chains and food webs.

45. Pacific Islands like Samoa are extremely vulnerable to **climate change**. Samoa's climate change can be characterized as tropical with high levels of temperature and humidity.



 $\frac{https://www.slideshare.net/norvergence/pacific-islands-climate-change-explained-by-the-team-norvergence-llc$

Discuss the **significance of climate change** in Samoa in relation to its advantages and disadvantages to the Samoan population. **Elaborate** on;

- (i) the **cause** of climate change.
- (ii) how the **people of Samoa are affected** by the issue (advantages and disadvantages).
- (iii) what **government agencies or people are trying to do** about climate change.
- (iv) what **you think can be done** to reduce climate change.

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STUDENT EDUCATION NUMBER									

BIOLOGY

2022

(For Scorers only)

STR	ANDS	Weighting	Scores	Check Scorer	AED Check
STRAND 1	VARIETY OF LIFE	16			
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STRAND 3	GENETICS	12			
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	TOTAL	100			