



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.

STRANDS		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.

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 → Class → Phylum
- B. Class → Family → Order
- C. Phylum → Class → Order
- D. Family → Kingdom → Species

SL 1

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.

SL 1

3. Biotechnology uses living organisms to develop products for specific purposes. Describe **TWO** uses of micro-organisms.

SL 2

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



<https://www.rnz.co.nz/international/pacific-news/408045/samoa-s-measles-crisis-wanes-but-questions-remain-unanswered>

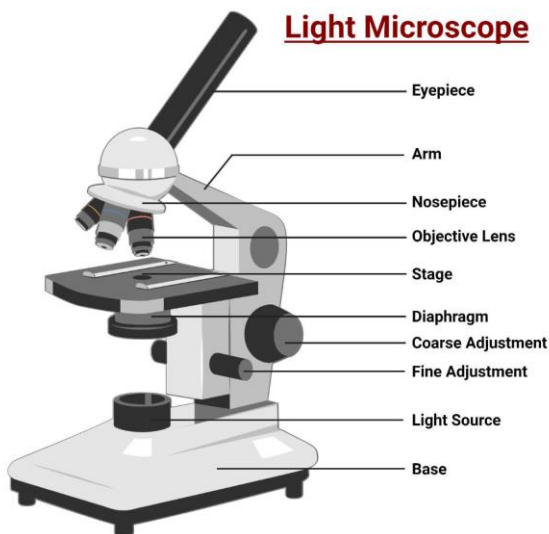
Mention **TWO** treatments or preventative ways Samoa used to control the spread of the disease.

SL 2

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.

SL 4

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

SL 1

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

SL 1

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

13. Describe the behaviour of chromosomes in **each stage** of mitosis and meiosis.

SL 2

14. Sex chromosomes are types of chromosomes that participate in sex determination
Humans and other mammals have the X and Y chromosomes.

Explain the roles of the **X** and the **Y chromosomes** in determining the sex of an individual.

SL 3

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

SL 1

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

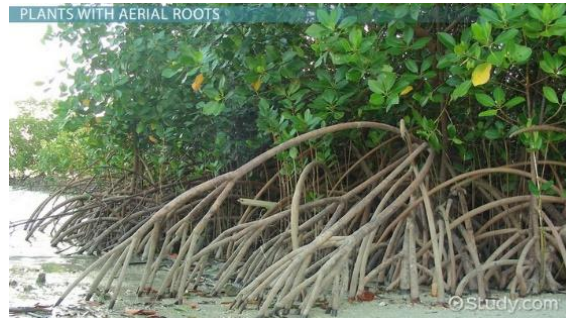
SL 1

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

	SL 1

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>

Describe **TWO** methods of seed dispersal stating **ONE** example in each method.

SL 2

21. Give **TWO disadvantages** of asexual reproduction in plants.

SL 2

22. 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.

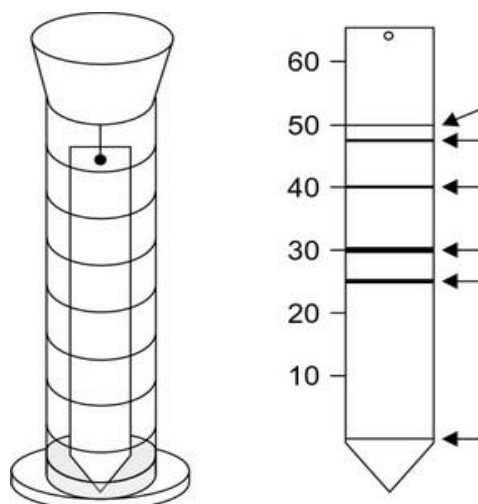
SL 2

23. Mention **TWO methods/types** of asexual reproduction in plants.

SL 2

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;

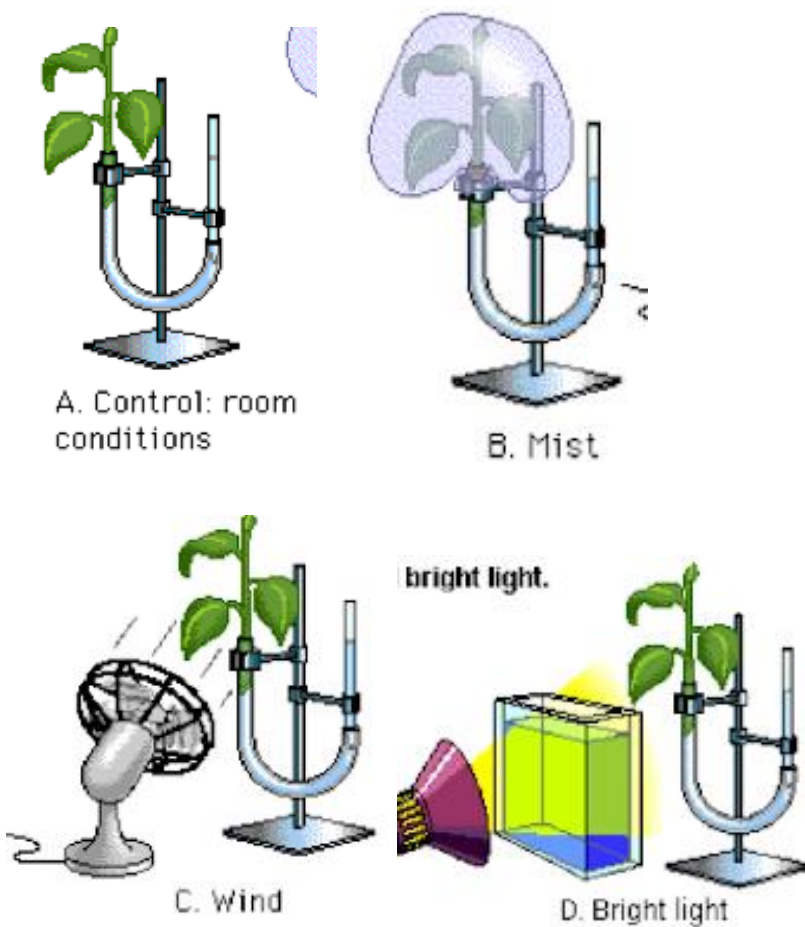
- (i) the order (**from top to bottom**) of the pigments on the chromatography paper.
- (ii) the colours of the leaf pigments.
- (iii) the names of the leaf pigments.

SL 4

28 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>

Explain how **each** environmental condition (A, B, C and D) affects the **rate of transpiration**.

SL 4

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.

SL 1

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

SL 1

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

32. The internal transport system carries gases, nutrients and other materials around the body. It has a circulatory system that is made up of blood vessels.

Which part of the blood vessel carries blood back to the heart?

- A. Capillaries
- B. Cardiac muscles
- C. Arteries
- D. Veins

SL 1

33. The lymphatic system is an organ in vertebrates that is part of the immune system and is made up of a complex network of tissues, vessels and other organs.

Describe **TWO functions** of the lymphatic system.

SL 2

34. Nerve cells are the cells that make up the brain and the nervous system.

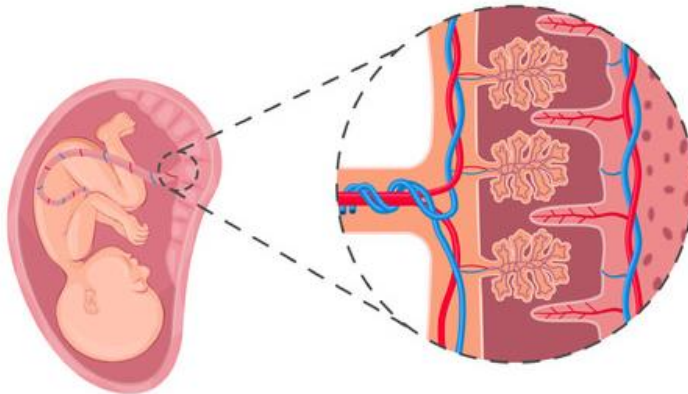
State the **TWO types** of nerve cells.

SL 2

35. Humans reproduce sexually through the processes of **gametogenesis, fertilization** and **embryonic development**. **Briefly describe** how these processes occur.

SL 2

36. 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 the embryo.**

SL 3

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.
- B. Food issues.
- C. Environmental issues.
- D. Rainforest issues.

SL 1

41. A biological interaction where one living organism kills another living organism for food is known as:

- A. Commensalism.
- B. Predation.
- C. Mutualism.
- D. Parasitism.

SL 1

42. The Ministry of Agriculture and Fisheries in Samoa has shown that **the effect of pests** such as the Rhinoceros beetle on coconut palms can be **reduced by using natural enemies** like fungi and viruses. What **scientific term** can be used to describe this method?

- A. Global control
- B. Chemical control
- C. Scavenger control
- D. Biological control

SL 1

43. Rainforests are being destroyed at a high rate. Below is a picture of the effect of **deforestation**.



<https://www.pinterest.com/pin/deforestation-facts-causes-effects--325948091757884444/>

State and explain TWO factors that contribute to **deforestation**.

SL 2

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