Diploma Programme
Programme du diplôme
Programa del Diploma

Biology
Standard level
Paper 1A

11 May 2026

Zone A afternoon | **Zone B** afternoon | **Zone C** afternoon

1 hour 30 minutes [Paper 1A and Paper 1B]

Instructions to students

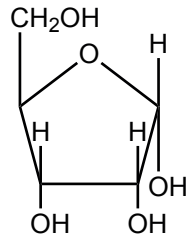
- Do not open this examination paper until instructed to do so.
- Answer all questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.
- A calculator is required for this paper.
- The maximum mark for paper 1A is **[30 marks]**.
- The maximum mark for paper 1A and paper 1B is **[55 marks]**.

2226 – 4019

16 pages

1. Which sugar is found in DNA?

A.



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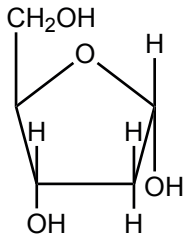

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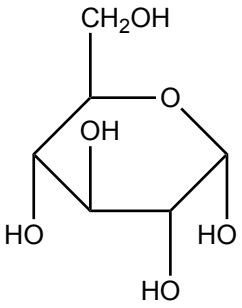

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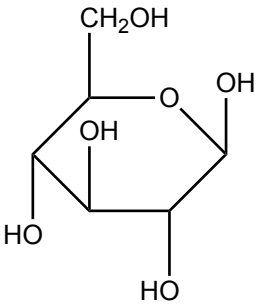
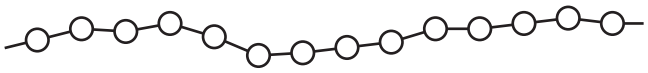


2. The diagram shows a fragment of a polymer molecule.



What is the role of water in the digestion of a polymer?

A. It dissolves the polymer to form shorter fragments.

B. It provides –H and –OH groups for the formation of monomers.

C. It provides energy to break covalent bonds.

D. It speeds up the condensation of polymers into monomers.

3. Oils are liquid at room temperature while fats are solid. What explains this difference?

A. Oils have a higher melting point because glycerol forms more bonds with carbon atoms.

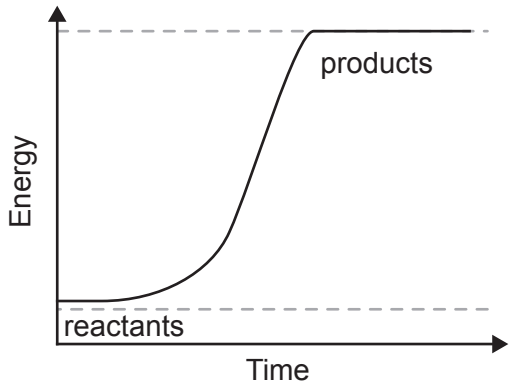
B. Fats have a higher melting point because of stronger covalent bonds between fatty acids.

C. Fats have a lower melting point because they have shorter fatty acid chains.

D. Oils have a lower melting point because fatty acids have one or more double carbon bonds.

4. Which graph represents changes in energy levels between reactants and products during an enzyme-catalysed anabolic reaction?

A.



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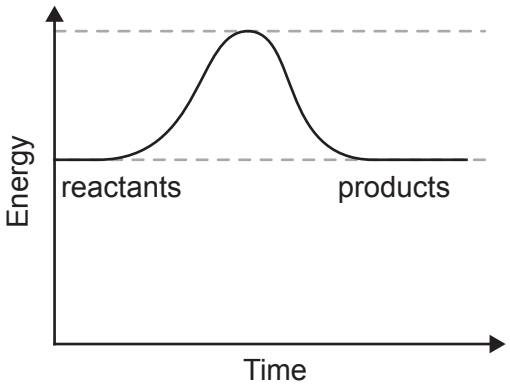

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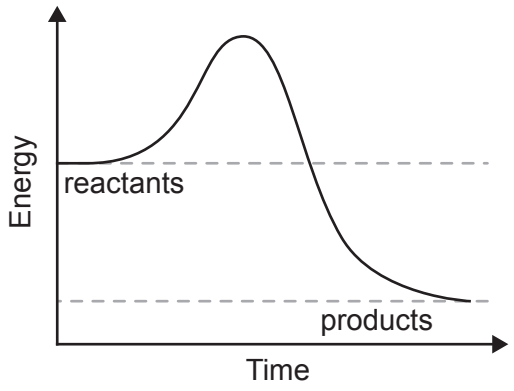

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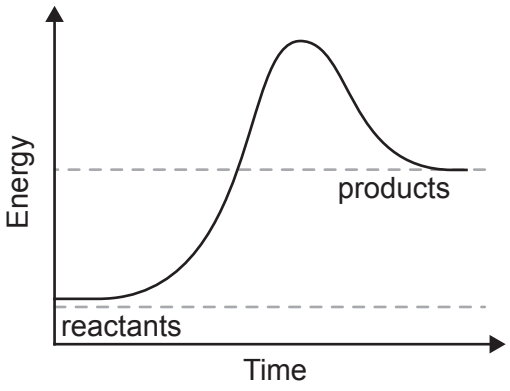
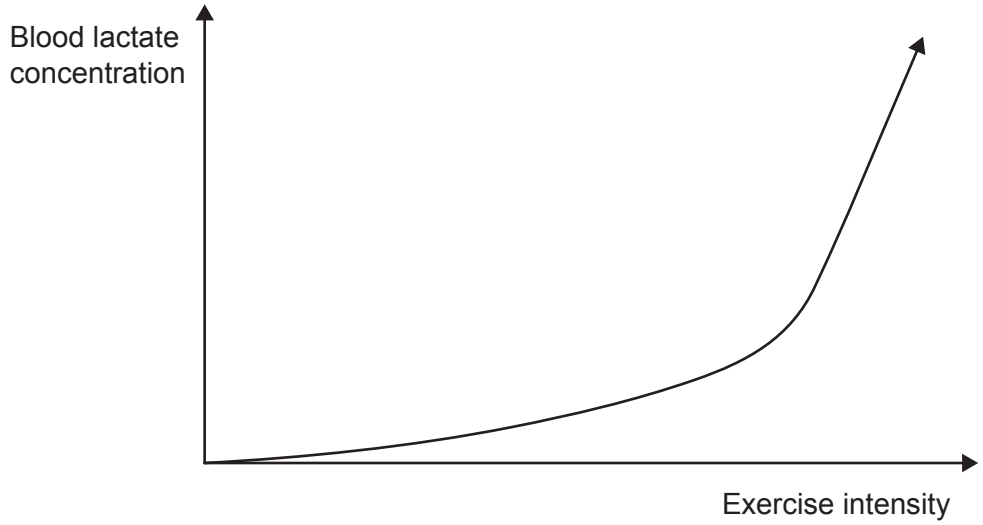


5. The graph shows changes in blood lactate concentration measured in an athlete at increasing exercise intensity.



What explains the shape of the curve?

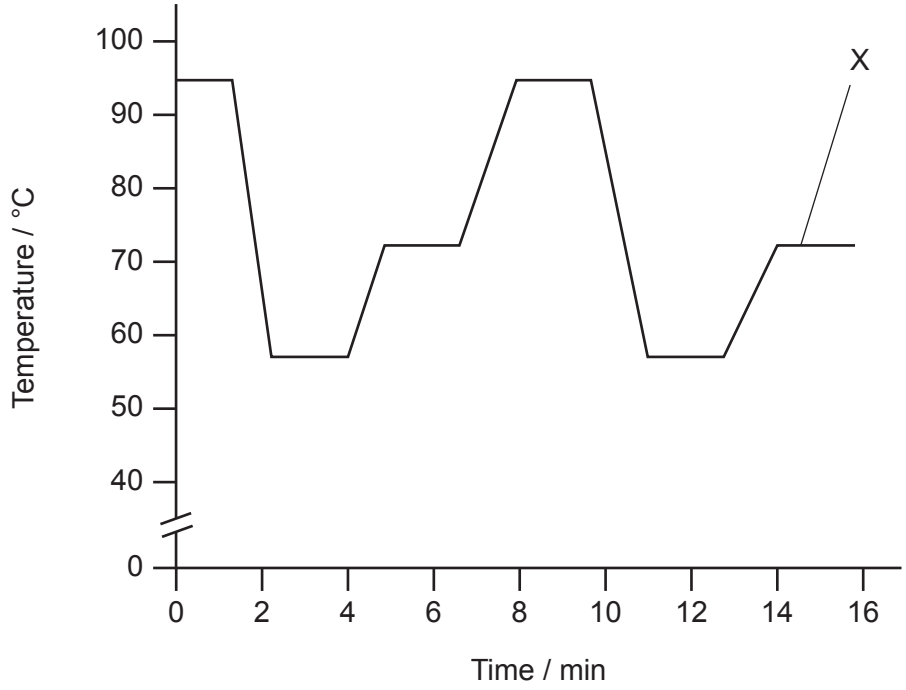
A. As exercise intensity increases, more lactate is used.

B. Under anaerobic conditions, lactate is converted to glucose.

C. Some glucose reacts with lactate to supply more ATP.

D. Glucose is broken down to lactate during anaerobic respiration.

6. The graph shows temperature changes during two PCR (polymerase chain reaction) cycles.



What is the purpose of the temperature at stage X?

A. To separate DNA strands

B. To provide the optimum temperature for the synthesis of new DNA

C. To allow binding of primers to single-stranded DNA

D. To break covalent bonds between nucleotides

7. The table shows some mRNA codons that code for glycine.

mRNA codons
GGA
GGU
GGC

Which tRNA is likely to attach to glycine during translation?

A. CCT

B. GGU

C. CCU

D. GGT

8. What can be seen using freeze-fracture microscopy?

A. Single atoms within cells

B. The internal structure of membranes

C. Interactions within the nucleus

D. Fluorescent antibody markers

9. How do ions cross plasma membranes?

A. By simple and facilitated diffusion

B. By facilitated diffusion and active transport

C. By active transport and osmosis

D. By osmosis and endocytosis

10. Which of the following are cell organelles?

A. Mitochondria, nuclei and microtubules

B. Microtubules, chloroplasts and Golgi apparatus

C. Golgi apparatus, ribosomes and lysosomes

D. Lysosomes, vesicles and cell walls

11. What occurs in the axon of a neuron when it is not conducting an impulse?

A. ATP is used to move sodium and potassium ions in opposite directions, which maintains the membrane potential.

B. Sodium and potassium ions diffuse in opposite directions to build up a membrane potential.

C. ATP is used to move both sodium and potassium ions out to maintain a negative membrane potential.

D. Sodium and potassium ions diffuse out until the membrane becomes polarized again.

12. What would show that a cell dividing by mitosis is entering metaphase?

A. Chromosomes are moved by microtubules.

B. Bivalents pair up.

C. The nuclear membrane starts to break down.

D. Chromatids begin to separate.

13. The table shows the common and scientific names of four plants.

Common name	**Scientific name**
garden sage	*Salvia officinalis*
garden valerian	*Valeriana officinalis*
rosemary	*Rosmarinus officinalis*
longspur seablush	*Valeriana ciliosa*

What can be deduced from their scientific names?

A. Garden sage, garden valerian and rosemary belong to the same family.

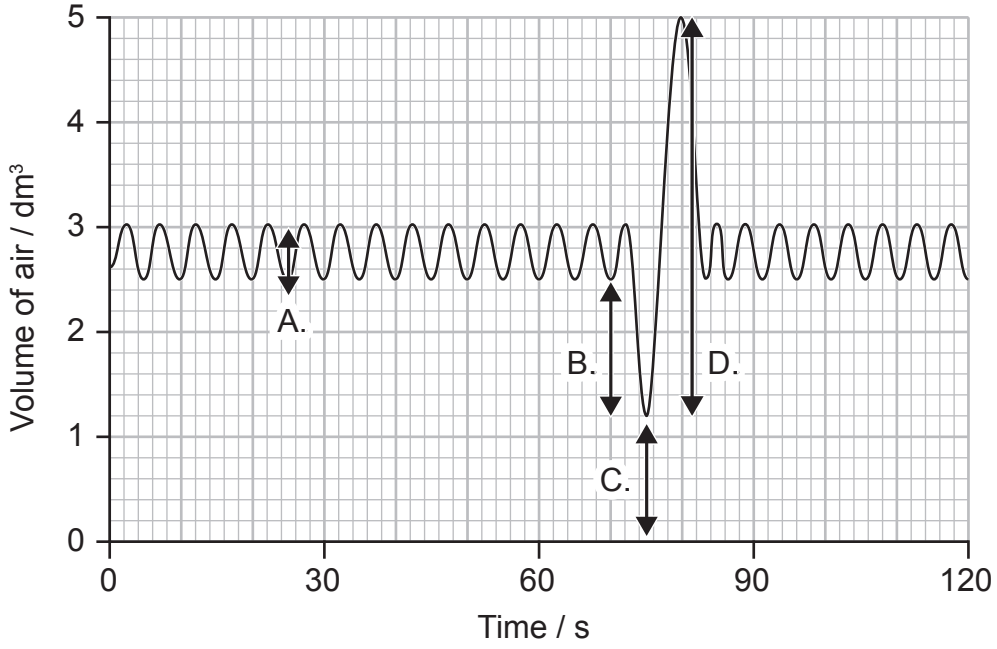
B. Garden sage and garden valerian are adapted to the same habitat.

C. Garden valerian and longspur seablush belong to the same genus.

D. Rosemary and garden sage are two varieties of the same species.

14. Lung volumes can be measured using a spirometer. The graph shows the volume of air in the lungs.

Which letter in the graph shows the volume of the expiratory reserve?



15. What distinguishes veins from arteries?

A. Veins have more elastic tissue.

B. Veins have a smaller lumen relative to their wall thickness.

C. Only veins have muscle tissue.

D. Only veins carry blood towards the heart.

16. Which structures can be found in nerves?

A. Myelinated and unmyelinated fibres of motor neurons

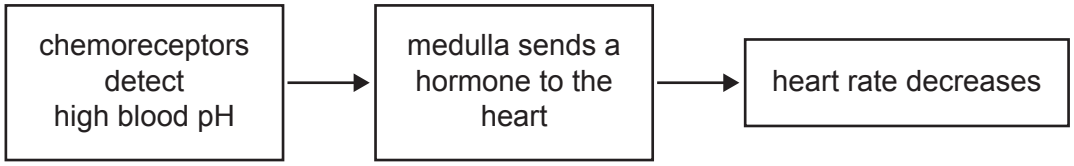
B. Dendrites of interneurons and motor neurons

C. Interneurons and nerve fibres of sensory neurons

D. Synapses between sensory fibres and motor fibres

17. Which diagram explains one way the heart rate is controlled?

A.



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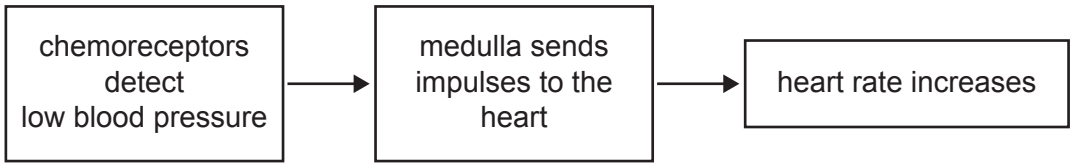

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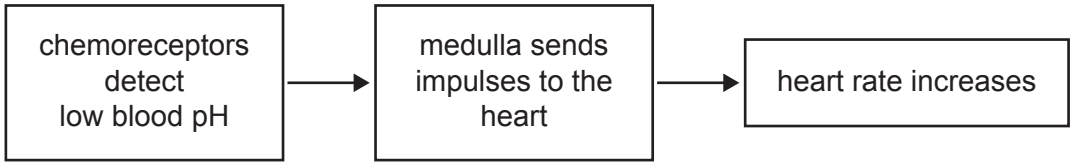

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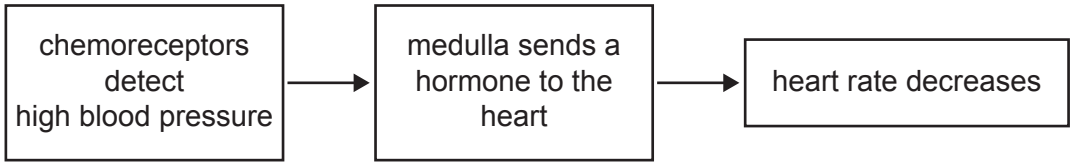


18. What are features of the innate immune system?

I. It remains unchanged.

II. It responds to a broad range of pathogens.

III. It produces memory cells.

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

19. What is regulated by negative feedback in the menstrual cycle?

A. FSH (follicle-stimulating hormone) secretion in response to increased oestradiol production

B. The breakdown of the endometrium due to low levels of ovarian hormones

C. The secretion of progesterone, triggered by high oestradiol levels

D. Degeneration of the corpus luteum in response to high levels of LH (luteinizing hormone)

20. A plant shows incomplete dominance for flower colour. One homozygous for blue flowers and another homozygous for red flowers were crossed. What could be the phenotypes for flower colour of the offspring produced by this cross?

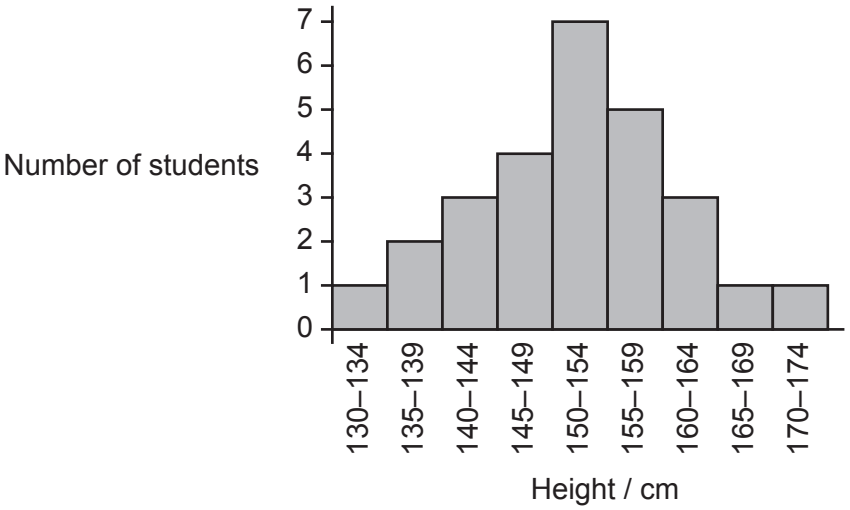
A. 50 % purple flowers and 50 % flowers with blue and red stripes

B. 50 % purple flowers, 25 % blue flowers and 25 % red flowers

C. 100 % purple flowers

D. 100 % flowers with blue and red stripes

21. The histogram shows the height distribution of a group of 14-year-old male students.



What contributes to variation in the height of the students?

A. One gene with multiple alleles

B. Sex-linked inheritance and physical activity

C. Polygenic inheritance and environmental factors

D. Autosomal inheritance and age

22. What could be used as evidence of evolution?

I. RNA base sequences

II. Analogous structures

III. Selective breeding of crop plants

A. I and II only

B. I and III only

C. II and III only

D. I, II and III

23. The mahogany glider (*Petaurus gracilis*) is an endangered tree-dwelling marsupial species native to coastal forests of Australia.

What is a possible in situ conservation strategy for this species?

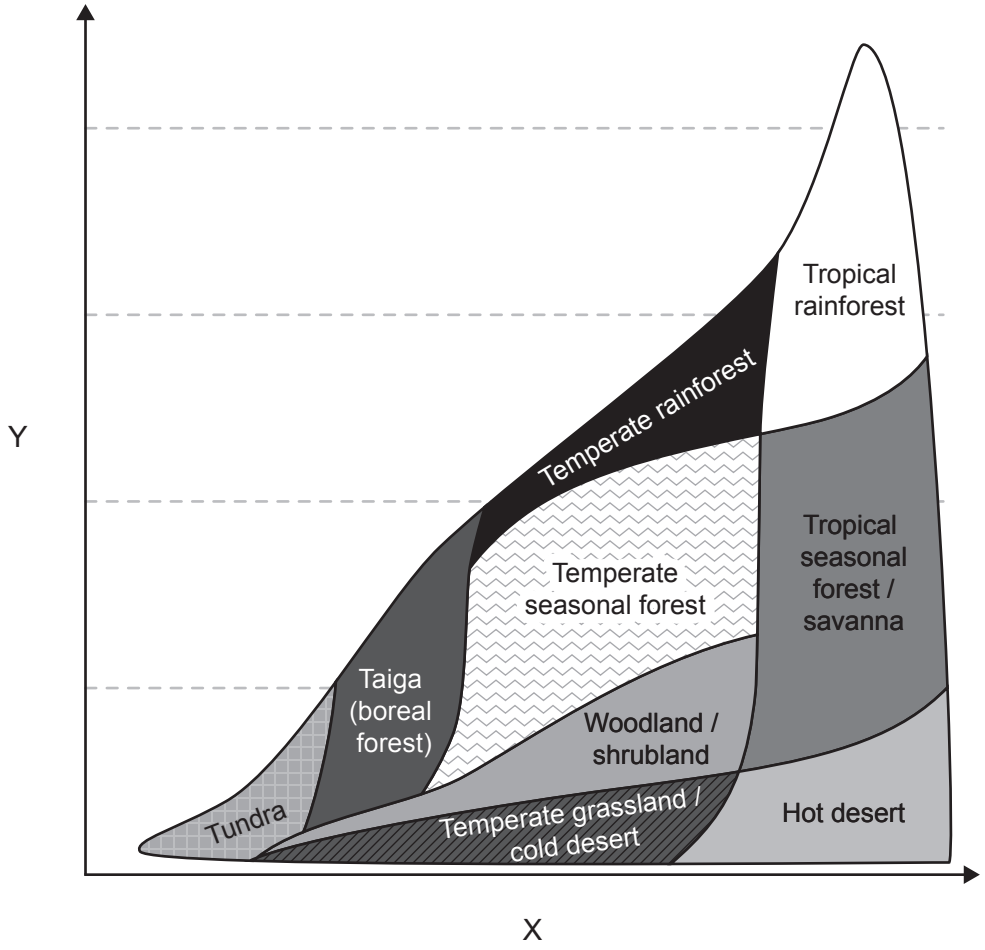
A. Protecting coastal areas to reduce forest fires

B. Treating injured individuals in zoos

C. Storing mahogany glider germ plasm in a gene bank

D. Breeding individuals in captivity to increase their numbers

24. The graph shows the distribution of some terrestrial biomes.



What do the X and Y axes represent?

	X axis	**Y axis**
A.	soil fertility	mean annual temperature
B.	annual rainfall	soil fertility
C.	mean annual temperature	annual rainfall
D.	annual rainfall	mean annual temperature

25. Moths of the species *Heterosphecia tawonoides* keep predators away by resembling bees. Their legs are covered by fur, and their wings are transparent, like bees. They are often seen feeding on muddy riverbanks among bees.

Which types of adaptations are shown by *H. tawonoides*?

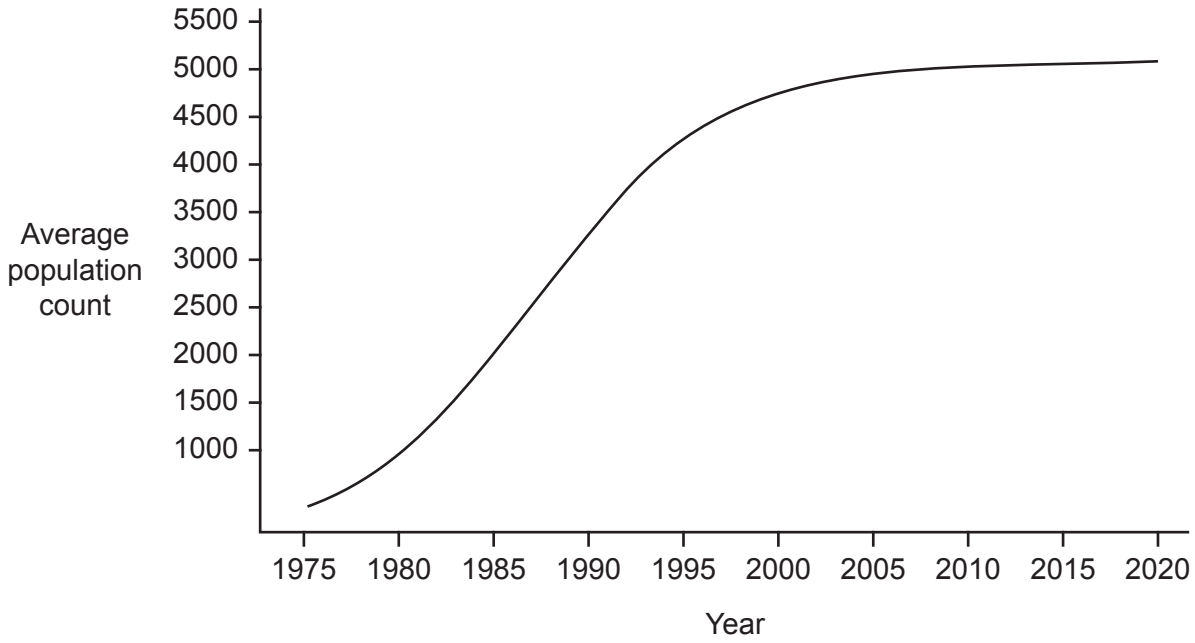
A. Physical and behavioural

B. Physical and ecological

C. Metabolic and ecological

D. Metabolic and behavioural

26. The size of the harbour seal (*Phoca vitulina*) population in the Salish Sea in North America is controlled by density-dependent factors.



What best explains the shape of the curve from 2010 onwards?

A. Higher temperatures during breeding season might limit the number of births.

B. Pests are likely to keep the population within its carrying capacity.

C. A rise in sea levels causes migration to new habitats.

D. Marine pollution causes higher death rates, which equalize birth rates.

27. Several allelopathic plant species are being investigated due to their potential use in agriculture. What could be an application of allelopathy in agriculture?

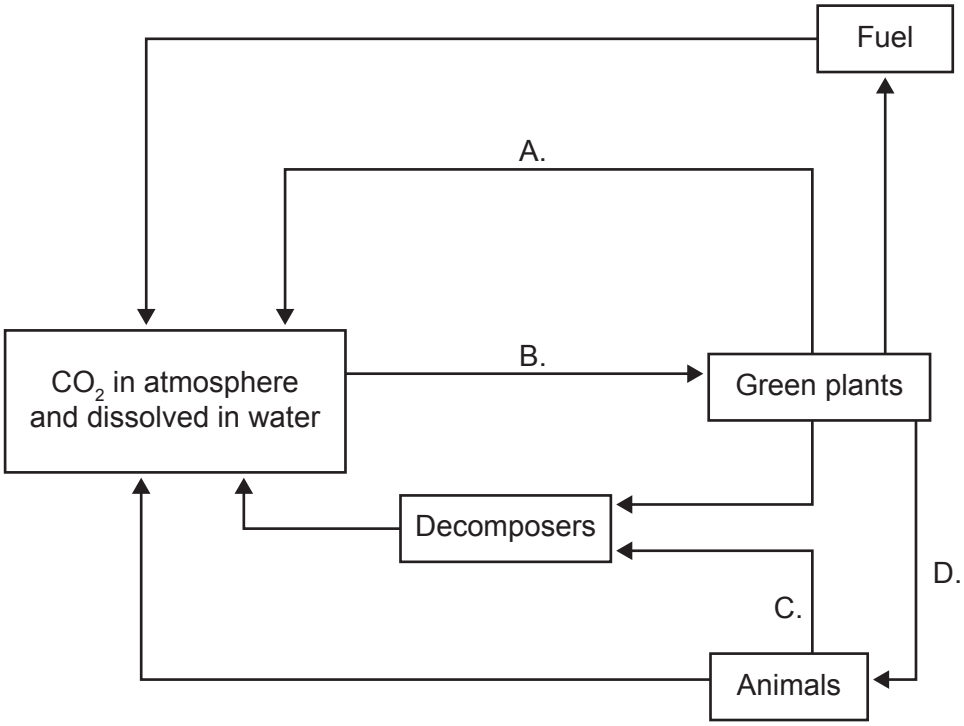
A. Allelopathic chemicals can be synthesized and used as fertilizers.

B. Salt-tolerant alleles can be inserted in crop plants to improve yields in salty soils.

C. Substances produced by allelopathic plants can be used to control weeds.

D. New antibiotics can be extracted from plants to fight viral infections in cattle.

28. The diagram shows part of the carbon cycle in a woodland ecosystem. Which arrow shows the conversion of primary production into secondary production?



29. What would be a consequence of removing a keystone species from an ecosystem?

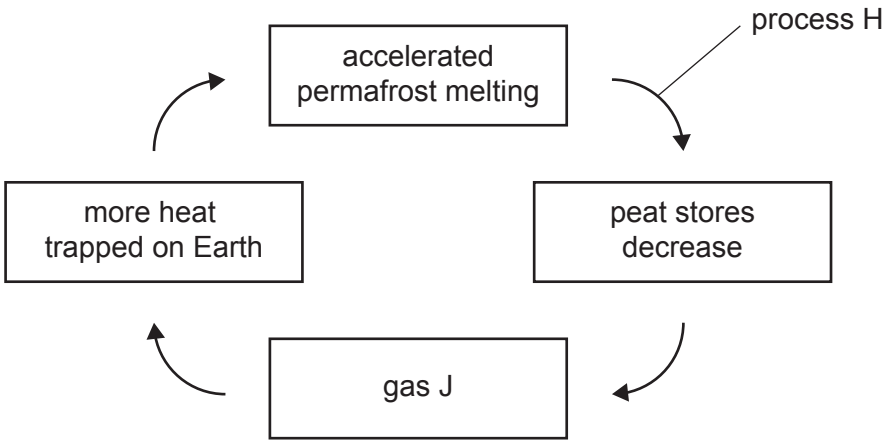
A. Native species would be restored.

B. Food chains would return to equilibrium.

C. Energy efficiency would increase.

D. Some populations would have a steep increase in numbers.

30. The diagram shows a positive feedback cycle in global warming.



What are process H and gas J?

	Process H	Gas J
A.	decomposition	methane
B.	fossilization	carbon dioxide
C.	combustion	carbon dioxide
D.	evaporation	methane

References:

23. Pfinge at French Wikipedia. https://commons.wikimedia.org/wiki/File:Mahogany_glider.jpg. CC BY-SA 2.0. https://creativecommons.org/licenses/by-sa/2.0.

24. Navarras. https://commons.wikimedia.org/wiki/File:Climate_influence_on_terrestrial_biome.svg. Public domain.

25. Used with permission of Sage Publications Inc. Journals, from A 130-Year-Old Specimen Brought Back to Life: A Lost Species of Bee-Mimicking Clearwing Moth, *Heterosphecia tawonoides* (*Lepidoptera*: *Sesiidae*: *Osminiini*), Rediscovered in Peninsular Malaysia's Primary Rainforest, Skowron Volponi, Marta A.; Volponi, Paolo, volume 10, 2017; permission conveyed through Copyright Clearance Center, Inc.

26. Ashley, E.A., Olson, J.K., Adler, T.E., Raverty, S., Anderson, E.M., Jeffries, S. and Gaydos, J.K., 2020. *Frontiers in Marine Science*, 7 [e-journal] https://doi.org/10.3389/fmars.2020.00319. Reference redacted. Source adapted.