

APOLLO

Transfers of energy and matter

HL

Biology

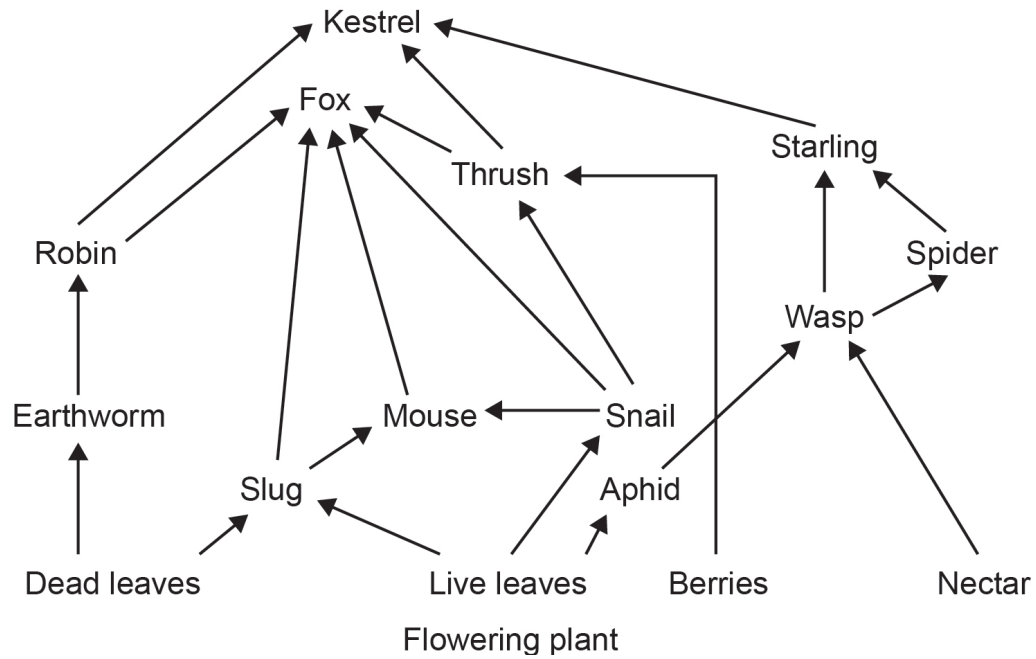
First assessment 2025

10 questions | questions

- 37.** Which organisms use oxidation of simple inorganic substances as an energy source?
- A. Photoautotrophs
 - B. Heterotrophs
 - C. Chemoautotrophs
 - D. Saprotrophs

- 37.** Studies show that adding iron to the ocean's surface triggers the growth of phytoplankton. What could be a short-term consequence of stimulating phytoplankton growth in this area?
- A. Rate of photosynthesis increases, so the ocean becomes the source of carbon.
 - B. Uptake of carbon dioxide into the ocean decreases, so it becomes a sink of carbon.
 - C. Rate of respiration increases, increasing the pH of the ocean.
 - D. Rate of photosynthesis increases, resulting in an increased uptake of carbon dioxide into the ocean.

35. A terrestrial food web is shown.



How many species in the food web are **only** primary consumers?

- A. 3
- B. 4
- C. 5
- D. 6

Turn over

40. Which action will decrease carbon sequestration?

- A. Afforestation
 - B. Primary production
 - C. Deforestation
 - D. Rewetting peatlands
-

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References:

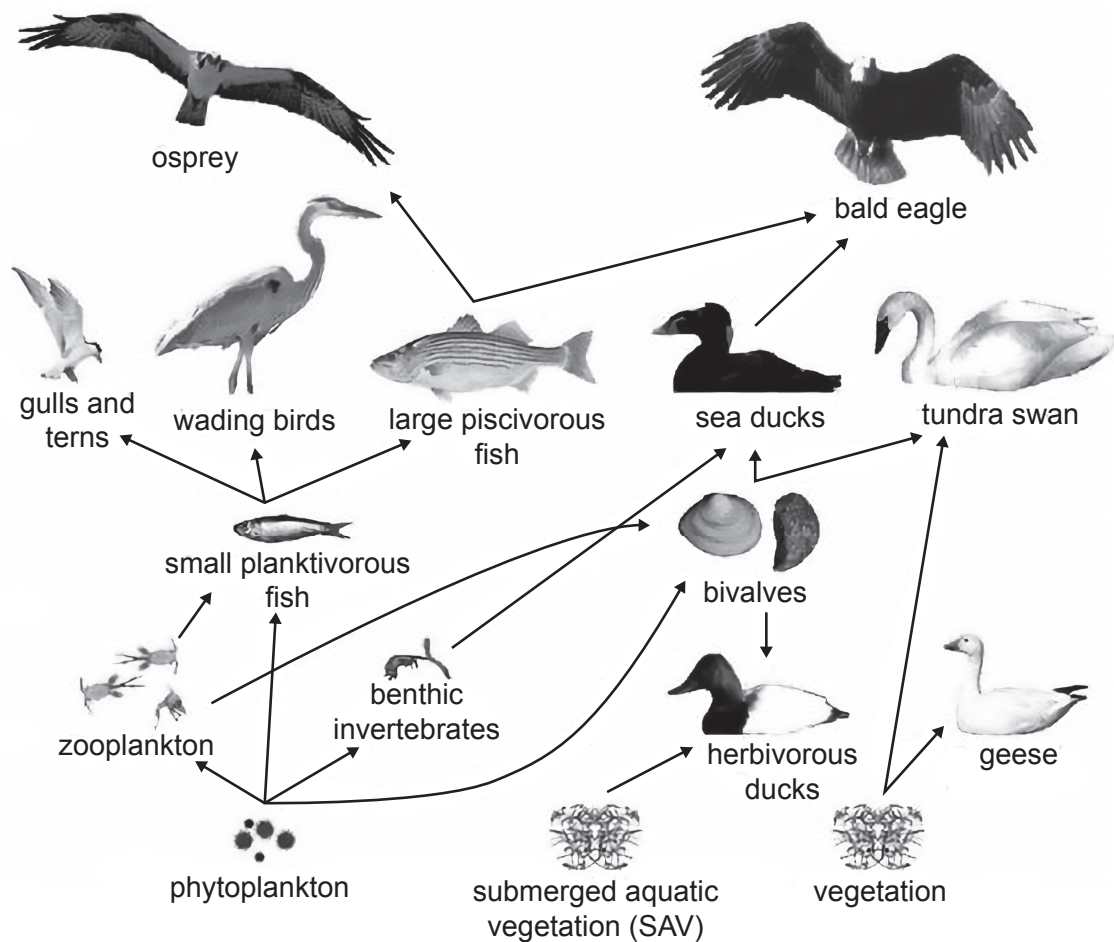
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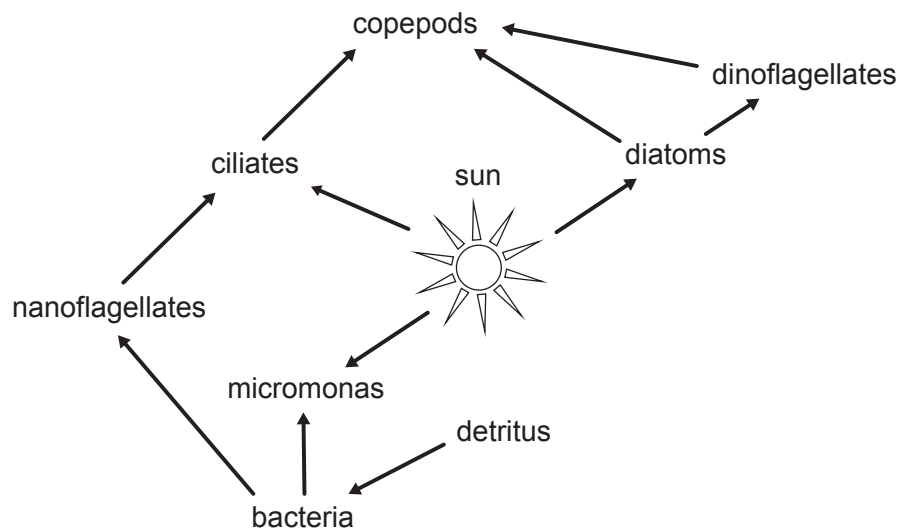
37. The image shows a food web from Chesapeake Bay, USA.



Which organisms are tertiary consumers in at least one food chain?

- A. Small planktivorous fish and tundra swans
- B. Herbivorous ducks and bald eagles
- C. Wading birds and geese
- D. Ospreys and benthic invertebrates

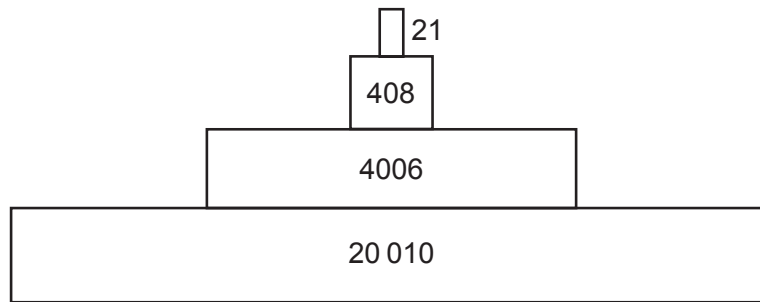
35. The diagram shows the flow of energy between some Arctic species.



Which organism is a mixotroph?

- A. Bacteria
- B. Nanoflagellates
- C. Micromonas
- D. Copepods

37. The diagram shows a pyramid of energy. The unit is $\text{kJ m}^{-2} \text{ year}^{-1}$.



What is a valid conclusion from the data displayed in the pyramid?

- A. Producers lose almost $16\,000 \text{ kJ m}^{-2} \text{ year}^{-1}$ as they reflect some sunlight.
- B. $4006 \text{ kJ m}^{-2} \text{ year}^{-1}$ is gained by primary consumers.
- C. Tertiary consumers use $408 \text{ kJ m}^{-2} \text{ year}^{-1}$ in life processes.
- D. $21 \text{ kJ m}^{-2} \text{ year}^{-1}$ is used by detritivores.

40. Increased leaching of nitrogen fertilizers disrupts the stability of aquatic ecosystems such as lakes. What change is expected if nitrogen leaches into a lake over time?
- A. Wilting of surface plants
 - B. Increased biochemical oxygen demand (BOD)
 - C. Weakened mollusc shells
 - D. Bioaccumulation of pollutants at higher trophic levels
-

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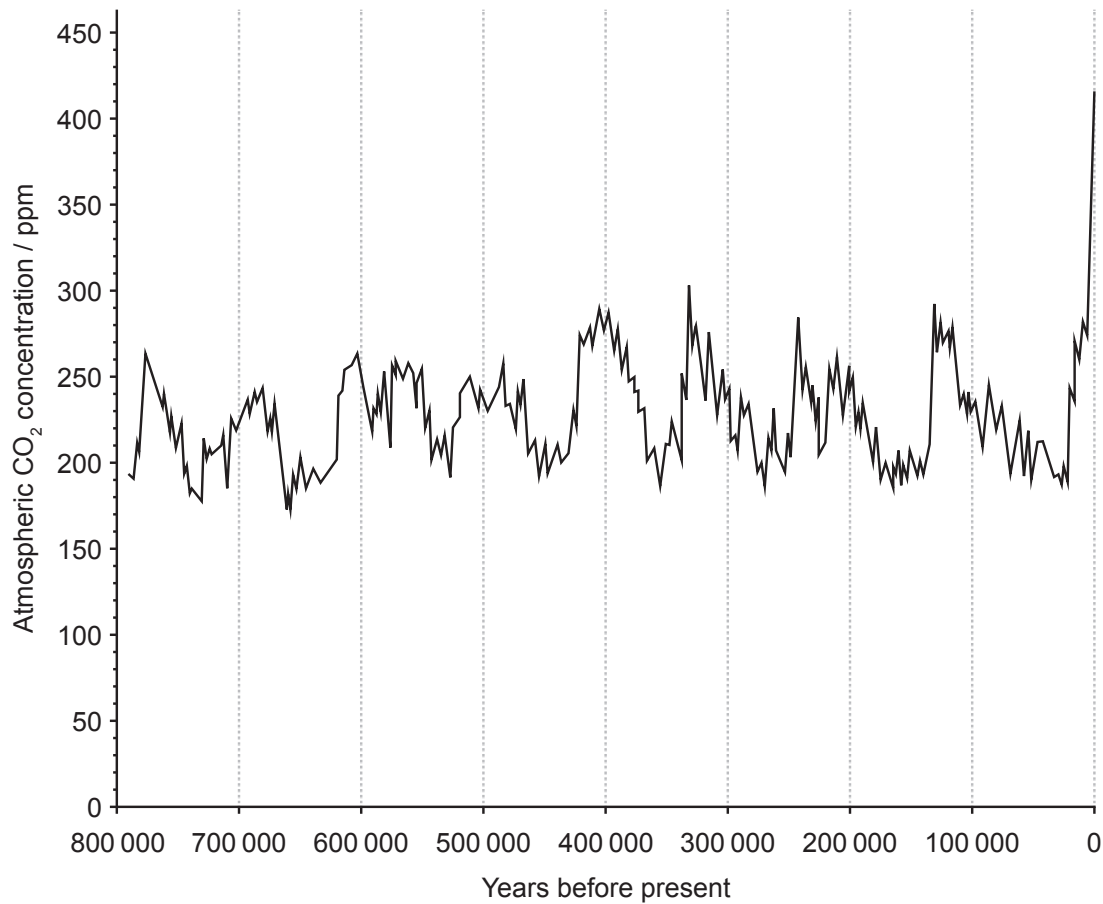
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Section A

Answer **all** questions. Answers must be written within the answer boxes provided.

4. The graph shows carbon dioxide (CO_2) concentration in the atmosphere during the past 800 000 years. The data was produced by measuring the CO_2 concentration of air bubbles trapped in cores of Antarctic ice.



(This question continues on the following page)



(Question 4 continued)

(a) State **one** metabolic process that removes CO₂ from the atmosphere. [1]

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(b) The graph shows long-term fluctuations in atmospheric CO₂ concentration of about 80 ppm. The decreases in CO₂ concentration are probably due to oceans acting as a sink by holding large quantities of dissolved CO₂.

Identify **two** other examples of natural sinks that can remove carbon from the carbon cycle and reduce atmospheric CO₂ concentration. [2]

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(c) The graph shows a recent extremely rapid increase in atmospheric CO₂ concentration. Explain **two** anthropogenic causes of this increase. [2]

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Turn over

35. What are common features of holozoic nutrition and saprotrophic nutrition?

	Mostly fungi and bacteria	Secretion of enzymes to digest food	Ingestion of food particles
A.	✓	✓	✗
B.	✓	✗	✓
C.	✗	✓	✗
D.	✗	✗	✗

Turn over