

Checkups and follow-ups

CHAPTER 10 ANSWER KEY

ST

Questions 1–15, A and C

Ecosystems

Checkup

1 WHAT IS AN ECOSYSTEM? (pp. 318–326)

1. Which level of ecological organization do the following examples illustrate?

a) a pack of wolves

Level 2: population

b) wolves hunting a caribou herd

Level 3: community

c) a lone wolf

Level 1: individual

d) a pack of wolves drinking from a lake

Level 4: ecosystem

2. What is the difference between a community and an ecosystem?

A community is a set of living organisms, while an ecosystem is a set of living organisms interacting with one another and with the nonliving components of the environment they inhabit.

3. What is the name of the feeding relationships between the living organisms of an ecosystem?

Trophic relationships

4. A carnivore cannot be a primary consumer in a food chain. Explain your answer.

Because primary consumers are consumers that feed on plants or parts of plants. Carnivores feed on other animals, not on plants, so they cannot be primary consumers.

5. Which trophic level do detritivores belong to? Explain your answer.

Detritivores belong to the trophic level of decomposers because they feed on the waste of living organisms and on dead matter.

6. What is transferred from one organism to another within each ecosystem?

Matter and energy

7. Explain the role of decomposers in the material flow of an ecosystem.

Decomposers recycle the matter in an ecosystem. They break down organic matter into inorganic matter, which then becomes available to producers.

8. What is the main source of energy in an ecosystem?

The sun

9. Approximately 10 percent of the energy absorbed by one consumer is available to the next consumer in a food chain. What happens to the energy that is lost at each level of a food chain? Give two explanations.

It is released in the form of heat and eliminated with the waste produced by living organisms.

10. All the living organisms in an ecosystem need organic matter to survive.

- a) Which organisms are responsible for producing new organic matter (biomass)?

Producers

- b) What indicator is obtained by measuring the amount of new biomass produced by these organisms over a certain length of time?

Primary productivity

- c) Name four factors that can affect the production of new biomass.

- *The amount of light*
- *Access to essential nutrients*
- *The amount of water available*
- *The temperature*

11. Build a food chain based on the photos below.

- a) Draw the food chain.

Sunflower → fly → trout → otter

- b) Specify the trophic level for each of the living organisms in your food chain.

The sunflower is a producer. The fly, trout and otter are all consumers.



12. Look at the illustration opposite.

a) Among the organisms in the illustration, name those that are:

– producers

Cattails, water lily, algae and

phytoplankton

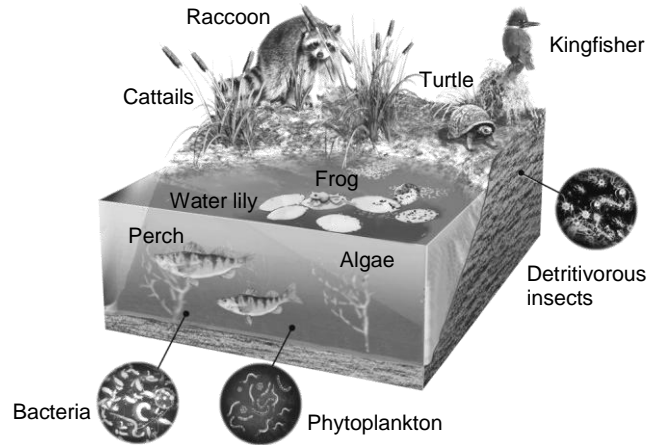
– consumers

Raccoon, kingfisher, frog, turtle and

perch

– decomposers

Detritivorous insects and bacteria



b) Draw a possible food chain containing the organisms in the illustration.

Answers will vary. Example: cattails → turtle → detritivorous insects.

13. If you tried to establish the feeding relationships between all the organisms of the lake ecosystem illustrated in question 12, would you be drawing a food chain or a trophic network? Explain your answer.

I would be drawing a trophic network because I would be representing several food chains in the same habitat.

2 DISTURBANCES (pp. 327–331)

14. True or false? Explain your answers.

a) The freezing of a lake can be considered a natural disturbance.

True. This disturbance is not caused by humans.

b) Excessive hunting and fishing are human disturbances of ecosystems.

True. Excessive hunting and fishing can alter the dynamics of an ecosystem.

c) All types of natural disturbance can occur in Québec.

False. Some natural disturbances, such as sandstorms or volcanic eruptions, cannot occur in Québec.

d) Ecological succession occurs only after a natural disturbance.

False. It also occurs after a human disturbance.

- e) Transforming forests into farmland constitutes a natural disturbance.

False. It is a human disturbance.

- f) A flood following heavy rain is a natural disturbance.

True. This disturbance is not caused by humans.

15. What is ecological succession?

Ecological succession is the series of changes that occur in an ecosystem after a disturbance and that continue until the balance of the ecosystem is restored.

⇒ Questions 16 and 17 are not intended for students in the ST program.

3 ECOTOXICOLOGY (pp. 331–336)

⇒ The questions in this section are not intended for students in the ST program.

4 BIOTECHNOLOGY TO THE RESCUE (pp. 337–341)

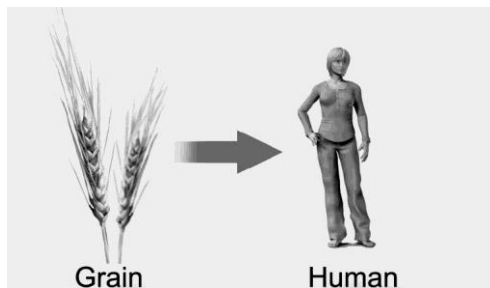
⇒ The questions in this section are not intended for students in the ST program.

REVIEW QUESTIONS

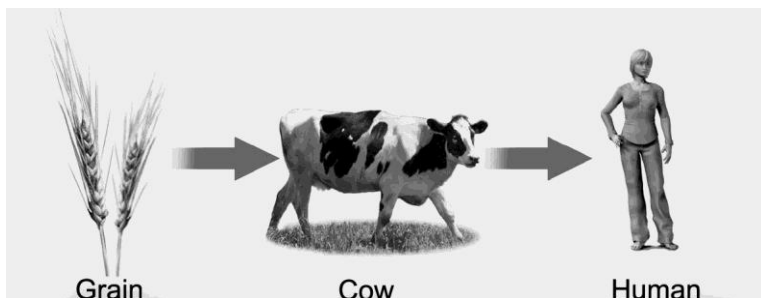
⇒ Question B is not intended for students in the ST program.

- A. Look at the following three food chains.

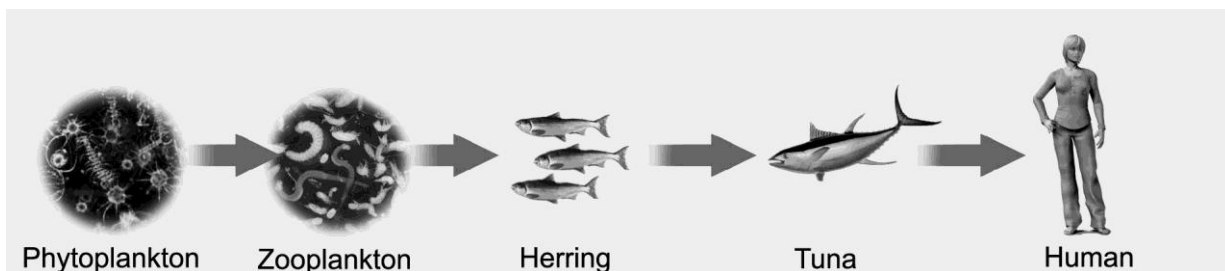
Chain 1



Chain 2



Chain 3



- a) For each of the food chains, name the trophic level of the human.

Chain 1: primary consumer

Chain 2: second-order consumer

Chain 3: fourth-order consumer

- b) Why is it correct to identify the phytoplankton in Chain 3 as producers?

Because the phytoplankton occupy the first trophic level of the food chain, which is always occupied by producers.

- c) Suppose that 10 percent of the available energy is converted into biomass at each change of trophic level. For each of the three food chains, calculate the percentage of the energy from the producers that the humans eventually convert into biomass.

Chain 1: *10 percent*

Chain 2: *1 percent*

Chain 3: *0.01 percent*

C. Prepare your own summary of Chapter 10 by building a concept map.

See the Concept maps section in Guide B.

Follow-up

- Tests conducted by Health Canada show that it is now possible to swim at several beaches along the St. Lawrence River (Fleuve Saint-Laurent). However, swimming on days after a heavy rainfall is not recommended. Explain your answer.

On days when there is heavy rainfall, the sewers to the Montréal wastewater treatment plant overflow and cannot collect all the wastewater. Many contaminants are then discharged directly into the river without being treated.

- What precautions must be taken by riverside residents in areas where local wastewater is discharged into septic tanks rather than to a treatment plant?

They must ensure that the septic tank is far enough from the river for the ground to absorb the contaminants in the wastewater before they reach the river.