EOT 3 / Revision Grade 12 General Biology/ Umm Alarab

T. Aysheh Alshdaifat

2	BIO.3.4.01.039 Explain and predict patterns of interactions among organisms across multiple ecoststems		157
	BIO.3.4.01.039 يبني تفسيراً يتنبأ من خلاله بأنماط التفاعل بين الكائنات الحية عبر أنظمة بيئية متعددة		

C Critical Thinking

Analyze an Argument Have students evaluate the following argument: Oxygen is the only abiotic factor that allows life to survive in the classroom, so as long as there is enough oxygen, all life will survive. Although oxygen is one abiotic factor, temperature, humidity, and air pressure are all important for life in the classroom.

D Develop Concepts

Activity Accompany students from the classroom to the school grounds. Have them identify the biotic and abiotic factors they observe. Alternatively, you could hold up magazine photographs of different environments and have students identify the biotic and abiotic factors they observe in each photograph.

Before beginning the exercise, define abiotic and biotic factors. Show students pictures of abiotic factors and biotic factors. Then organize students into small groups. Give each group pictures and have them classify them as showing abiotic or biotic factors.

Reading Check Answers will vary based on community location and student selections, but should accurately note the similarities and differences between abiotic and biotic factors. Be sure students understand that both abiotic and biotic factors are necessary for the survival of every organism.

Caption Question **Fig. 5** Sample answer: Organisms often depend on other organisms for food and reproduction.

Figure 5 The salmon swimming upstream are biotic factors in the stream community. Other organisms in the water, such as frogs and algae, also are biotic factors.
Explain how organisms are dependent on other organisms.

Biotic factors The living factors in an organism's environment are called the **biotic** (by AH tihk) **factors.** Consider the biotic factors in the habitat of salmon shown in **Figure 5.** These biotic factors include all of the organisms that live in the water, such as other fish, algae, frogs, and microscopic organisms. In addition, organisms that live on the land adjacent to the water might be biotic factors for the salmon. Migratory animals, such as birds that pass through the area, also are biotic factors. The interactions among organisms are necessary for the health of all species in the same geographic location. For example, the salmon need other members of their species to reproduce. Salmon also depend on other organisms for food and, in turn, are a food source for other organisms.

Abiotic factors The nonliving factors in an organism's environment are called **abiotic** (ay bi AH tihk) **factors.** The abiotic factors for different organisms vary across the biosphere, but organisms that live in the same geographic area might share the same abiotic factors. These factors might include temperature, air or water currents, sunlight, soil type, rainfall, or available nutrients. Organisms depend on abiotic factors for survival. For example, the abiotic factors important to a particular plant might be the amount of rainfall, the amount of sunlight, the type of soil, the range of temperature, and the nutrients available in the soil. The abiotic factors for the salmon in **Figure 5** might be the temperature range of the water, the pH of the water, and the salt concentration of the water.

Organisms are adapted to surviving in the abiotic factors that are present in their natural environments. If an organism moves to another location with a different set of abiotic factors, the organism might die if it cannot adjust quickly to its new surroundings. For example, if a lush green plant that normally grows in a swampy area is transplanted to a dry desert, the plant likely will die because it cannot adjust to abiotic factors present in the desert.

CAREERS IN BIOLOGY

Ecologist The field of ecology is vast. Ecologists study the organisms in the world and the environments in which they live. Many ecologists specialize in a particular area such as marine ecology.

Reading Check **Compare and contrast** abiotic and biotic factors for a plant or animal in your community.

Explain How are organisms dependent on other organisms?

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Analyze an Argument

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2. الأشياء الحية في أي نظام بيئي Living things in any ecosystem

2 / 2 pts

Auto-graded

- عامل حيوي Biotic factor ✓
- عامل غير حيوي Abiotic factor
- عامل بيئي environmental factor

3. المكونات الغير حية في اي نظام بيئي Inorganic components in any ecosystem

2 / 2 pts

Auto-graded

- عوامل غير حية abiotic factors ✓
- عوامل حية biotic factors
- عوامل بيئية environmental factor

4. ليس عاملا حيويا not biotic factor

2 / 2 pts

Auto-graded

- الحرارة temperature ✓
- عدد الحيوانات number of animals
- حجم الجماعة population volume

5. ليس عاملا غير حيويا is not Abiotic factor

2 / 2 pts

Auto-graded

- الحرارة temperature
- الحموضة Acidity
- نسبة الأكسجين Oxygen percentage
- حجم الجماعة population volume ✓

6. تعتمد الكائنات الحية في حياتها وبقائها على قيد الحياة على Living things depend on ....to be survival

2 / 2 pts

Auto-graded

- العوامل الحيوية biotic factors
- العوامل غير الحيوية Abiotic factors
- العوامل الحيوية وغير الحيوية معا both of biotic and abiotic ✓

23. Which would be an abiotic factor for a tree in the forest? عامل غير حي لشجرة

5 / 5 pts

Auto-graded

- a bird nesting in its branches طيور تعيش عليها
- fungus growing on its roots فطريات تنمو على جذورها
- wind blowing through its branches رياح تحرك افرعها ✓
- a caterpillar eating its leaves فراشات تاكل أوراقها

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D Develop Concepts

AL Extension Have students read the text under the head *Levels of Organization.*

SAY TO STUDENTS: ***Another name for the levels of organization is biological hierarchy. This hierarchy actually begins at the atomic level, with electrons, protons, and neutrons.***

ASK STUDENTS: ***What are the levels of biological hierarchy between subatomic particles and organism?*** atom, molecule, organelle, cell, tissue, organ, organ system, organism

S Skill Practice

BL OL

Use Graphic Organizers Have students fold a sheet of paper in half horizontally. Then have students make six equal tabs by cutting five slits in the top layer of the paper. Ask students to label each tab with the levels of organization and write the definition of each level of hierarchy under the appropriate tab. On the back of the paper, have students sketch an example of each level of organization. The examples should be different from the examples given in the text.

Develop Concepts

BL OL AL

Scaffolding

ASK STUDENTS: ***What is the lowest level of organization that most ecologists study?*** individual organism ***What name is given to several organisms of the same species interacting together?*** population ***What factors are included in an ecosystem that are not included in a community?*** abiotic factors ***Describe how ecosystems and biomes differ.*** Biomes include several ecosystems interacting over a large area. ***Which level of biological organization is the most complex?*** biosphere

Levels of Organization

The biosphere is too large and complex for most ecological studies. To study relationships within the biosphere, ecologists look at different levels of organization or smaller pieces of the biosphere. The levels increase in complexity as the numbers and interactions between organisms increase. The levels of organization are

- organism;
- population;
- biological community;
- ecosystem;
- biome;
- biosphere.

Refer to **Figure 6** as you read about each level.

Study Tip

Question Session Study the levels of organization illustrated in Figure 6 with a partner. Question each other about the topic to deepen your knowledge.

Review Based on what you've read about populations, how would you now answer the analysis questions?

Organisms, populations, and biological communities The lowest level of organization is the individual organism itself. In **Figure 6,** the organism is represented by a single fish. Individual organisms of a single species that share the same geographic location at the same time make up a **population.** The school of fish represents a population of organisms. Individual organisms often compete for the same resources, and if resources are plentiful, the population can grow. However, usually there are factors that prevent populations from becoming extremely large. For example, when the population has grown beyond what the available resources can support, the population size begins to decline until it reaches the number of individuals that the available resources can support.

The next level of organization is the biological community. A **biological community** is a group of interacting populations that occupy the same geographic area at the same time. Organisms might or might not compete for the same resources in a biological community. The collection of plant and animal populations, including the school of fish, represents a biological community.

Ecosystems, biomes, and the biosphere The next level of organization after a biological community is an ecosystem. An **ecosystem** is a biological community and all of the abiotic factors that affect it. As you can see in **Figure 6,** an ecosystem might contain an even larger collection of organisms than a biological community. In addition, it contains the abiotic factors present, such as water temperature and light availability. Although **Figure 6** represents an ecosystem as a large area, an ecosystem also can be small, such as an aquarium or tiny puddle. The boundaries of an ecosystem are somewhat flexible and can change, and ecosystems even might overlap.

The next level of organization is the biome. A **biome** is a large group of ecosystems that share the same climate and have similar types of communities. The biome shown in **Figure 6** is a marine biome. All of the biomes on Earth combine to form the highest level of organization: the biosphere.

Reading Check **Infer** what other types of biomes might be found in the biosphere if the one shown in **Figure 6** is called a marine biome.

Reading Check Other biomes might be terrestrial, atmospheric, and subterranean.

Assess Content Development

Assess how understanding has developed when students revisit the Launch Lab analysis questions.

Differentiated Instruction

Below Level The scaffolding technique described on this page can benefit students working below level. This method of questioning will guide students through their thought processes.

According to Al Diwan Teacher book

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LAUNCH Lab

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For more tips, see page 14T–15T.

9. أنواع مختلفة من جماعات أحيائية different species of living things

2 / 2 pts

Auto-graded

- النظام البيئي ecosystem
- المجتمع community ✓
- الجماعة population
- الغلاف الحيوي biosphere

10. نوع واحد من الكائنات الحية تعيش في نفس المكان ونفس الظروف One species of organism lives in the same place and in the same conditions

2 / 2 pts

Auto-graded

- النظام البيئي ecosystem
- المجتمع community
- الجماعة population ✓
- الغلاف الحيوي biosphere

11. فرد واحد من جماعة أحيائية only one living thing

2 / 2 pts

Auto-graded

- الجماعة population
- المجتمع community
- النظام البيئي ecosystem
- الكائن الحي organism ✓

12. هي المنطقة يعيش فيها الكائن الحي. its the area where an organism can live

2 / 2 pts

Auto-graded

- المنزل house
- الموطن البيئي habitat ✓
- الموقع niche
- النظام البيئي ecosystem

13. الدور الذي يقوم به الكائن الحي the role of an organism

2 / 2 pts

Auto-graded

- المنزل house
- الموطن البيئي habitat
- الموقع niche ✓
- النظام البيئي ecosystem

3. Which would represent a population? اي الجمل التالي تعبر عن جماعة

0 / 0 pts

Auto-graded

- All the fish in an aquarium. كل انواع السمك في أكوريوم
- All the dogs in your neighborhood. جميع الكلاب في المنطقة ✓
- All the animals in the local zoo. كل الحيوانات بالحديقة
- all of the above

7. أي جزء من الكرة الأرضية يدعم الحياة لكائن حي Any part of the globe supports the life of an organism

2 / 2 pts

Auto-graded

- النظام البيئي Ecosystem
- الإقليم الإحيائي biome
- الغلاف الحيوي biosphere ✓
- المجتمع الأحيائي community

8. يشتمل علي المكونات الحية وغير الحية في منطقة ما Includes living and non-living components in a region

2 / 2 pts

Auto-graded

- الغلاف الحيوي biosphere
- النظام البيئي ecosystem ✓
- المجتمع community
- الجماعة population

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S Skill Practice

OL AL COOP LEARN

Visual Literacy Have students read the text under the heading *Ecosystem Interactions* and review Figure 7. Assign students to work in pairs to sketch a different scene containing a biological habitat of their choice. Have them include at least six organisms that live in the habitat. Tell students to list the niche of each organism on the back of their drawings.

EL Help students list four organisms that live in the habitat.

R Reading Strategy

AL COOP LEARN

Brainstorm Arrange students in groups of two or three.

SAY TO STUDENTS: ***Read the new vocabulary under the heading*** **Ecosystem Interactions.** ***Brainstorm ideas for the meaning of each word.*** Write all ideas on the board for students to see. Tell students to write down the words *habitat* and *niche* and write what they consider to be the best analogy for each word beside it. For example, students' habitat might be a school. Their niche would be learners.

D Develop Concepts

EL OL AL **Discuss** The concepts of habitat and niche are often confused with each other.

ASK STUDENTS: ***How is a habitat different from a niche?*** The niche is a characteristic of a species and the niche involves the role an individual organism plays in the community. A habitat is the physical area in which the organism lives. ***What is an example of a habitat and an individual's niche in that habitat?*** Answers will vary, but should distinguish between an organism and its habitat.

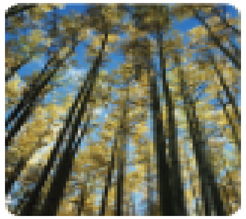

Figure 7 These trees are the habitat for the community of organisms that live there.

Ecosystem Interactions

The interactions between organisms are important in an ecosystem. A community of organisms increases the chances for survival of any one species by using the available resources in different ways. If you look closely at a tree in the forest, like the one shown in **Figure 7**, you will find a community of different birds using the resources of the tree in different ways. For example, one bird species might eat insects on the leaves while another species of bird might use pieces of bark as nesting materials. The chance of survival for the birds increases because they are using different resources.

The trees shown in **Figure 7** also are habitats. A **habitat** is an area where an organism lives. A habitat might be a single tree for an organism that spends its life on one tree. If the organism moves from tree to tree, its habitat would be a grove of trees.

Organisms not only have a habitat, they have a niche as well. A **niche** (NIHCH) is the role or position that an organism has in its environment. An organism's niche is how it meets its needs for food, shelter, and reproduction. The niche might be described in terms of requirements for living space, temperature, moisture, or in terms of appropriate mating or reproduction conditions.

Reading Check **Compare and contrast** a habitat and a niche.

Community Interactions

Organisms that live together in a biological community constantly interact. These interactions, along with the abiotic factors, shape an ecosystem. Interactions include competition for basic needs such as food, shelter, and mates, as well as relationships in which organisms depend on each other for survival.

Competition Competition occurs when more than one organism uses a resource at the same time. Resources are necessary for life and might include food, water, space, and light. For example, during a drought, as shown in **Figure 8**, water might be scarce for many organisms. The strong organisms directly compete with the weak organisms for survival. Usually the strong survive and the weak die. Some organisms might move to another location where water is available. At times when water is plentiful, all organisms share the resources and competition is not as fierce.

Predation Many species get their food by eating other organisms. The act of one organism pursuing and consuming another organism for food is **predation** (prih DAY shun). The organism that pursues another organism is the predator, and the organism that is pursued is the prey. If you have watched a cat catch a bird or mouse, you have witnessed a predator catch its prey.

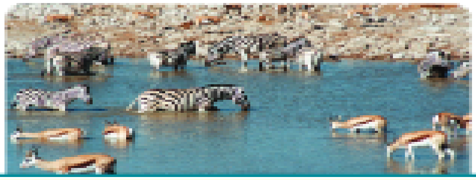

Figure 8 During droughts, animals compete for water; when water is plentiful, organisms share this resource.

Reading Check A habitat is an area. A niche is the role an organism plays in its environment.

Demonstration

EL OL **Illustrate a Niche** Show the class a fallen log or branch with bracket fungus or other fungi on it.

ASK STUDENTS: ***How is the fungus using the branch?*** The log or branch is a habitat for the fungus. ***What is one example the niche of the fungus?*** The fungus is a decomposer, taking its nutrients from the wood. Est. time: 5 min

Figure 7 These trees are the habitat for the community of organisms that live there.

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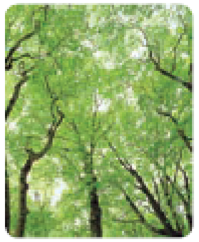

Figure 2.7 These trees are the habitat for the community of organisms that live there.

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Competition Competition occurs when more than one organism uses a resource at the same time. Resources are necessary for life and might include food, water, space, and light. For example, during a drought, as shown in **Figure 2.8**, water might be scarce for many organisms. The strong organisms directly compete with the weak organisms for survival. Usually the strong survive and the weak die. Some organisms might move to another location where water is available. At times when water is plentiful, all organisms share the resources and competition is not as fierce.

Predation Many, but not all, species get their food by eating other organisms. The act of one organism consuming another organism for food is **predation** (prih DAY shun). The organism that pursues another organism is the predator, and the organism that is pursued is the prey. If you have watched a cat catch a bird or mouse, you have witnessed a predator catch its prey.

Figure 2.8 During droughts, animals compete for water; when water is plentiful, organisms share this resource.

S Skill Practice

EL OL AL COOP LEARN

Visual Literacy Have students read the text under the heading *Ecosystem Interactions* and review Figure 2.7. Assign students to work in pairs to sketch a different scene containing a biological habitat of their choice. Have them include at least six organisms that live in the habitat. Tell students to list the niche of each organism on the back of their drawings.

BL Have students list four organisms that live in the habitat.

R Reading Strategy

EL AL COOP LEARN

Brainstorm Arrange students in groups of two or three.

SAY TO STUDENTS: *Read the new vocabulary under the heading* Ecosystem Interactions. *Brainstorm ideas for the meaning of each word.* Write all ideas on the board for students to see. Tell students to write down the words *habitat* and *niche* and write what they consider to be the best analogy for each word beside it. For example, students' habitat might be a school. Their niche would be learners.

D Develop Concepts

BL OL AL **Discuss** The concepts of habitat and niche are often confused with each other.

ASK STUDENTS: *How is a habitat different from a niche?* The niche is a characteristic of a species and the niche involves the role an individual organism plays in the community. A habitat is the physical area in which the organism lives. *What is an example of a habitat and an individual's niche in that habitat?* Answers will vary, but should distinguish between an organism and its habitat.

Reading Check A habitat is an area. A niche is the role an organism plays in its environment.

Demonstration

BL OL **Illustrate a Niche** Show the class a fallen log or branch with bracket fungus or other fungi on it.

ASK STUDENTS: *How is the fungus using the branch?* The log or branch is a habitat for the fungus. *What is one example the niche of the fungus?* The fungus is a decomposer, taking its nutrients from the wood. Est. time: 5 min

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Figure 2.7 These trees are the habitat for the community of organisms that live there.

Ecosystem Interactions

S

The interactions between organisms are important in an ecosystem. A community of organisms increases the chances for survival of any one species by using the available resources in different ways. If you look closely at a tree in the forest, like the one shown in **Figure 2.7**, you will find a community of different birds using the resources of the tree in different ways. For example, one bird species might eat insects on the leaves while another species of bird eats the ants found on the bark. The chance of survival for the birds increases because they are using different resources.

The trees shown in **Figure 2.7** also are habitats. A **habitat** is an area where an organism lives. A habitat might be a single tree for an organism that spends its life on one tree. If the organism moves from tree to tree, its habitat would be a grove of trees. R

Organisms not only have a habitat—they have a niche as well. A **niche** (NIHCH) is the role or position that an organism has in its environment. An organism's niche is how it meets its needs for food, shelter, and reproduction. The niche might be described in terms of requirements for living space, temperature, moisture, or in terms of appropriate mating or reproduction conditions. D

Reading Check **Compare and contrast** a habitat and a niche.

Community Interactions

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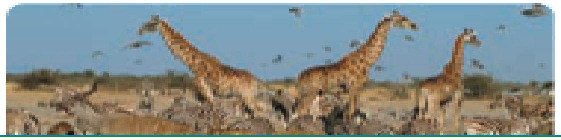

Figure 2.8 During droughts, animals compete for water; when water is plentiful, organisms share this resource.

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15. العلاقة بين كائنين كلاهما يستفيد من الأخر the relation between two organism both are benefits

2 / 2 pts

Auto-graded

- التطفل parasitism
- تبادل المنفعة mutualism ✓
- التعايش commensalism
- الافتراس predation

16. العلاقة بين كائنين يستفيد أحدهما فيما يتضرر الأخر The relationship between two living things, one benefits and the other is harmed

2 / 2 pts

Auto-graded

- التطفل parasitism ✓
- تبادل المنفعة mutualism
- التعايش communsalism
- الافتراس predation

17. العلاقة بين كائنين يستفيد أحدهما فيما لا يتأثر ولا يتضرر الأخر

2 / 2 pts

Auto-graded

- التطفل parasitism
- تبادل المنفعة mutualism
- التعايش communsalism ✓
- الافتراس predation

18. العلاقة بين كائنين يقضي أحدهما علي الأخر ويستهلكه The relationship between two objects that eliminate and consume one another

2 / 2 pts

Auto-graded

- التطفل parasitism
- تبادل المنفعة mutualism
- التعايش communsalism
- الافتراس predation ✓

19. العلاقة التي تنشأ عن نقص أو ضعف الموارد The relationship that results from a lack or limited resources

2 / 2 pts

Auto-graded

- التطفل parasitism
- التنافس competition ✓
- التعايش communsalism
- الافتراس predation

24. The insect is gathering pollen and nectar for food, but at the same time is aiding in the plant's reproduction. What does this rela-relationship demonstrate? العلاقة بين الحشرة وهذا والنبات

5 / 5 pts
Auto-graded

- ○ predation افترا س
- ◉ mutualism تبادل منفعة ✓
- ○ commensalism تعايش
- ○ parasitism تطفل

20. أحد العلاقات التالية ليست علاقة تكافلية One of the following relationships is not a symbiotic relationship

2 / 2 pts
Auto-graded

- ○ التعايش communsalism
- ◉ الافتراس predation ✓
- ○ تبادل المنفعة mutualism
- ○ التطفل parasitism

21. اختر نوع العلاقة المناسبة select suitable relationship

0 / 5 pts
Auto-graded

	افتراس	تطفل	تعايش	تبادل المنفعة	التنافس
الغزال والأسد	◉	○	○	○	○
البكتريا والانسان	○	◉	○	○	○
يتغذى كائن علي بقايا طعام كائن أخر	○	○	◉	○	○
الطحالب والفطريا ت	○	○	○	◉	○
أكثر من طائر علي نفس الشجرة	○	○	○	○	◉

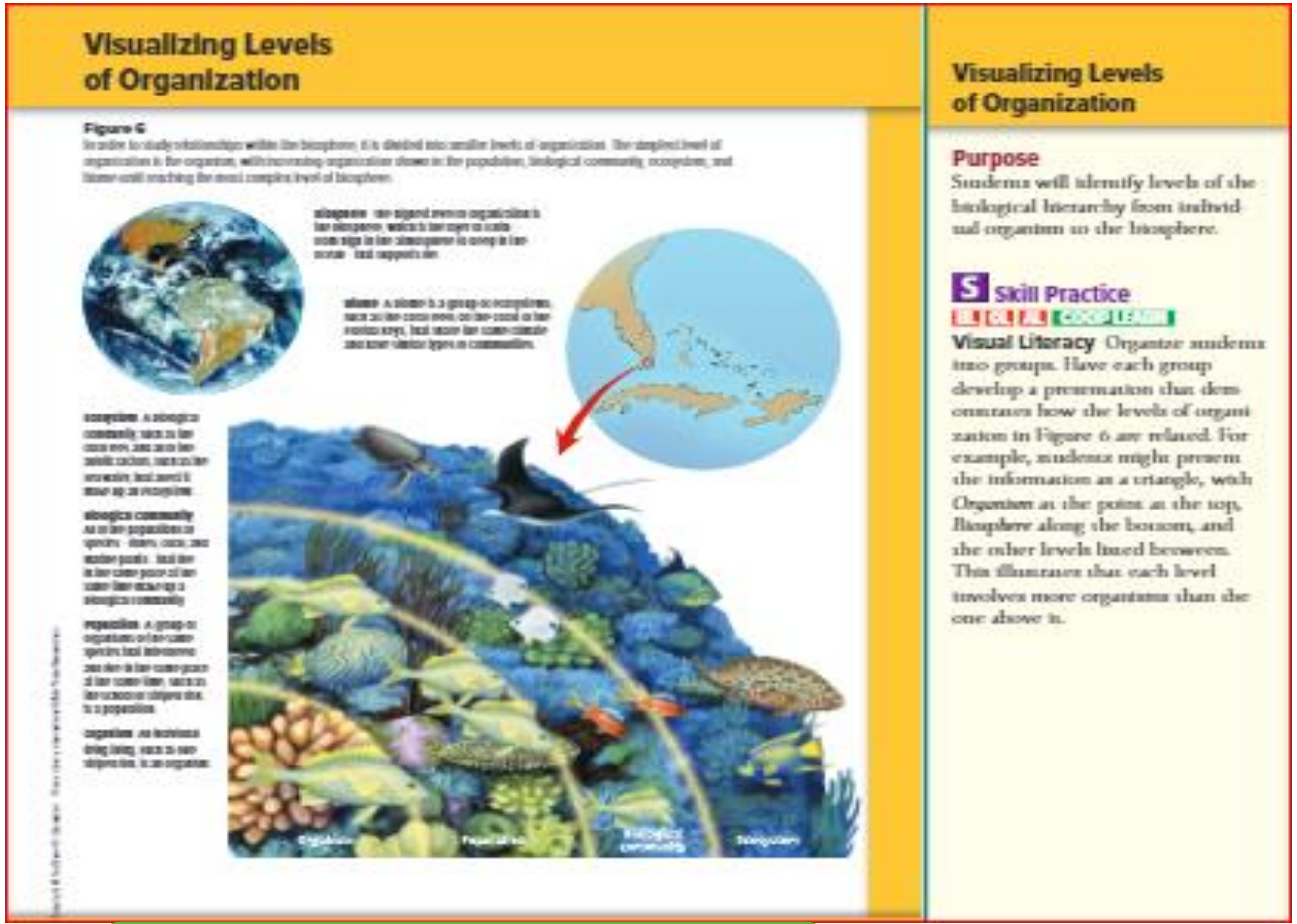
25. What term best describes the bee's role of gathering pollen? الوصف الأمثل لدور النحل

5 / 5 pts

Auto-graded

- niche الموقع ✓
- parasite التطفل
- habitat الموطن
- predator مفترس

3	BIO.3.4.01.041 Compare and contrast biotic characteristics of sustainable and nusustainable terrestrial and aquatic ecosystems	الشكل 6	160
	BIO.3.4.01.041 يقارن أوجه التشابه والاختلاف بين المكونات الحية وغير الحية للأنظمة البيئية على اليابسة وفي الماء المستدامة وغير المستدامة	Figure 6	



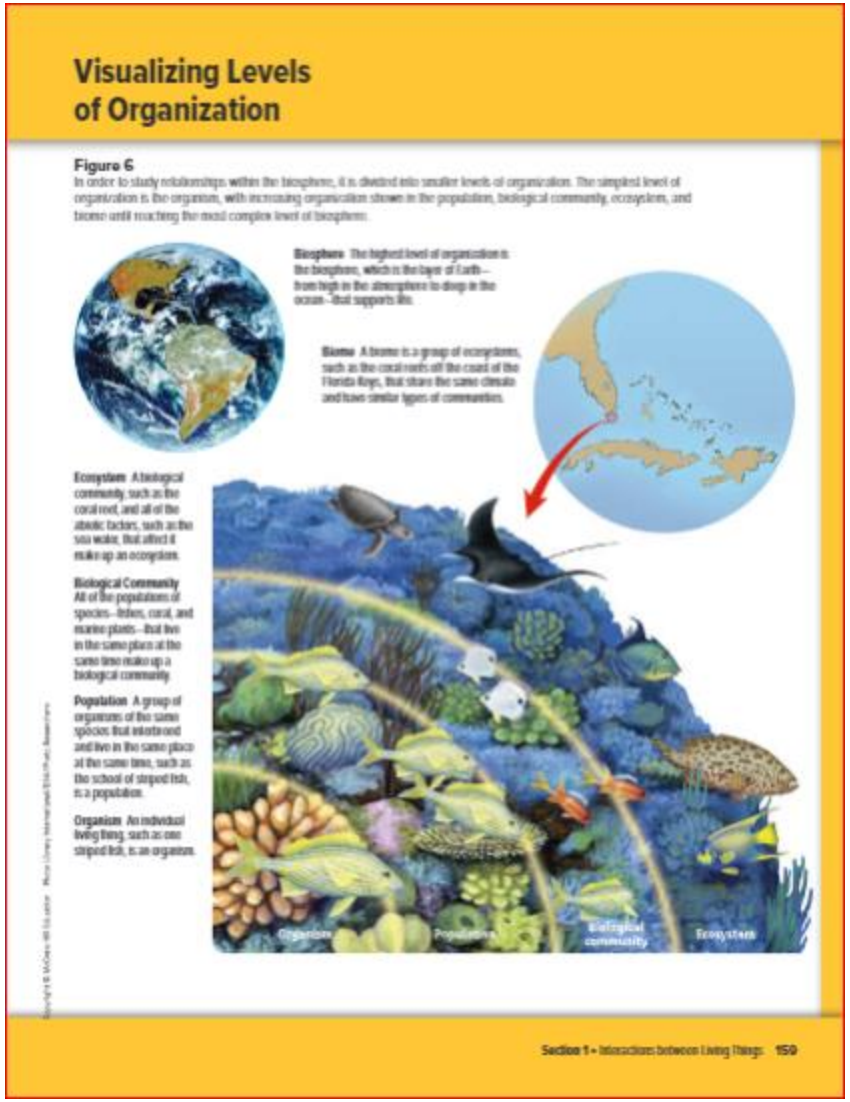
Visualizing Levels of Organization

Purpose

Students will identify levels of the biological hierarchy from individual organism to the biosphere.

Skill Practice

Visual Literacy Organize students into groups. Have each group develop a presentation that demonstrates how the levels of organization in Figure 6 are related. For example, students might present the information as a triangle, with Organism at the point at the top, Biosphere along the bottom, and the other levels listed between. This illustrates that each level involves more organisms than the one above it.



Visualizing Levels of Organization

Figure 6
In order to study relationships within the biosphere, it is divided into smaller levels of organization. The simplest level of organization is the organism, with increasing organization shown in the population, biological community, ecosystem, and biome until reaching the most complex level of biosphere.

Biosphere The highest level of organization is the biosphere, which is the layer of Earth—from high in the atmosphere to deep in the ocean—that supports life.

Biome A biome is a group of ecosystems, such as the coral reefs off the coast of the Florida Keys, that share the same climate and have similar types of communities.

Ecosystem A biological community, such as the coral reef, and all of the abiotic factors, such as the sea water, that affect it make up an ecosystem.

Biological Community All of the populations of species—fishes, coral, and marine plants—that live in the same place at the same time make up a biological community.

Population A group of organisms of the same species that interbreed and live in the same place at the same time, such as the school of striped fish, is a population.

Organism An individual living thing, such as one striped fish, is an organism.

Page 159 in Teacher Book

Visualizing Levels of Organization

NATIONAL GEOGRAPHIC

Figure 2.6
In order to study relationships within the biosphere, it is divided into smaller levels of organization. The most complex level, the biosphere, is followed by biome, ecosystem, biological community, population, and organism. Organisms are further divided into organ systems, organs, tissues, cells, molecules, and finally atoms.

Biosphere The highest level of organization is the biosphere, which is the layer of Earth—from high in the atmosphere to deep in the ocean—that supports life.

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Concepts in Motion **Interactive Figure** To see an animation of the levels of organization, visit biologygmh.com.

Biology Online

Virtual Lab

CD-ROM In this lab, students will explore and analyze five simplified model ecosystems.

"The aim of education should be to teach us rather how to think, than what to think—rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with thoughts of other men."

—Bill Beattie

Visualizing Levels of Organization

Purpose

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Skill Practice

BL OL AL COOP LEARN

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Concepts in Motion

Interactive Figure Students can interact with the levels of organization art at biologygmh.com.

Biology Online

14. رتب المستويات البيئية التالية من الأصغر إلي الأكبر Rank the following organization levels from smallest to largest

5 / 5 pts

Auto-graded

- الكائن الحي organism ✓
- الجماعة population ✓
- المجتمع community ✓
- النظام البيئي ecosystem ✓
- الاقليم الحيوي biome ✓
- biosphere الغلاف الحيوي ✓

4	BIO.3.4.01.041 Compare and contrast biotic characteristics of sustainable and nusustainable terrestrial and aquatic ecosystems	الشكل 8	161
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Brainstorm Arrange students in groups of two or three.

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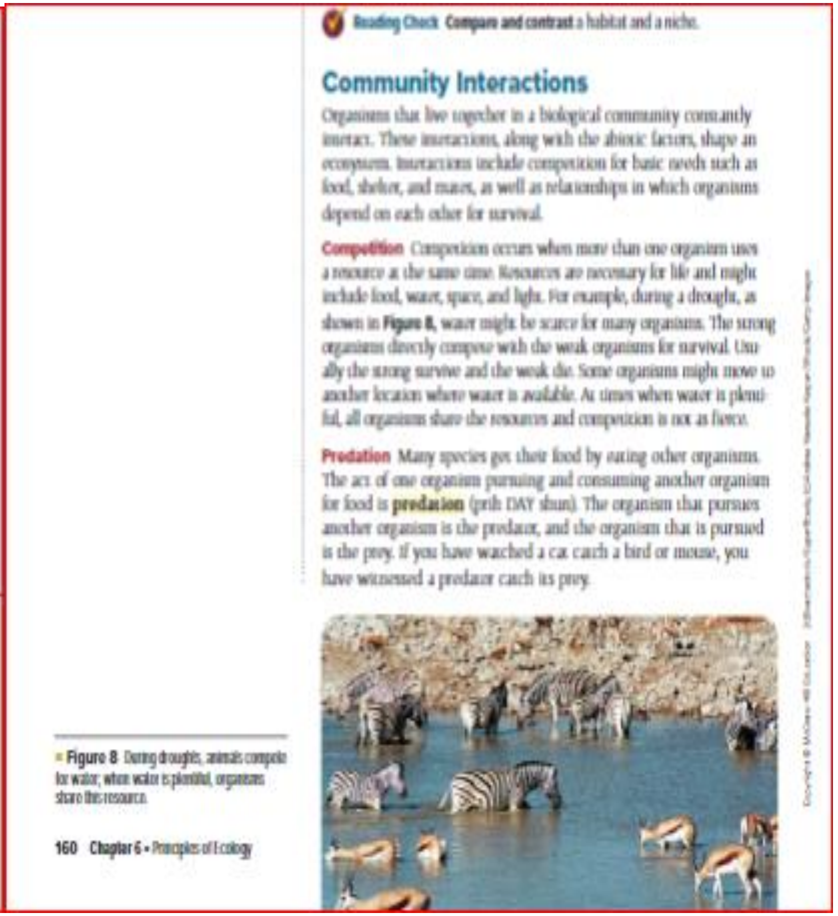

Reading Check Compare and contrast a habitat and a niche.

Community Interactions

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Predation Many species get their food by eating other organisms. The act of one organism pursuing and consuming another organism for food is **predation** (prih DAY shun). The organism that pursues another organism is the predator, and the organism that is pursued is the prey. If you have watched a cat catch a bird or mouse, you have witnessed a predator catch its prey.

Figure 8 During droughts, animals compete for water; when water is plentiful, organisms share this resource.

160 Chapter 6 • Principles of Ecology

Figure 8 in page 160 In both T,S Books / Al Diwan

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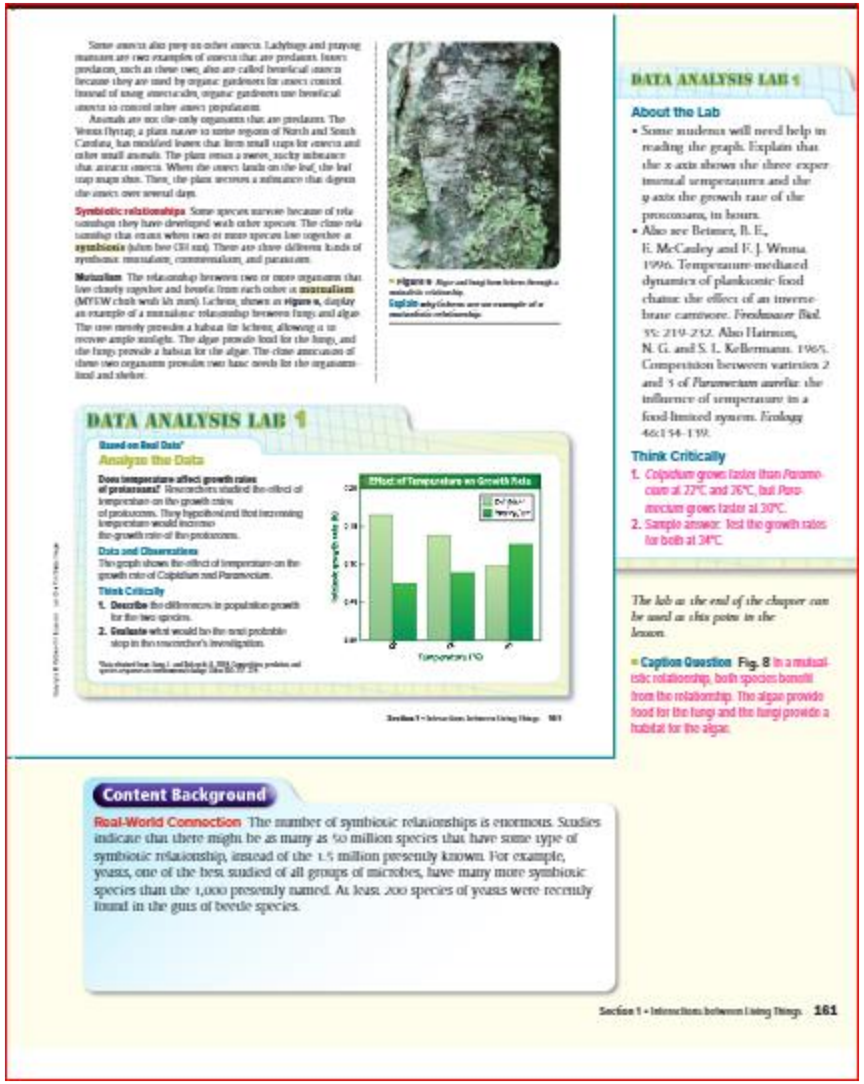
6	BIO.3.4.01.028 Describe the complementary processes of cellular respiration and photosynthesis with respect to the flow energy and the cycling of matter ecosytems and explain how human activities can disrupt the balance ach ieved by these processes	الشكل 10	163
	BIO.3.4.01.028 يصف العمليات التكميلية لتنفس الخلية والبناء الضوئي من حيث تدفق الطاقة ودورة المادة ضمن الأنظمة البيئية ، وكيف يمكن للأنشطة البشرية أن تخل بالتوازن الذي تحققه هذه العمليات	Figure 10	



DATA ANALYSIS LAB 1

About the Lab

- Some students will need help in reading the graph. Explain that the x axis shows the three experimental temperatures and the y axis the growth rate of the protozoans, in hours.
- Also see Beisner, B. E., E. McCauley and F. J. Wrona. 1996. Temperature-mediated dynamics of planktonic food chains: the effect of an invertebrate carnivore. Freshwater Biol. 35: 219-232. Also Hairston, N. G. and S. L. Kellermann. 1965. Competition between varieties 2 and 3 of Paramecium aurelia: the influence of temperature in a food-limited system. Ecology 46:134-139.

Think Critically

1. Colpidium grows faster than Paramecium at 22°C and 26°C, but Paramecium grows faster at 30°C.
2. Sample answer: Test the growth rates for both at 34°C.

The lab at the end of the chapter can be used at this point in the lesson.

Caption Question Fig. 8 In a mutualistic relationship, both species benefit from the relationship. The algae provide food for the fungi and the fungi provide a habitat for the algae.

Content Background

Real-World Connection The number of symbiotic relationships is enormous. Studies indicate that there might be as many as 50 million species that have some type of symbiotic relationship, instead of the 1.5 million presently known. For example, yeasts, one of the best studied of all groups of microbes, have many more symbiotic species than the 1,000 presently named. At least 200 species of yeasts were recently found in the guts of beetle species.

Section 1 • Interactions between Living Things 161

Figure 10 page 162 in Student and Teacher`s book / Al Diwan BUT not discussing Relation between photosynthesis and respiration maybe you mean Figure 9 page 161

Some insects also prey on other insects. Ladybugs and praying mantises are two examples of insects that are predators. Some insect predators also are called beneficial insects because they are used by organic gardeners for insect control. Instead of using insecticides, organic gardeners use beneficial insects to control other insect populations.

Animals are not the only organisms that are predators. The Venus flytrap, a plant native to some regions of North and South Carolina, has modified leaves that form small traps for insects and other small animals. The plant emits a sweet, sticky substance that attracts insects. When the insect lands on the leaf, the leaf trap snaps shut. Then, the plant secretes a substance that digests the insect over several days.

Symbiotic relationships Some species survive because of relationships they have developed with other species. The close relationship that exists when two or more species live together is **symbiosis** (sihm bee OH sus). There are three different kinds of symbiosis: mutualism, commensalism, and parasitism.

Mutualism The relationship between two or more organisms that live closely together and benefit from each other is **mutualism** (MYEW chuh wuh lih zum). Lichens, shown in **Figure 2.9**, display an example of a mutualistic relationship between fungi and algae. The tree merely provides a habitat for lichens, allowing it to receive ample sunlight. The algae provide food for the fungi, and the fungi provide a habitat for the algae. The close association of these two organisms provides two basic needs for the organisms—food and shelter.

Figure 2.9 Algae and fungi form lichens through a mutualistic relationship.
Explain *why lichens are an example of a mutualistic relationship.*

DATA ANALYSIS LAB 2.1

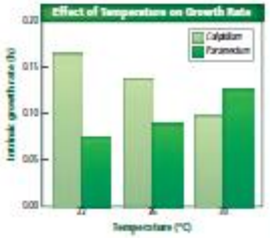
Based on Real Data*

Analyze the Data

Does temperature affect growth rates of protozoans? Researchers studied the effect of temperature on the growth rates of protozoans. They hypothesized that increasing temperature would increase the growth rate of the protozoans.

Data and Observations

The graph shows the effect of temperature on the growth rate of *Colpidium* and *Paramecium*.



Think Critically

1. **Describe** the differences in population growth for the two species.
2. **Evaluate** What could be the next step in the researcher's investigation?

*[illegible]

DATA ANALYSIS LAB 2.1

About the Lab

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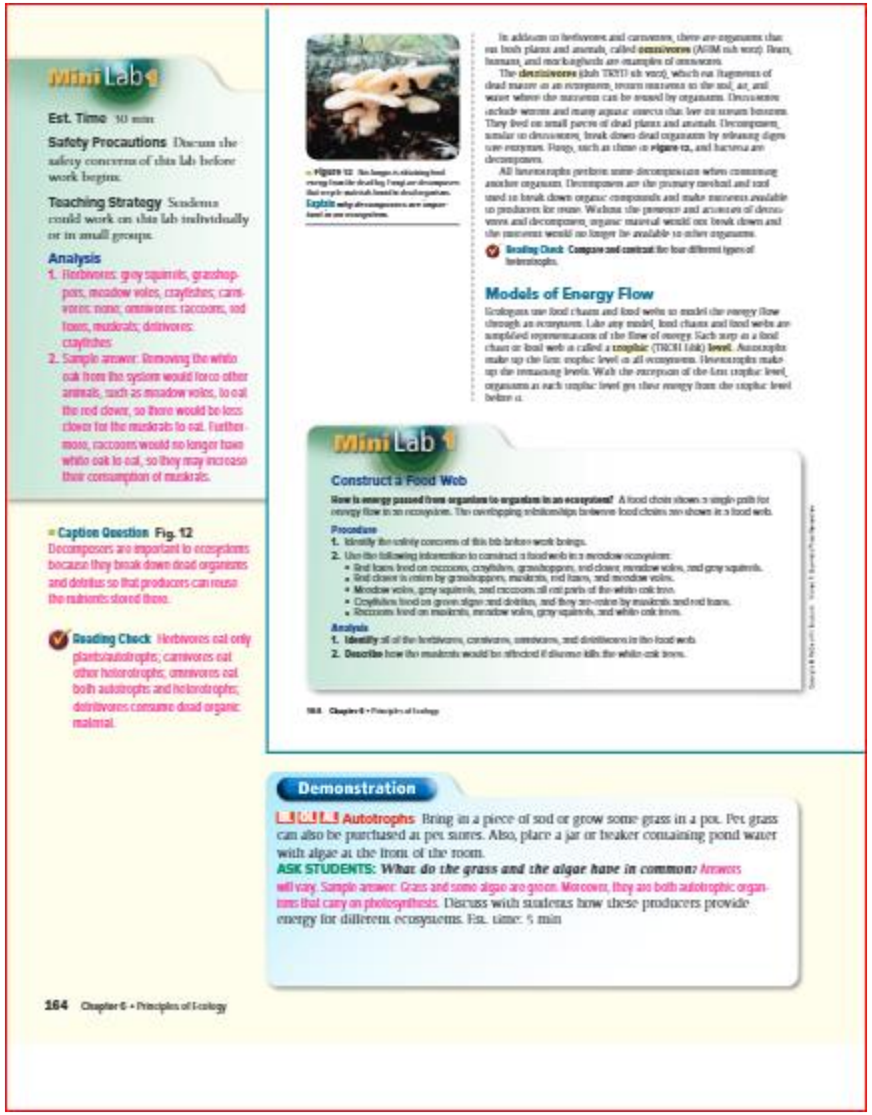
7	BIO.3.4.01.028 Describe the complementary processes of cellular respiration and photosythesis with respect to the flow energy and the cycling of matter ecosytems and explain how human activities can disrupt the balance ach ieved by these processes	الشكل 12	165 - 164
	BIO.3.4.01.028 يصف العمليات التكميلية لتنفس الخلية والبناء الضوئي من حيث تدفق الطاقة ودورة المادة ضمن الأنظمة البيئية ، وكيف يمكن للأنشطة البشرية أن تخل بالتوازن الذي تحققه هذه العمليات	Figure 12	



Mini Lab 1

Est. Time 10 min

Safety Precautions Discuss the safety concerns of this lab before work begins.

Teaching Strategy Students could work on this lab individually or in small groups.

Analysis

Caption Question Fig. 12

Reading Check

Models of Energy Flow

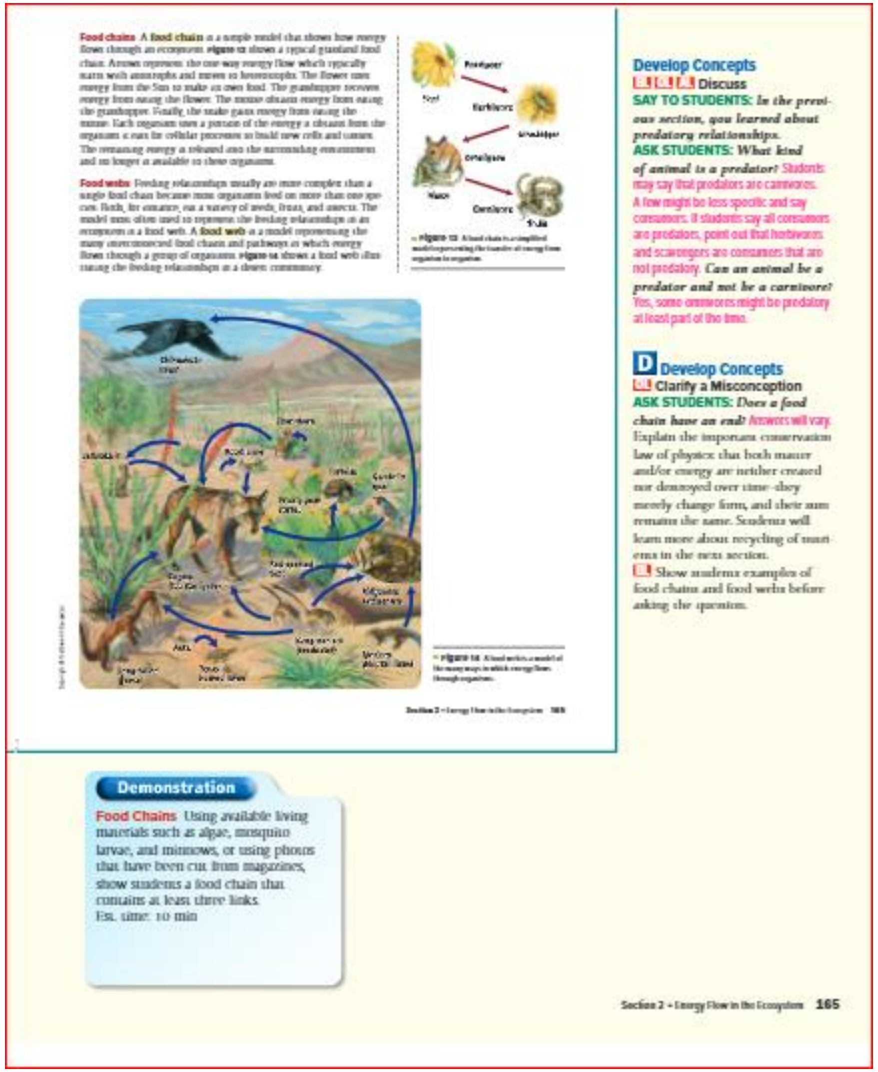
Mini Lab 1

Construct a Food Web

Demonstration

Autotrophs

164 Chapter 6 • Principles of Ecology



Food chains

Food webs

Develop Concepts

Discuss

Develop Concepts

Clarify a Misconception

Demonstration

Food Chains

Section 2 • Energy Flow in the Ecosystem 165

MiniLab 2.1

See FAST FILE Unit 1 Resources, *MiniLab worksheet.*

RUBRIC A rubric for evaluating MiniLabs is found on your TeacherWorks™ CD-ROM.

Est. Time 30 min

Safety Precautions Approve lab safety forms before work begins.

Teaching Strategy Students could work on this lab individually or in small groups.

Analysis

1. Herbivores: grey squirrels, grasshoppers, meadow voles, crayfishes; carnivores: none; omnivores: raccoons, red foxes, muskrats; detrivores: crayfishes
2. Sample answer: Removing the white oak from the system would force other animals, such as meadow voles, to eat the red clover, so there would be less clover for the muskrats to eat. Furthermore, raccoons would no longer have white oak to eat, so they may increase their consumption of muskrats.

LabManager™
Customize this lab with the LabManager™ CD-ROM.

Figure 2.12 This fungus is obtaining food energy from the dead log. Fungi are decomposers that recycle materials found in dead organisms.
Explain *why decomposers are important in an ecosystem.*

In addition to herbivores and carnivores, there are organisms that eat both plants and animals, called **omnivores** (AHM nih vorz). Bears, humans, and mockingbirds are examples of omnivores.

The **detritivores** (dih TRYD uh vorz), which eat fragments of dead matter in an ecosystem, return nutrients to the soil, air, and water where the nutrients can be reused by organisms. Detritivores include worms and many aquatic insects that live on stream bottoms. They feed on small pieces of dead plants and animals. Decomposers, similar to detritivores, break down dead organisms by releasing digestive enzymes. Fungi, such as those in **Figure 2.12**, and bacteria are decomposers.

All heterotrophs, including detritivores, perform some decomposition when they consume another organism and break down its body into organic compounds. However, it is primarily the decomposers that break down organic compounds and make nutrients available to producers for reuse. Without the detritivores and decomposers, the entire biosphere would be littered with dead organisms. Their bodies would contain nutrients that would no longer be available to other organisms. The detritivores are an important part of the cycle of life because they make nutrients available for all other organisms.

Models of Energy Flow

Ecologists use food chains and food webs to model the energy flow through an ecosystem. Like any model, food chains and food webs are simplified representations of the flow of energy. Each step in a food chain or food web is called a **trophic** (TROH fihk) **level.** Autotrophs make up the first trophic level in all ecosystems. Heterotrophs make up the remaining levels. With the exception of the first trophic level, organisms at each trophic level get their energy from the trophic level before it.

MiniLab 2.1

Construct a Food Web

How is energy passed from organism to organism in an ecosystem? A food chain shows a single path for energy flow in an ecosystem. The overlapping relationships between food chains are shown in a food web.

Procedure

1. Read and complete the lab safety form.
2. Use the following information to construct a food web in a meadow ecosystem:
   - Red foxes feed on raccoons, crayfishes, grasshoppers, red clover, meadow voles, and grey squirrels.
   - Red clover is eaten by grasshoppers, muskrats, red foxes, and meadow voles.
   - Meadow voles, gray squirrels, and raccoons all eat parts of the white oak tree.
   - Crayfishes feed on green algae and detritus, and they are eaten by muskrats and red foxes.
   - Raccoons feed on muskrats, meadow voles, grey squirrels, and white oak trees.

Analysis

1. **Identify** all of the herbivores, carnivores, omnivores, and detritivores in the food web.
2. **Describe** how the muskrats would be affected if disease kills the white oak trees.

Caption Question **Fig. 2.12**
Decomposers are important to ecosystems because they break down dead organisms and detritus so that producers can reuse the nutrients stored there.

Demonstration

BL OL AL Autotrophs Bring in a piece of sod or grow some grass in a pot. Pet grass can also be purchased at pet stores. Also, place a jar or beaker containing pond water with algae at the front of the room.
ASK STUDENTS: ***What do the grass and the algae have in common?*** Answers will vary. Sample answer: Grass and some algae are green. Moreover, they are both autotrophic organisms that carry on photosynthesis. Discuss with students how these producers provide energy for different ecosystems. Est. time: 5 min

Food chains A **food chain** is a simple model that shows how energy flows through an ecosystem. **Figure 2.13** shows a typical grassland food chain. Arrows represent the one-way energy flow which typically starts with autotrophs and moves to heterotrophs. The flower uses energy from the Sun to make its own food. The grasshopper gets its energy from eating the flower. The mouse gets its energy from eating the grasshopper. Finally, the snake gets its energy from eating the mouse. Each organism uses a portion of the energy it obtains from the organism it eats for cellular processes to build new cells and tissues. The remaining energy is released into the surrounding environment and no longer is available to these organisms.

Food webs Feeding relationships usually are more complex than a single food chain because most organisms feed on more than one species. Birds, for instance, eat a variety of seeds, fruits, and insects. The model most often used to represent the feeding relationships in an ecosystem is a food web. A **food web** is a model representing the many interconnected food chains and pathways in which energy flows through a group of organisms. **Figure 2.14** shows a food web illustrating the feeding relationships in a desert community.

Figure 2.13 A food chain is a simplified model representing the transfer of energy from organism to organism.

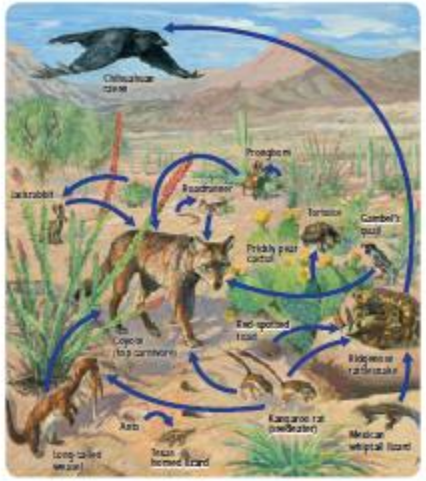


Figure 2.14 A food web is a model of the many ways in which energy flows through organisms.

Concepts in Motion
Interactive Figure To see an animation of a food web in a desert environment, visit biologygmh.com.

Develop Concepts

BL OL AL Discuss
SAY TO STUDENTS: ***In the previous section, you learned about predatory relationships.***
ASK STUDENTS: ***What kind of animal is a predator?*** Students may say that predators are carnivores. A few might be less specific and say consumers. If students say all consumers are predators, point out that herbivores and scavengers are consumers that are not predatory. ***Can an animal be a predator and not be a carnivore?*** Yes, some omnivores might be predatory at least part of the time.

D Develop Concepts

OL Clarify a Misconception
ASK STUDENTS: ***Does a food chain have an end?*** Answers will vary. Explain the important conservation law of physics: that both matter and/or energy are neither created nor destroyed over time—they merely change form, and their sum remains the same. Students will learn more about recycling of nutrients in the next section.
BL Show students examples of food chains and food webs before asking the question.

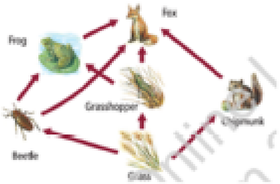
Concepts in Motion
Interactive Figure Students can interact with the food web art at biologygmh.com.
Biology Online

Demonstration

Food Chains Using available living materials such as algae, mosquito larvae, and minnows, or using photos that have been cut from magazines, show students a food chain that contains at least three links. Est. time: 10 min

30. Which organism in the illustration is an autotroph? أي من هذة الكائنات ذاتي التغذية

5 / 5 pts
Auto-graded



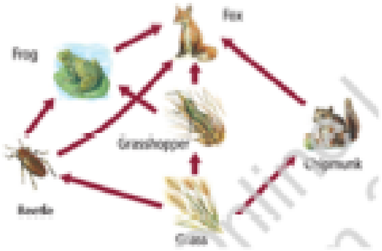
- fox الثعلب
- frog الضفدع
- grass العشب ✓
- grasshopper الجراد

31. Which is a detritivore? من المترممات

5 / 5 pts
Auto-graded

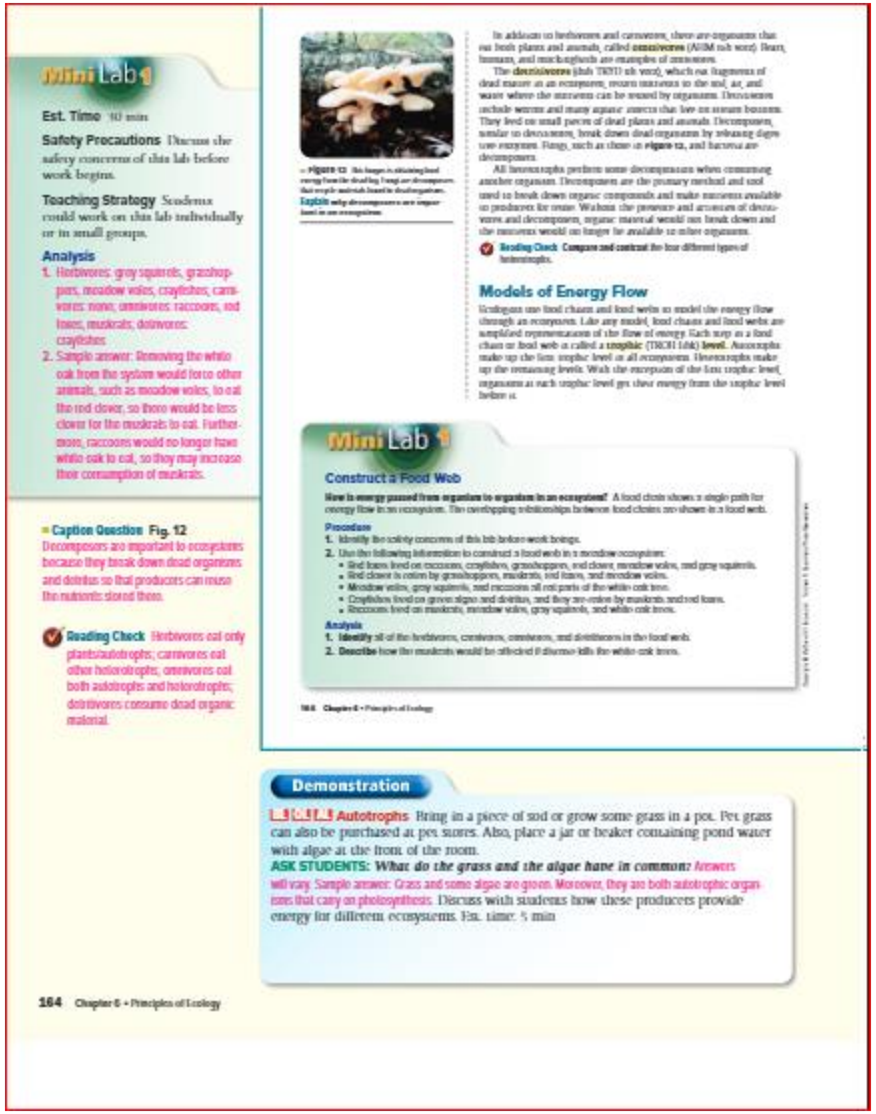
- sunflower تباع الشمس
- cat القط
- crayfish السمك ✓
- mouse الفأر

29. What does the illustration represent?



- a food web شبكة غذائية ✓
- an ecological pyramid الهرم البيئي
- food chain سلسلة غذائية

9	BIO.3.4.01.032 Explain that as energy flow throgh different organizational levels living systems ,chemical elements are recombined to form different products and energy is transferred from one system to another BIO.3.4.01.032 يفسر إنه مع تدفق الطاقة على المستويات التنظيمية المختلفة للأنظمة الحياتية ، فإن العناصر الكيميائية تندمج من جديد لتشكل نواتج مختلفة ويتم نقل الطاقة من نظام لآخر		164



MiniLab 1

Est. Time 10 min

Safety Precautions Discuss the safety concerns of this lab before work begins.

Teaching Strategy Students could work on this lab individually or in small groups.

Analysis

Models of Energy Flow

MiniLab 1

Construct a Food Web

Caption Question Fig. 12

Reading Check

Demonstration

Autotrophs

ASK STUDENTS: What do the grass and the algae have in common?

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27. How does energy first enter a pond ecosystem? كيف تدخل الطاقة للنظام البيئي

5 / 5 pts

Auto-graded

- through growth of algae خلال الطحالب
- through light from the Sun من خلال الشمس ✓
- through decay of dead fish من تحلل الاسماك
- through runoff from fields من الجريان في الحقول

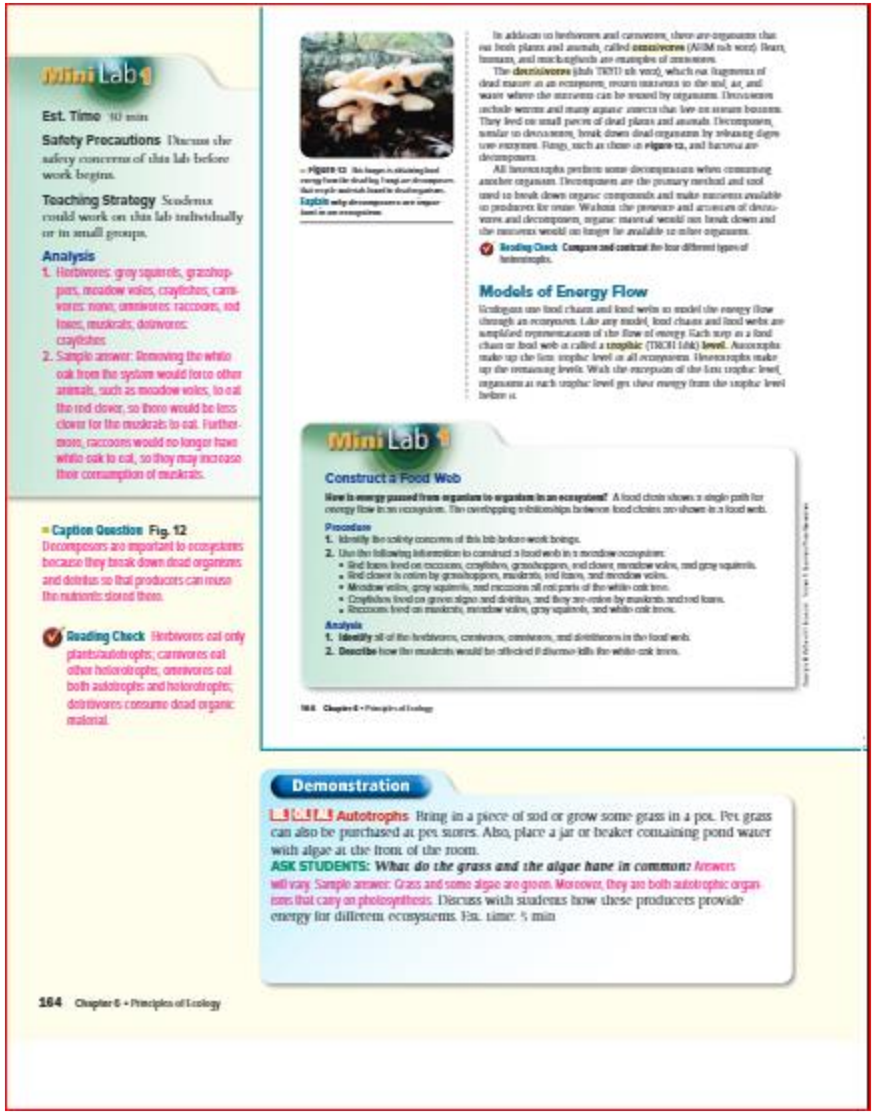
28. Which statement is true about energy in an ecosystem? الوصف الصحيح للطاقة في نظام بيئي

5 / 5 pts

Auto-graded

- Energy for most ecosystems originates from the Sun. أصلها الشمس ✓
- Energy most often is released as light from an ecosystem. تنتج من البيئة لضوء الشمس
- Energy flows from heterotrophs to autotrophs.تنتقل من

10	BIO.3.4.01.032 Explain that as energy flow throgh different organizational levels living systems ,chemical elements are recombined to form different products and energy is transferred from one system to another BIO.3.4.01.032 يفسر إنه مع تدفق الطاقة على المستويات التنظيمية المختلفة للأنظمة الحياتية ، فإن العناصر الكيميائية تندمج من جديد لتشكل نواتج مختلفة ويتم نقل الطاقة من نظام لآخر		164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Caption Question Fig. 12 Decomposers are important to ecosystems because they break down dead organisms and detritus so that producers can reuse the nutrients stored there.

Reading Check Herbivores eat only plants/autotrophs; carnivores eat other heterotrophs; omnivores eat both autotrophs and heterotrophs; detritivores consume dead organic material.

Models of Energy Flow

MiniLab 1

Construct a Food Web

Demonstration

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164 Chapter 6 • Principles of Ecology

8	BIO.3.4.01.032 Explain that as energy flow throgh different organizational levels living systems ,chemical elements are recombined to form different products and energy is transferred from one system to another	الشكل 13	165
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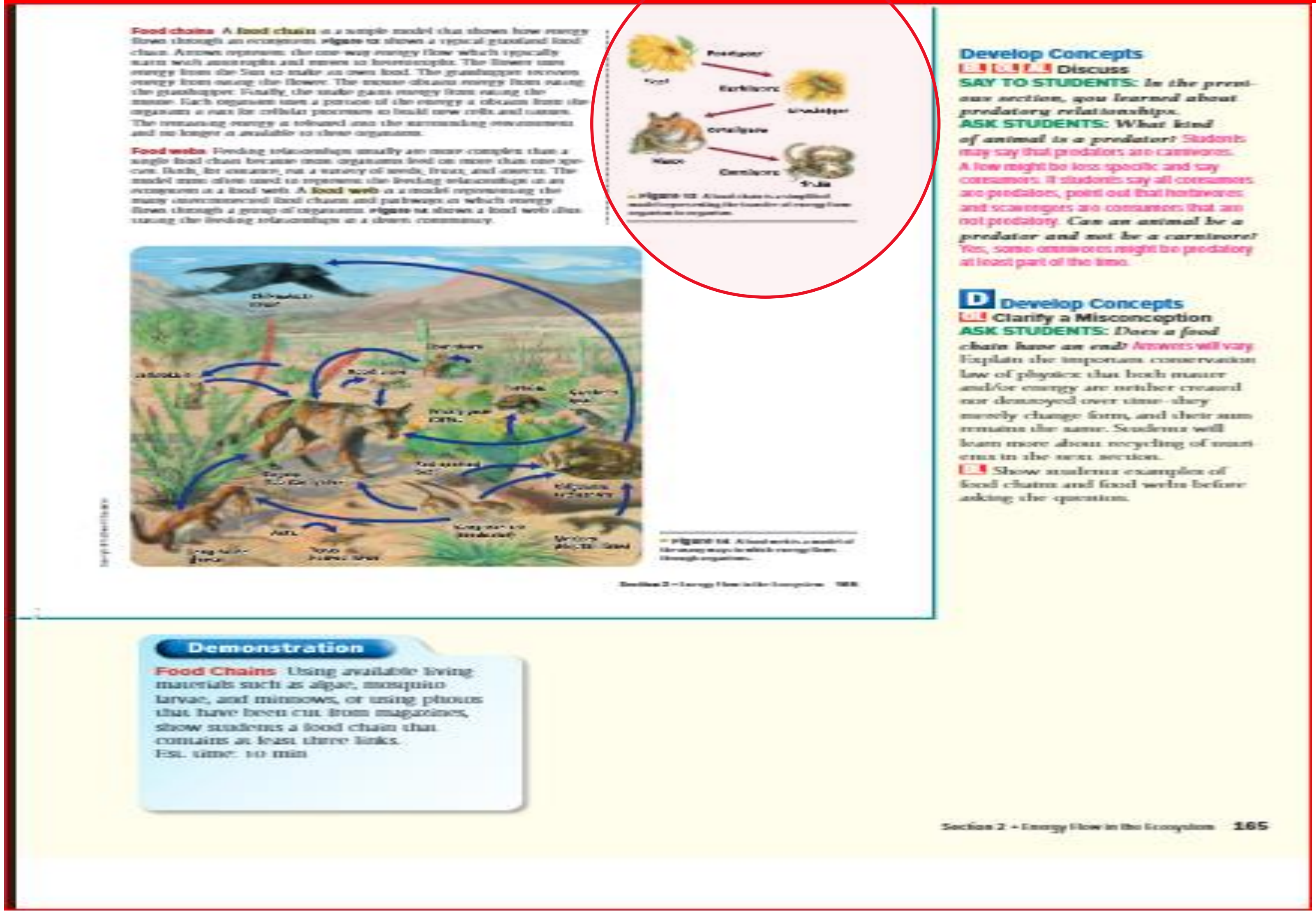

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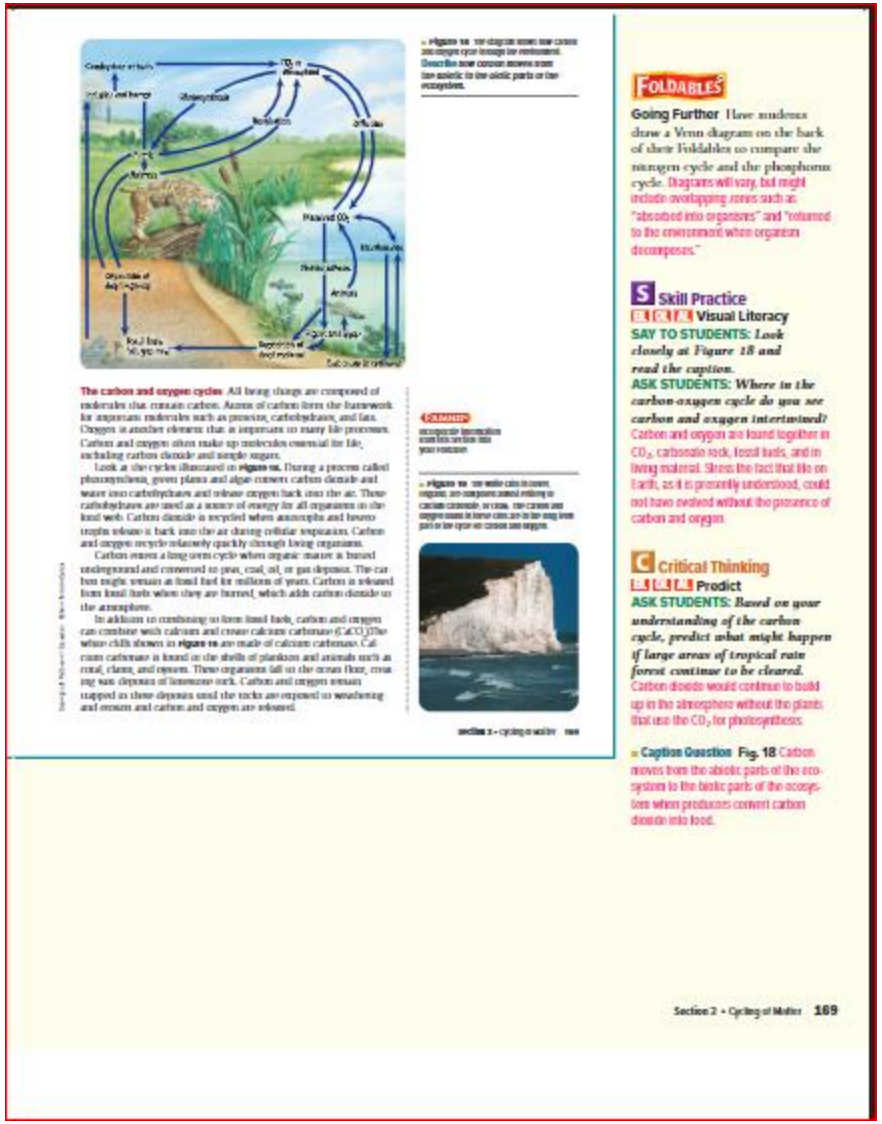
Figure 13 in page 165 in student book

11	BIO.3.4.01.026 Explain that photosythesis and celluar respiration are important components of the carbon cycle in which carbon is exchanged between the biosphere atmosphere oceans and geosphere through chemical phyiscal geologicl and biology processes	الشكل 17	169
	BIO.3.4.01.026 يفسر أن البناء الضوئي والتنفس الخلوي هي مكونات عامة في دورة الكربون، والتي يتم من خلالها تبادل الكربون ما بين المحيط الخلوي ، والغلاف الجوي، والمحيطات ، والمحيط الأرضي من خلال العمليات الكيميائية والفيزيائية والجيولوجية والحيوية	Figure 17	



FOLDABLES

Going Further Have students draw a Venn diagram on the back of their Foldables to compare the nitrogen cycle and the phosphorus cycle. Diagrams will vary, but might include overlapping zones such as "absorbed into organisms" and "returned to the environment when organism decomposes."

S Skill Practice

Visual Literacy

SAY TO STUDENTS: *Look closely at Figure 18 and read the caption.*

ASK STUDENTS: *Where in the carbon-oxygen cycle do you see carbon and oxygen intertwined?* Carbon and oxygen are found together in CO_2, carbonate rock, fossil fuels, and in living material. Stress the fact that life on Earth, as it is presently understood, could not have evolved without the presence of carbon and oxygen.

C Critical Thinking

Predict

ASK STUDENTS: *Based on your understanding of the carbon cycle, predict what might happen if large areas of tropical rain forest continue to be cleared.* Carbon dioxide would continue to build up in the atmosphere without the plants that use the CO_2 for photosynthesis.

Caption Question Fig. 18 Carbon moves from the abiotic parts of the ecosystem to the biotic parts of the ecosystem when producers convert carbon dioxide into food.

Section 2 • Cycling of Matter 169

Figure 18 is about carbon cycle in page 169 not 17

12	BIO.3.4.01.026 Explain that photosythesis and celluar respiration are important components of the carbon cycle in which carbon is exchanged between the biosphere atmosphere oceans and geosphere through chemical phyiscal geologicl and biology processes	الشكل 20	171
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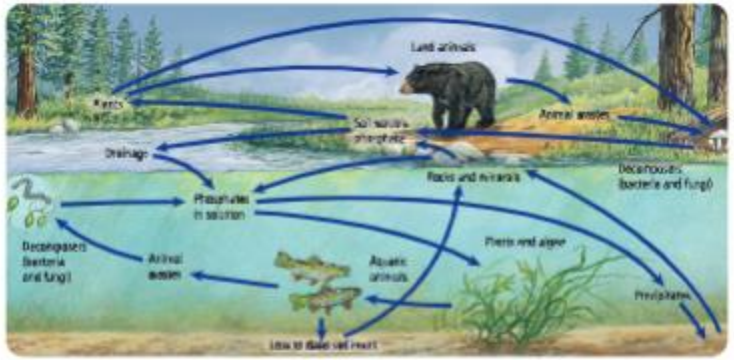


The phosphorus cycle Phosphorus is an element that is essential for the growth and development of organisms. **Figure 21** illustrates the two cycles of phosphorus: a short-term and long-term cycle. In the short-term cycle, phosphorus in phosphates in solution, is cycled from the soil to producers and then from the producers to consumers. When organisms die or produce waste products, decomposers return the phosphorus to the soil where it can be used again. Phosphorus moves from the short-term cycle to the long-term cycle through precipitation and sedimentation to form rocks. In the long-term cycle, weathering or erosion of rocks that contain phosphorus slowly adds phosphorus to the cycle. Phosphorus, in the form of phosphates, might be present only in small amounts in soil and water. Therefore, phosphorus is a factor that limits the growth of producers.

Figure 21 The phosphorus cycle has a short-term cycle and a long-term cycle.

Section 3 Review

Section Summary

- Biogeochemical cycles include the exchange of important nutrients between the abiotic and biotic parts of an ecosystem.
- The carbon and oxygen cycles are closely intertwined.
- Nitrogen gas is limited in its ability to enter biotic portions of the environment.
- Phosphorus and carbon have short-term and long-term cycles.

Understand Main Ideas

1. **Name** four important biogeochemical processes that cycle nutrients.
2. **Compare and contrast** two of the cycles of matter.
3. **Explain** the importance of nutrients to an organism of your choice.
4. **Describe** how phosphorus moves through the biotic and abiotic parts of an ecosystem.

Think Critically

5. **Design** an experiment to test the amount of fertilizer to use on a lawn for the best results. Fertilizers usually contain nitrogen, phosphorus, and potassium. The numbers on the label represent the amount of each nutrient in the fertilizer. How would you experiment to determine the correct quantity of fertilizer?

Section 3 • Cycling of Matter 171

Phosphorus cycle Figure 20 in page 171? Not discussing carbon movement

PHOTOSYNTHESIS and CELLULAR RESPIRATION

Photosynthesis Equation:

$$6CO_2 + 6\,H_2O \xrightarrow{\text{sunlight}} C_6H_{12}O_6 + 6\,O_2$$

6 Carbon Dioxide + 6 Water $\xrightarrow{\text{sunlight}}$ Glucose + 6 Oxygen

Cellular Respiration Equation:

$$C_6H_{12}O_6 + 6\,O_2 \rightarrow 6\,CO_2 + 6\,H_2O + ATP$$

Glucose + 6 Oxygen → 6 Carbon Dioxide + 6 Water

13	BIO.3.4.01.040 Explain how matter is recy cled within the environment and how it promotes sustainability	الشكل 19	170
	BIO.3.4.01.040 يشرح كيف تدور المادة ضمن البيئة وكيف تعزز على الاستدامة	Figure 19	

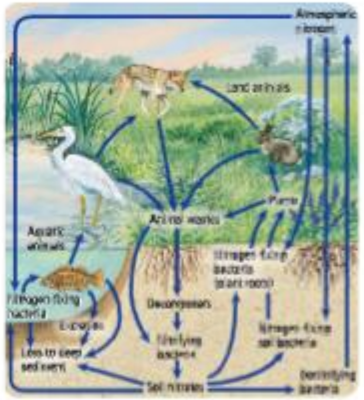


Figure 20 Nitrogen is used and reused as it is cycled continuously through the biosphere.

The nitrogen cycle Nitrogen is an element found in proteins. The largest concentration of nitrogen is found in the atmosphere. Plants and animals cannot use nitrogen directly from the atmosphere. Nitrogen gas is captured from the air by species of bacteria that live in water, the soil, or grow on the roots of some plants. The process of capture and conversion of nitrogen into a form that is usable by plants is called **nitrogen fixation**. Some nitrogen is also fixed during electrical storms when the energy from lightning bolts changes nitrogen gas to nitrates. Nitrogen is also added to soil when chemical fertilizers are applied to lawns, crops, or other areas.

Nitrogen enters the food web when plants absorb nitrogen compounds from the soil and convert them into proteins, as illustrated in **Figure 20**. Consumers get nitrogen by eating plants or animals that contain nitrogen. They reuse the nitrogen and make their own proteins. Because the supply of nitrogen in a food web depends on the amount of nitrogen that is fixed, nitrogen is often a factor that limits the growth of producers.

Nitrogen is returned to the soil in several ways, also shown in **Figure 20**. When an animal urinates, nitrogen returns to the water or soil and is reused by plants. When organisms die, decomposers transform the nitrogen in proteins and other compounds into ammonia. Organisms in the soil convert ammonia into nitrogen compounds that can be used by plants. Finally, in a process called **denitrification**, some soil bacteria convert fixed nitrogen compounds back into nitrogen gas, which returns it to the atmosphere.

MiniLab 2

Test for Nitrates

How much nitrate is found in various water sources? One ion containing nitrogen found in water can be easily tested—nitrate. Nitrate is a common form of inorganic nitrogen that is used easily by plants.

Procedure

1. Identify the safety concerns of this lab before work begins.
2. Prepare a data table to record your observations.
3. Obtain the **water samples** from different sources that are provided by your teacher.
4. Using a **nitrate test kit**, test the amount of nitrate in each water sample.
5. Dispose of your samples as directed by your teacher.

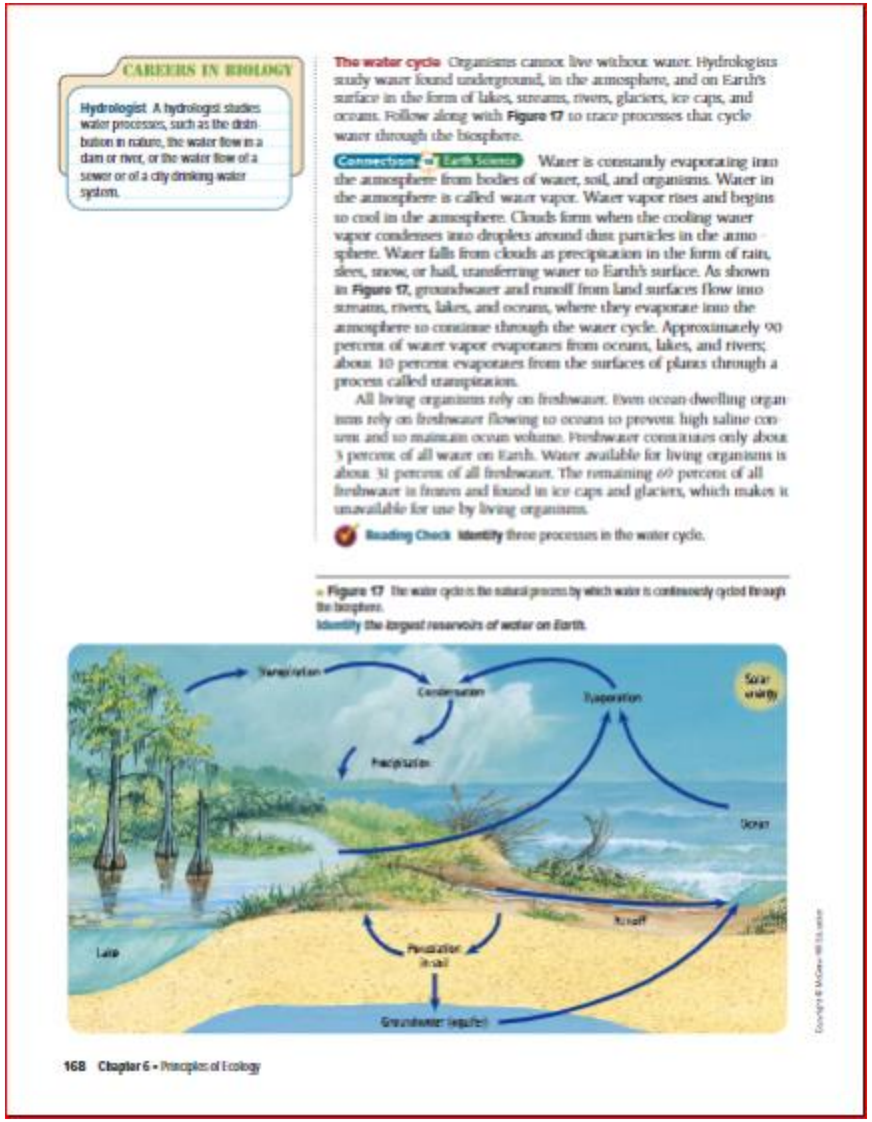
Analysis

1. **Determine** whether the samples contain differing amounts of nitrate. Explain.
2. **Identify** what types of human activities might increase the amount of nitrate in the water.
3. **Infer** what problems a high nitrate level could cause, considering that nitrates also increase the growth rate of algae in waterways.

I think all cycles are included in the exam

Figure 20 in page 170

14	BIO.3.4.01.040 Explain how matter is recy cled within the environment and how it promotes sustainability	الشكل 19	168
	BIO.3.4.01.040 يشرح كيف تدور المادة ضمن البيئة وكيف تعزز على الاستدامة	Figure 19	



CAREERS IN BIOLOGY

Hydrologist A hydrologist studies water processes, such as the distribution in nature, the water flow in a dam or river, or the water flow of a sewer or of a city drinking water system.

The water cycle Organisms cannot live without water. Hydrologists study water found underground, in the atmosphere, and on Earth's surface in the form of lakes, streams, rivers, glaciers, ice caps, and oceans. Follow along with **Figure 17** to trace processes that cycle water through the biosphere.

Connection to Earth Science Water is constantly evaporating into the atmosphere from bodies of water, soil, and organisms. Water in the atmosphere is called water vapor. Water vapor rises and begins to cool in the atmosphere. Clouds form when the cooling water vapor condenses into droplets around dust particles in the atmosphere. Water falls from clouds as precipitation in the form of rain, sleet, snow, or hail, transferring water to Earth's surface. As shown in **Figure 17**, groundwater and runoff from land surfaces flow into streams, rivers, lakes, and oceans, where they evaporate into the atmosphere to continue through the water cycle. Approximately 90 percent of water vapor evaporates from oceans, lakes, and rivers; about 10 percent evaporates from the surfaces of plants through a process called transpiration.

All living organisms rely on freshwater. Even ocean-dwelling organisms rely on freshwater flowing to oceans to prevent high saline content and to maintain ocean volume. Freshwater constitutes only about 3 percent of all water on Earth. Water available for living organisms is about 31 percent of all freshwater. The remaining 69 percent of all freshwater is frozen and found in ice caps and glaciers, which makes it unavailable for use by living organisms.

Reading Check **Identify** three processes in the water cycle.

Figure 17 The water cycle is the natural process by which water is continuously cycled through the biosphere.
Identify *the largest reservoirs of water on Earth.*

Figure 17 water cycle in page 168 not 19

15	BIO.3.4.01.040 Explain how matter is recy cled within the environment and how it promotes sustainability	الشكل 20	171
	BIO.3.4.01.040 يشرح كيف تدور المادة ضمن البيئة وكيف تعزز على الاستدامة	Figure 20	

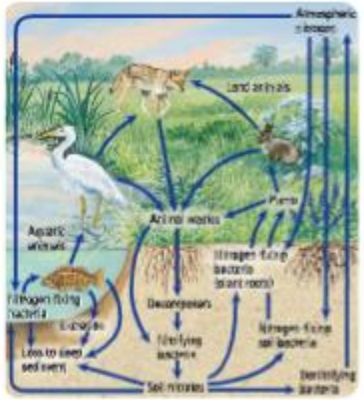


Figure 20 Nitrogen is used and reused as it is cycled continuously through the biosphere.

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3. **Infer** what problems a high nitrate level could cause, considering that nitrates also increase the growth rate of algae in waterways.

Figure 20 nitrogen cycle in page 170

32. What is the name of the process in which bacteria and lightning convert nitrogen into compounds that are useful to plants?العملية التي من خلالها يتم تحويل النيتروجين لصورة قابلة للاستخدام بواسطة البكتريا والبرق

5 / 5 pts
Auto-graded

- ammonification تكوين الامونيا
- denitrification ازالة النيتروجين
- nitrate cycling دورة النيتروجين
- nitrogen fixation تثبيت النيتروجين ✓

33. What are the two major life processes that involve carbon and oxygen? العمليات الساسية التي تتضمن الكسجين والكربون

5 / 5 pts
Auto-graded

- coal formation and photosynthesis تكون الفحم و البناء الضوئي
- photosynthesis and respiration البناء الضوئي والتنفس الخلوي ✓
- fuel combustion and open burning احتراق الوقود والحرائق المفتوحة
- death and decay الموت والتحلل

34. Which process locks phosphorus in a long term cycle? تدوير الفوسفات لوقت طويل جدا

5 / 5 pts
Auto-graded

- organic materials buried at the bottom of oceans من المواد العضوية في قاع المحيطات
- phosphates released into the soil انطلاقه من التربة
- animals and plants eliminating wastes من فضلات النباتات والحيوانات
- rain eroding mountains من تعرية الامطار للجبال ✓

35. Which would be considered an ecosystem? ما الذي يعتبر نظاما بيئيا

5 / 5 pts
Auto-graded

- bacteria living in a deep ocean vent بكتريا تعيش في عمق المحيط
- biotic factors in a forest العوامل الحية في غابة
- living and nonliving things in a pond الاشياء الحية وغير الحية في بركة ماء ✓
- populations of zebras and lionsجماعات من الاسود والجمير الوحشية

36. the total mass of organisms at a trophic level كتلة الكائنات الحية في مستوى غذائي

5 / 5 pts
Auto-graded

- niche الموقع
- trophic level المستوى الغذائي
- biomass الكتلة الحيوية ✓
- biotic factor العامل الحيوي

37. Which statement best describes a biogeochemical cycle? الوصف الافضل للدورات البيوجيوكيميائية

5 / 5 pts

Auto-graded

- A cycle that recycles chemical elements and water.تدوير الماء والمواد الكيميائية
- A cycle that continuously cycles chemical elements and water.التدوير المستمر للماء والمواد الكيميائية
- A cycle that continuously cycles chemical elements and water التدوير المستمر للمواد التي يحتجها الكائنات الحية
- d. A cycle that continuously cycles chemical elements and water that are needed by organisms through an ecosystem.التدوير المستمر للماء والمواد التي يحتاجها الكائنات الحية مع البيئة والغلاف الجوي ✓

38. The relationship between condensation and precipitation is that العلاقة بين التكاثف والهطول

Points / 5 pts

- a. precipitation needs to occur prior to condensation. الهطول قبل التكاثف
- b. condensation needs to occur prior to precipitation. التكاثف يحدث قبل الهطول
- c. both are parts of the water cycle. كلاهما جزء من دورة الماء
- d. both b and c describe the relationship. كلا من b وc صحيحة

39. The best description of the relationship between runoff and groundwater is that الوصف الأفضل للعلاقةبين جريان الماء و المياة الجوفية

5 / 5 pts

Auto-graded

- a. runoff turns into groundwater. جريان الماء يذهب الي المياة الجوفية
- b. groundwater turns into runoff. المياة الجوفية تذهب الي الجريان
- c. both result from precipitation and may end up in bodies of water. كلاهما يأتي من الهطول ويعتبران من مناطق لتجمع المياة ✓

40. Nitrogen fixation تثبيت النيتروجين

5 / 5 pts

Auto-graded

- is the process of changing nitrogen gas to nitrates.a. هي عملية تغيير غاز النيتروجين إلى نترات ✓
- is the process of changing nitrates to nitrogen gas.b. هو عملية تغيير النترات إلى غاز النيتروجين
- is carried out by nitrogen-fixing plants.c. يتم تنفيذها من قبل النباتات المثبتة للنيتروجين.
- naturally occurs in the atmosphered. بشكل طبيعي يحدث في الغلاف الجوي.

43. Which statement is correct? الجملة الصحيحة هي

5 / 5 pts

Auto-graded

- Fossil fuels can store carbon for millions of years, and release carbon when burned.a. يمكن للوقود الأحفوري تخزين الكربون لملايين السنين، وإطلاق الكربون عند حرقه. ✓
- Fossil fuels can store carbon for millions of years, and release oxygen when burned.b. يمكن للوقود الأحفوري تخزين الكربون لملايين السنين، وإطلاق الأكسجين عند حرقه
- Fossil fuels can store oxygen for millions of years, and release carbon when burned.c. يمكن للوقود الأحفوري تخزين الأكسجين لملايين السنين، وإطلاق الكربون عند حرقه.
- Fossil fuels can store nitrogen for millions of years, and release nitrogen when burned.d. الوقود الأحفوري يمكن تخزين النيتروجين لملايين السنين، وإطلاق النيتروجين عند حرقها

44. Which of the following would NOT be a community? أي من التالي لن يكون مجتمعًا؟

5 / 5 pts

Auto-graded

- All the plants, insects, and soil in your back yard.a. جميع النباتات والحشرات والتربة في الفناء الخلفي الخاص بك ✓
- All the many varieties of dogs in your neighborhood.b. جميع أنواع كثيرة من الكلاب في منطقتكم.
- All the fish in an aquarium.c. كل الأسماك في حوض السمك.

41. In terms of carbon and the atmosphere, autotrophs من حيث الكربون والغلاف الجوي، الكائنات ذاتية التغذية تقوم

0 / 5 pts

Auto-graded

- remove carbon through photosynthesis and release carbon by cellular respiration. a. إزالة الكربون من خلال التمثيل الضوئي وإطلاق الكربون عن طريق التنفس الخلوي ✓
- remove carbon through cellular respiration and release carbon by photosynthesis.b. إزالة الكربون من خلال التنفس الخلوي وإطلاق الكربون عن طريق التمثيل الضوئي. ✗
- remove oxygen through photosynthesis but release carbon by cellular respiration.c. إزالة الأكسجين من خلال التمثيل الضوئي ولكن الإفراج عن الكربون عن طريق التنفس الخلوي
- only remove carbon through photosynthesis.d. فقط إزالة الكربون من خلال التمثيل الضوئي.

42. Which statement is correct? الجملة الصحيحة هي

5 / 5 pts

Auto-graded

- Nitrogen must cycle through an ecosystem because it is used to make proteins and nucleic acids. a. يجب أن يمر النيتروجين عبر نظام بيئي لأنه يستخدم لصنع البروتينات والأحماض النووية
- Nitrogen makes up most of Earth's atmosphere.b. النيتروجين يشكل معظم الغلاف الجوي للأرض
- Nitrogen gas from the atmosphere cannot be used by plants to make organic compounds.c. لا غاز النيتروجين في الغلاف الجوي يمكن استخدامه من قبل النباتات لصنع مركبات عضوية
- All are true كلها صحيحة ✓

48. rain, snow, sleet, hail, or freezing rain المطر أو الثلج أو البرد أو المطر المتجمد

5 / 5 pts
Auto-graded

- evaporation التبخر
- precipitation الهطول ✓
- condensation التكاثف
- groundwater المياة الجوفية

49. occurs when plants release water vapor through leaf pores يحدث عندما يتبخر الماء من النباتات

5 / 5 pts
Auto-graded

- evaporation التبخر
- precipitation الهطول
- condensationالتكاثف
- transpirationالنتح ✓

50. occurs when water on the surface changes to water vapor يحدث عندما يتحول الماء الي بخار

5 / 5 pts
Auto-graded

- evaporation التبخير ✓
- precipitationالهطول
- condensationالتكاثف
- transpirationالنتح

51. the process in which water vapor changes to tiny droplets of liquid water العملية التي تحول بخار الماء الي صورة سائلة اوقطرات ماء

5 / 5 pts
Auto-graded

- evaporation التبخر
- precipitationالهطول
- condensationالتكاثف ✓
- transpiration النتح

52. cycles that recycle chemical elements and water needed by organisms

5 / 5 pts
Auto-graded

- biogeochemical cycle ✓
- nitrogen cycle
- condensation
- transpiration

53. moves nitrogen back and forth between the atmosphere and organisms حركة النيتروجين بين الغلاف الجوي والكائنات الحية

Points / 5 pts

- nitrogen cycle دورة النيتروجين
- groundwater المياة الجوفية
- water cycle دورة الماء
- carbon cycle دورة الكربون

54. the process of changing nitrogen gas to nitrates عملية تحويل النيتروجين الي نترات

5 / 5 pts
Auto-graded

- nitrogen cycle دورة النيتروجين
- nitrogen fixation تثبيت النيتروجين ✓
- denitrification ازالة النيتروجين
- carbon cycle دورة الكربون

55. the process of changing nitrates to nitrogen gas تحويل النترات الي نيتروجين

5 / 5 pts
Auto-graded

- nitrogen cycle دورة النيتروجين
- nitrogen fixation تثبيت انيتروجين
- denitrification ازالة النيتروجين ✓
- carbon cycle دورة الكربون

56. The area between the highest mountain and the deepest ocean where life can be found المنطقة بين اعلي قمة جبل وأعمق نقطة في المحيط حيث توجد حياة

5 / 5 pts
Auto-graded

- Biosphere الغلاف الحيوي ✓
- Biome المنطقة الحيوية
- Farm المزرعة
- Ecosystem النظام البيئي

58. All food chains begin with a السلاسل الغذائية تبدأ ب

5 / 5 pts
Auto-graded

- primary consumer المستهلك الأول
- secondary consumer المستهلك الثاني
- producers منتج ✓
- scavengers مترمم

59. Photosynthesis and respiration are important because التنفس البناء الضوئي مهمان بسبب

0 / 5 pts
Auto-graded

- they make mutualism possible يكونان علاقات تبادل المنفعة
- they are the building blocks of life يكونان اساس الحياة ✗
- they are the 6 characteristics of life خصائص الحياة الستة
- they cycle matter and energy between autotrophs and heterotrophs يدوران الماد والطاقة بين الكائنات المنتجة والمستهلكة ✓

60. Another name for a consumer is a المسمى الثاني للمستهلكات

5 / 5 pts
Auto-graded

- heterotroph غير ذاتية التغذية ✓
- autotroph ذاتية التغذية
- producer منتجات

61. Trophic Levels show the المستوي الغذائي يوضح

5 / 5 pts
Auto-graded

- what grade each organism has achieved in the ecosystem ما هي الدرجة التي حققها كل كائن حي في النظام البيئي
- position that an organism occupies in a food chain - what it eats, and what eats it الموقف الذي يشغله كائن حي في سلسلة غذائية -ما يأكله، ومن يأكله ✓
- part of the triangle the organism likes the most جزء من المثلث للكائن الحي
- elevation the organism likes to live in ارتفاع الكائن الحي

62. Which level would have the most biomass? ما هو المستوى الذي سيكون له أكبر قدر من الكتلة الحيوية؟

5 / 5 pts
Auto-graded

- Primary consumers - herbivores الأول أكلات الاعشاب
- Secondary consumers- carnivores المستهلكين الثانويين - آكلات اللحوم
- Producers المنتجون ✓
- Quaternary consumers- Apex Predators - المستهلك الرابع المفترسون

63. When many food chains link to each other in an ecosystem, it is called a(n) عندما ترتبط سلاسل غذائية عديدة ببعضها البعض في نظام بيئي، يطلق عليه

5 / 5 pts
Auto-graded

- food chain السلسلة الغذائية
- food web الشبكة الغذائية ✓
- Habitat الموطن
- Trophic levels المستوي الغذائي

64. Only __% of energy gets passed on from one trophic level to the next كمية الطاقة التي تنقل من مستوى طاقة الي الذي يليه

5 / 5 pts
Auto-graded

- 5%
- 10% ✓
- 20%
- 50%

65. In the carbon cycle, organisms exchange ___ with the atmosphere في دورة الكربون الكائن الحي يبدل مع الغلاف الجوي__________

5 / 5 pts
Auto-graded

- carbon dioxide ثاني اكسيد الكربون ✓
- oxygen الأكسجين
- nitrogen النيتروجين

66. How is carbon released from calcium carbonate? كيفة يتحرر الكربون من كربونات الكالسيوم

5 / 5 pts
Auto-graded

- by a process of erosion بعمليات التعرية ✓
- burned as fossil fuels حرق الوقود
- by a process of diffusion بالانتشار
- by decomposition التكسير

67. How nitrogen is "fixed" into usable form for plants... كيف يتم تحويل النيتروجين لصورة قابلة للاستخدام (تثبيت النيتروجين)

5 / 5 pts
Auto-graded

- through action of bacteria only بواسطة البكتريا فقط
- through lightning only البرق فقط
- through photosynthesis البناء الضوئي
- through action of bacteria & lightning البكتريا والبرق ✓

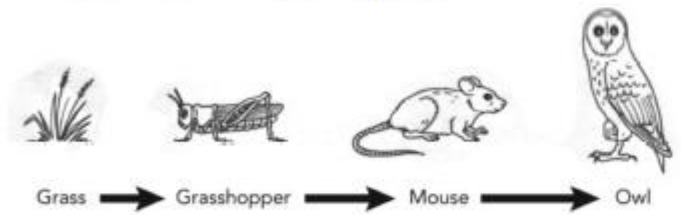
68. What is the main source of energy on Earth? المصدر الرئيسي للطاقة علي الرض

5 / 5 pts
Auto-graded

- the sun الشمس ✓
- plants النباتات
- consumers المستهلكون
- producers المنتجون

70. this image reveres to الصورة تشيرالي

5 / 5 pts
Auto-graded



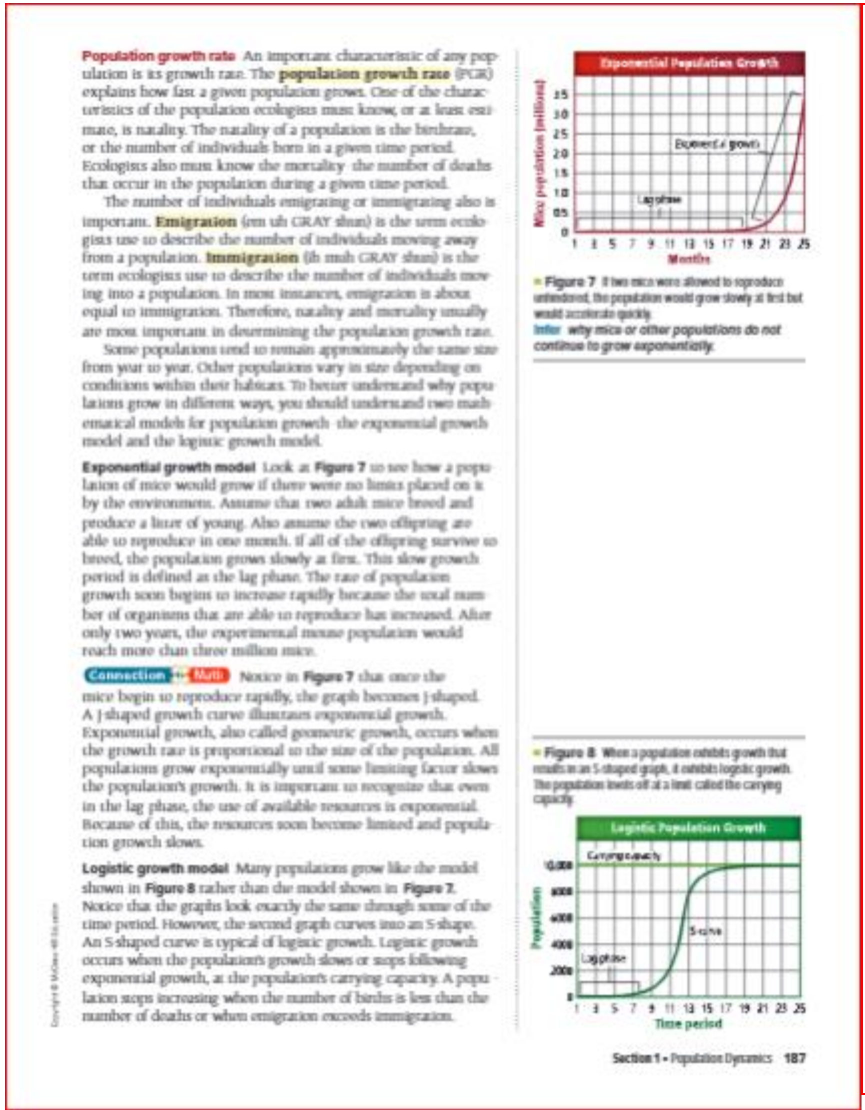
- food web الشبكة الغذائية
- Relationship العلاقات بين الكائنات
- Habitat الموطن
- food chain السلسة الغذائية ✓

71. this image reveres to

3 / 3 pts
Auto-graded

- pyramids of numbers هرم الاعداد ✓
- pyramids of biomass هرم الكتلة الحيوية
- pyramids of energy هرم الطاقة

16	BIO.3.4.01.033 Explain that ecosytems are dynameic in nature and that their characteristics can very over time		187
	BIO.3.4.01.033 يشرح كيف أن الأنظمة البيئية ديناميكية بطبيعتها ، وكيف يمكن أن تتغير خصائصها بمرور الزمن		



Population growth rate An important characteristic of any population is its growth rate. The **population growth rate** (PGR) explains how fast a given population grows. One of the characteristics of the population ecologists must know, or at least estimate, is natality. The natality of a population is the birthrate, or the number of individuals born in a given time period. Ecologists also must know the mortality the number of deaths that occur in the population during a given time period.

The number of individuals emigrating or immigrating also is important. **Emigration** (em uh GRAY shun) is the term ecologists use to describe the number of individuals moving away from a population. **Immigration** (ih muh GRAY shun) is the term ecologists use to describe the number of individuals moving into a population. In most instances, emigration is about equal to immigration. Therefore, natality and mortality usually are most important in determining the population growth rate.

Some populations tend to remain approximately the same size from year to year. Other populations vary in size depending on conditions within their habitats. To better understand why populations grow in different ways, you should understand two mathematical models for population growth the exponential growth model and the logistic growth model.

Exponential growth model Look at **Figure 7** to see how a population of mice would grow if there were no limits placed on it by the environment. Assume that two adult mice breed and produce a litter of young. Also assume the two offspring are able to reproduce in one month. If all of the offspring survive to breed, the population grows slowly at first. This slow growth period is defined as the lag phase. The rate of population growth soon begins to increase rapidly because the total number of organisms that are able to reproduce has increased. After only two years, the experimental mouse population would reach more than three million mice.

Connection to **Math** Notice in **Figure 7** that once the mice begin to reproduce rapidly, the graph becomes J-shaped. A J-shaped growth curve illustrates exponential growth. Exponential growth, also called geometric growth, occurs when the growth rate is proportional to the size of the population. All populations grow exponentially until some limiting factor slows the population's growth. It is important to recognize that even in the lag phase, the use of available resources is exponential. Because of this, the resources soon become limited and population growth slows.

Logistic growth model Many populations grow like the model shown in **Figure 8** rather than the model shown in **Figure 7**. Notice that the graphs look exactly the same through some of the time period. However, the second graph curves into an S-shape. An S-shaped curve is typical of logistic growth. Logistic growth occurs when the population's growth slows or stops following exponential growth, at the population's carrying capacity. A population stops increasing when the number of births is less than the number of deaths or when emigration exceeds immigration.

Figure 7 If two mice were allowed to reproduce unhindered, the population would grow slowly at first but would accelerate quickly.
Infer why mice or other populations do not continue to grow exponentially.

Figure 8 When a population exhibits growth that results in an S-shaped graph, it exhibits logistic growth. The population levels off at a limit called the carrying capacity.

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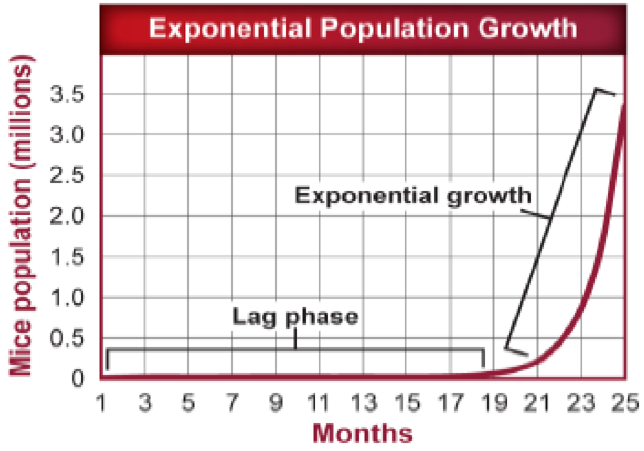
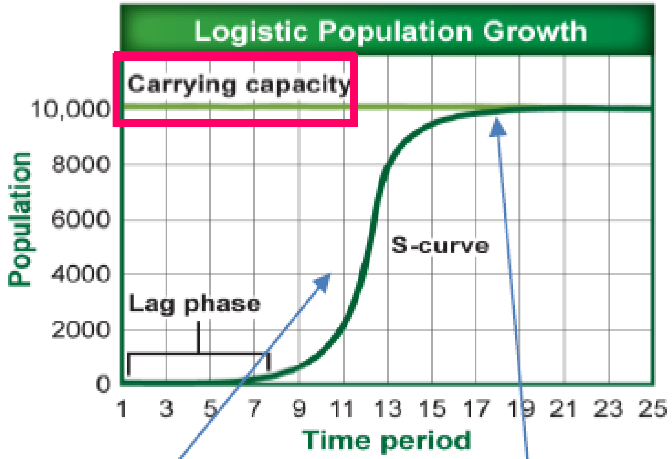
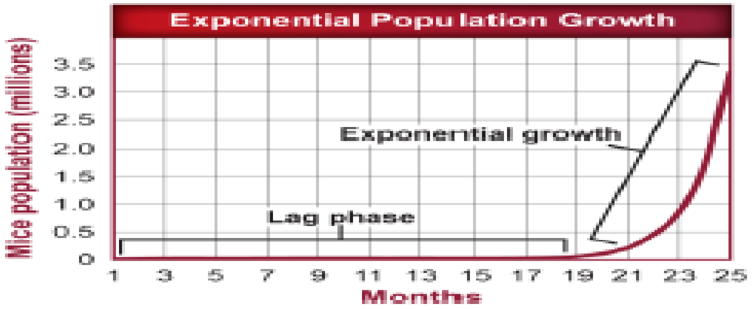
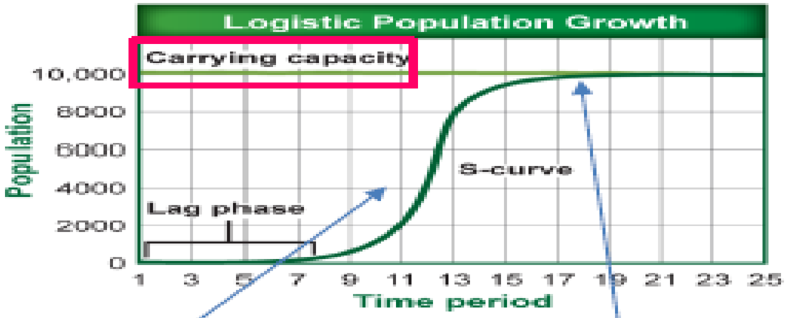
-	Exponential Growth Model	نموذج النمو النسبي (اللوجستي)
Shape	**J letter**	**S letter**
Occurring	occurs when the size of population is proportional to the is growth rate	When the exponential growth reach the - carrying capacity the growth will stop and become stable.
Population Growth	All populations grow exponentially until some limiting factor slows the population's growth.	1- More death rate than birth rate 2- More Emigration than Immigration.
	 Note:When the exponential growth reach the carrying capacity the growth will stop and become stable	

The mathematical models for population growth

-	Exponential Growth Model	نموذج النمو النسبي (اللوجستي)
Shape	**J letter**	**S letter**
Occurring	occurs when the size of population is proportional to the is growth rate	When the exponential growth reach the - carrying capacity the growth will stop and become stable.
Population Growth	All populations grow exponentially until some limiting factor slows the population's growth.	1- More death rate than birth rate 2- More Emigration than Immigration.





Note: When the exponential growth reach the carrying capacity the growth will stop and become stable

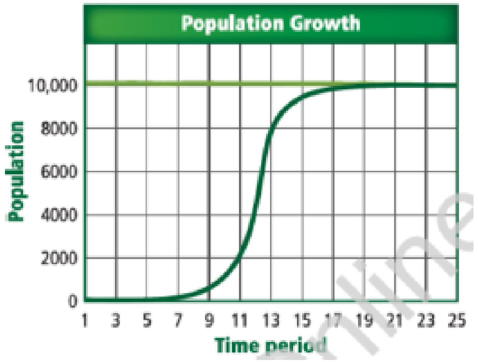
Carrying capacity:
The maximum number of individuals in a species that an environment can support for the long term.

Carrying capacity is limited by,
1-Energy 2- Water
3- Oxygen 4- Nutrients available

Before reaching the Carrying capacity	When reaching the carrying capacity
Resources are available, so 1- More births than deaths. 2- Population grow fast.	Resources become limited, so 1- Population exceeds the carrying capacity. 2-Deaths outnumber births.

22. What do the time periods 1–7 represent?ماذا تمثل الفترة من 1 الي 7

0 / 0 pts
Auto-graded



- carrying capacity القدرة الاستيعابية
- geometric growth النمو الجيومتري
- acceleration phase طور التسارع
- lag phase طور التباطؤ ✓

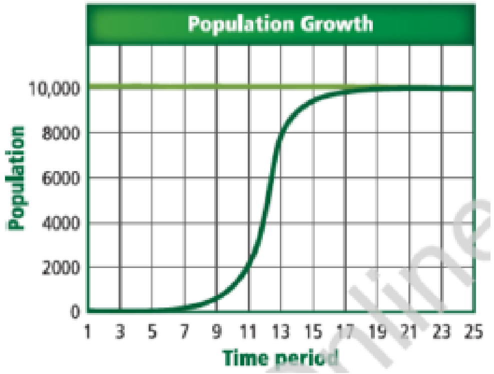
23. If angelfish produce hundreds of young several times a year, which statement below is true? ماهي الجملة التي تصف الأسماك التي تنجب المئات عدة مرات سنويا

0 / 0 pts
Auto-graded

- Angelfish have a k-strategy reproductive pattern. تتكاثر عن طريق استراتيجية K
- Angelfish have an r-strategy reproductive pattern. استراتيجية r ✓
- Angelfish probably have a low mortality rate. معدل الوفيات منخفض
- Angelfish provide a lot of care for their young. تعتني هذة الاسماك بصغارها

21. What is the horizontal line on this graph called? ماذا يمثل الخط الافقي

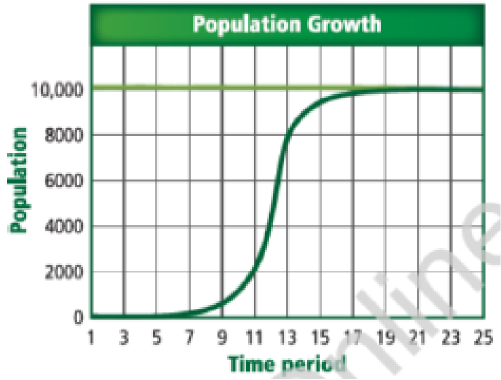
0 / 0 pts
Auto-graded



- carrying capacity القدرة الاستيعابية ✓
- geometric growth النمو الجيومتري
- exponential growth النمو الاسي
- straight-line growth النمو الخطي

20. Which population growth model does this graph illustrate? نوع النمو الموضح بالشكل

0 / 0 pts
Auto-graded



- exponential growth الاسي
- lag phase طور التباطؤ
- logistic growth اللوجيستي ✓
- straight-line growth نمو الخط المستقيم

3. Which would represent a population? اي الجمل التالي تعبر عن جماعة — 0 / 0 pts *Auto-graded*

- All the fish in an aquarium. كل انواع السمك في أكوريوم
- All the dogs in your neighborhood. جميع الكلاب في المنطقة ✓
- All the animals in the local zoo. كل الحيوانات بالحديقة
- all of the above

4. The age-sex structure of a quickly growing population would probably have التركيب العمري الذي يصف النمو السريع للجماعة — 0 / 0 pts *Auto-graded*

- a wide base, showing many young individuals. قاعدة عريضة وزيادة في عدد صغار السن ✓
- a wide top, showing many older individuals. قمة التركيب عريضة توضح كثرة كبار السن
- .a wide middle area, showing many middle-aged individualsمنتصف الشكل يوضح كثرة متوسطي السن
- all of the above

5. Population growth can be represented by the equation r = يمكن حساب معدل النمو عن طريق
b=معدل الولادات e=الهجرة الخارجية d=معدل الوفيات i=الهجرة الداخلية — 0 / 0 pts *Auto-graded*

- (b + e) - (d + i)
- (b + i) - (d + e) ✓
- (b + d) - (i + e)
- (d + i) - (b + e)

6. During exponential growth, أثناء النمو الأسي — 0 / 0 pts *Auto-graded*

- population growth eventually slows and population size levels off.يقل معدل النمو ويتوقف حجم الجماعة
- as population size increases, the growth rate also increases. مع زيادة حجم الجماعة الاحيائية يزيد معدل النمو ✓
- all of the above

7. exponential growth shape يمثل النمو الأسي علي شكل حرف — 0 / 0 pts *Auto-graded*

- J ✓
- s
- r
- k

8. The carrying capacity of a population القدرة الاستيعابية لجماعة — 0 / 0 pts *Auto-graded*

- is reached as resources become limiting. الوصول اليها عندما تكون الموارد محدودة ✓
- is reached at the end of exponential growth.تصل اليها بنهاية النمو الأسي
- is reached in r-selected populations. تكون في استراتيجية r
- is reached when the environment begins to be harmed تصل لها عندما تكون البيئة ضارة

17	BIO.3.4.03.012 Interpret qualitative and quantitative data from undisturbed and disturbed ecosystems communicate the resulte graphically and extrapolating from the data and explain the importance of biodiversity for all sustainable ecosystems	الشكل 10	189
	BIO.3.4.03.012 يفسر البيانات الكمية والنوعية الخاصة بالأنظمة البيئية المضطربة وغير المضطربة البرية والمائية، وربط النتائج بيانياً ، ويستقرىء من البيانات ، ويشرح أهمية التنوع الحيوي لجميع الأنظمة البيئية المستدامة	Figure 10	

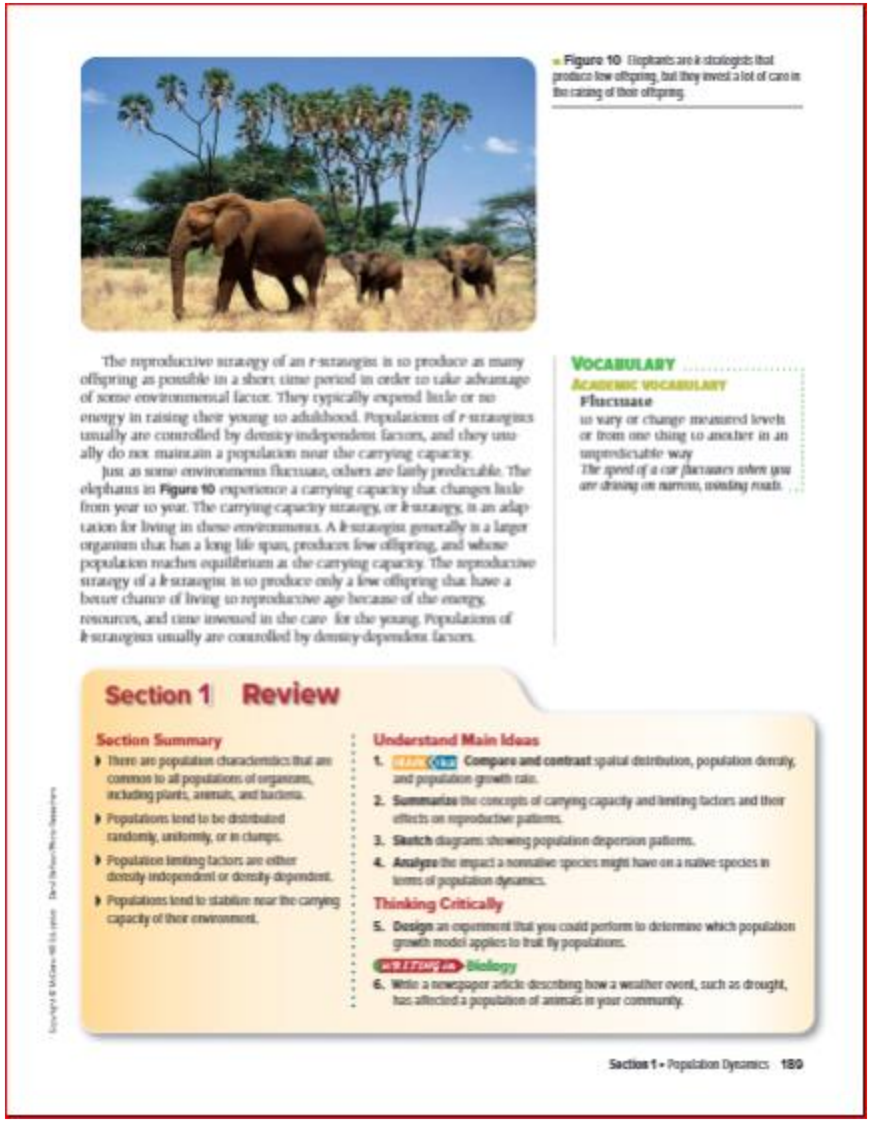


Figure 10 Elephants are k-strategists that produce few offspring, but they invest a lot of care in the raising of their offspring.

The reproductive strategy of an r-strategist is to produce as many offspring as possible in a short time period in order to take advantage of some environmental factor. They typically expend little or no energy in raising their young to adulthood. Populations of r-strategists usually are controlled by density-independent factors, and they usually do not maintain a population near the carrying capacity.

Just as some environments fluctuate, others are fairly predictable. The elephants in **Figure 10** experience a carrying capacity that changes little from year to year. The carrying capacity strategy, or k-strategy, is an adaptation for living in these environments. A k-strategist generally is a larger organism that has a long life span, produces few offspring, and whose population reaches equilibrium at the carrying capacity. The reproductive strategy of a k-strategist is to produce only a few offspring that have a better chance of living to reproductive age because of the energy, resources, and time invested in the care for the young. Populations of k-strategists usually are controlled by density-dependent factors.

VOCABULARY

ACADEMIC VOCABULARY

Fluctuate

to vary or change measured levels or from one thing to another in an unpredictable way

The speed of a car fluctuates when you are driving on narrow, winding roads.

Section 1 Review

Section Summary

- There are population characteristics that are common to all populations of organisms, including plants, animals, and bacteria.
- Populations tend to be distributed randomly, uniformly, or in clumps.
- Population limiting factors are either density independent or density dependent.
- Populations tend to stabilize near the carrying capacity of their environment.

Understand Main Ideas

1. **Compare and contrast** spatial distribution, population density, and population growth rate.
2. **Summarize** the concepts of carrying capacity and limiting factors and their effects on reproductive patterns.
3. **Sketch** diagrams showing population dispersion patterns.
4. **Analyze** the impact a nonnative species might have on a native species in terms of population dynamics.

Thinking Critically

5. **Design** an experiment that you could perform to determine which population growth model applies to fruit fly populations.

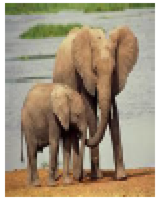
WRITING in Biology

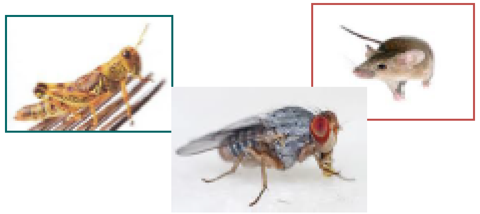
6. Write a newspaper article describing how a weather event, such as drought, has affected a population of animals in your community.

Section 1 • Population Dynamics 189

➢ Compare between the two reproductive patterns

k-strategy.	*r*-strategy	
An adaptation for living in stable environments.	An adaptation for living in an environment where fluctuation in biotic or abiotic factors occur.	Description
Large	Small	Individual size
Long	Short	Life span
Few	Many	Number of offspring
Yes	No	Raising the offspring
Density-Dependent factors (Biotic)	Density-independent factors. (Abiotic)	Controlled by
Long time	Short time (exceed the carrying capacity)	How long they stay in Carrying capacity level
Human – Elephant	Fruit fly , mouse , locusts	Examples





55. compare between r and K-strategy قارن بين استراتيجية rوK

0 / 0 pts

Auto-graded

	r-strategy	k- strategy
organism size smallحجم صغير	◉	○
using high energy يحتاج طاقة كثيرة	○	◉
parental care رعاية الصغار	○	◉
long life cycle دورة حياة طويلة	○	◉
fast develop ment التطور السريع	◉	○
many offspring مواليد كثيرة	◉	○
few offspring مواليد	○	◉

18	BIO.3.4.03.012 Interpret qualitative and quantitative data from undisturbed and disturbed ecosystems communicate the resulte graphically and extrapolating from the data and explain the importance of biodiversity for all sustainable ecosystems BIO.3.4.03.012 يفسر البيانات الكمية والنوعية الخاصة بالأنظمة البيئية المضطرية وغير المضطربة البرية والمائية، ويربط النتائج بيانياً ، ويستقريء من البيانات ، ويشرح أهمية التنوع الحيوي لجميع الأنظمة البيئية المستدامة		185

Crown fire damage

Managed ground fire damage

Figure 4 A crown fire is a density-independent factor that can limit population growth. However, small ground fires can promote growth of pines in a pine forest community.

Explain *why these two situations involving fire have different results on the pine tree populations.*

Figure 4 shows an example of the effects that fire can have on a population. Fire has damaged this ponderosa pine forest community. Sometimes the extreme heat from a crown fire, which is a fire that advances to the tops of the trees, can destroy many mature ponderosa pine trees, a dominant species in forests of the western United States. In this example, the fire limits the population of ponderosa trees by killing many of the trees. However, smaller but more frequent ground fires have the opposite effect on the population. By thinning lower growing plants that use up nutrients, a healthier population of mature ponderosa pines is produced.

Populations can be limited by the unintended results of human alterations of the landscape. For example, over the last 100 years, human activities on the Colorado River, such as building dams, water diversions, and water barriers, have significantly reduced the amount of water flow and changed the water temperature of the river. In addition, the introduction of nonnative fish species altered the biotic factors in the river. Because of the changes in the river, the number of small fish called humpback chub was reduced. During the 1960s, the number of humpback chub dropped so low that they were in danger of disappearing from the Colorado River altogether.

Air, land, and water pollution are the result of human activities that also can limit populations. Pollution reduces the available resources by making some of the resources toxic.

Density-dependent factors Any factor in the environment that depends on the number of members in a population per unit area is a **density-dependent factor**. Density-dependent factors are often biotic factors such as predation, disease, parasites, and competition. A study of density-dependent factors was done on the wolf moose populations in northern Michigan on Isle Royale, located in Lake Superior.

CAREERS IN BIOLOGY

Population Biologist A population biologist studies the characteristics of populations, such as growth, size, distribution, or genetics. They use their findings to predict the future of populations and determine what can be done to lessen the negative impacts.

Example 4

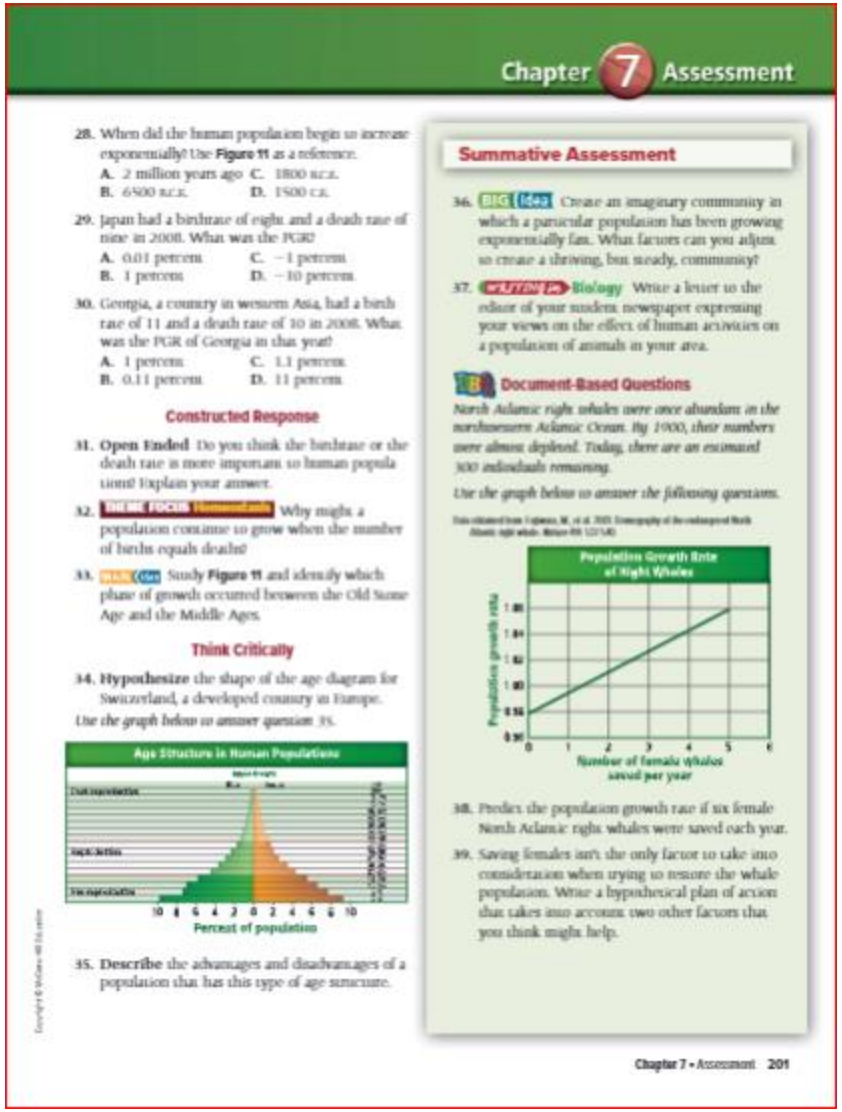
Fire:

Fires kills many trees and destroys forests (ex: pine forests)

Question: Fires destroy completely developed trees in forests, but ground fires have a positive impact on population. THINK HOW!

By thinning lower growing plants that use up nutrients.

19	BIO.3.4.01.032 Explain the ways in which human activities and technologies alter balances and interactions in the environment	تمرين 38	201
	BIO.3.4.01.032 يشرح الطرائق التي تؤدي من خلال الأنشطة البشرية والتقنيات إلى تغيير التوازن والتفاعلات في البيئة	exercise 38	


Chapter 7 Assessment

28. When did the human population begin to increase exponentially? Use **Figure 11** as a reference.
A. 2 million years ago C. 1800 B.C.E.
B. 6500 B.C.E. D. 1500 C.E.

29. Japan had a birthrate of eight and a death rate of nine in 2008. What was the PGR?
A. 0.01 percent C. −1 percent
B. 1 percent D. −10 percent

30. Georgia, a country in western Asia, had a birth rate of 11 and a death rate of 10 in 2008. What was the PGR of Georgia in that year?
A. 1 percent C. 1.1 percent
B. 0.11 percent D. 11 percent

Constructed Response

31. **Open Ended** Do you think the birthrate or the death rate is more important to human populations? Explain your answer.

32. THEME FOCUS Homeostasis Why might a population continue to grow when the number of births equals deaths?

33. MAIN Idea Study **Figure 11** and identify which phase of growth occurred between the Old Stone Age and the Middle Ages.

Think Critically

34. **Hypothesize** the shape of the age diagram for Switzerland, a developed country in Europe.

Use the graph below to answer question 35.

Age Structure in Human Populations

Percent of population

35. **Describe** the advantages and disadvantages of a population that has this type of age structure.

Summative Assessment

36. BIG Idea Create an imaginary community in which a particular population has been growing exponentially fast. What factors can you adjust to create a thriving, but steady, community?

37. WRITING in Biology Write a letter to the editor of your student newspaper expressing your views on the effect of human activities on a population of animals in your area.

Document-Based Questions

North Atlantic right whales were once abundant in the northwestern Atlantic Ocean. By 1900, their numbers were almost depleted. Today, there are an estimated 300 individuals remaining.

Use the graph below to answer the following questions.

Population Growth Rate of Right Whales

Population growth rate

Number of female whales saved per year

38. Predict the population growth rate if six female North Atlantic right whales were saved each year.

39. Saving females isn't the only factor to take into consideration when trying to restore the whale population. Write a hypothetical plan of action that takes into account two other factors that you think might help.

Chapter 7 • Assessment 201

38. 1.08
39. Answers will vary, but might include slowing fishing rates to increase resources available or limiting threats to the population by rerouting shipping lanes, etc.

20	BIO.3.4.03.012 Interpret qualitative and quantitative data from undisturbed and disturbed ecosystems communicate the resulte graphically and extrapolating from the data and explain the importance of biodiversity for all sustainable ecosystems	الشكل 5	186
	BIO.3.4.03.012 يفسر البيانات الكمية والنوعية الخاصة بالأنظمة البيئية المضطربة وغير المضطربة البرية والمائية، ويربط النتائج بيانياً ، ويستقرئ من البيانات ، ويشرح أهمية التنوع الحيوي لجميع الأنظمة البيئية المستدامة	Figure 5	

Figure 5 The long-term study of the wolf and moose populations on Isle Royale shows the relationship between the number of predators and prey over time.
Infer what might have caused the increase in the number of moose in 1995.

FOLDABLES Incorporate information from this section into your Foldable.

Prior to the winter of 1947-48, apparently there were no wolves on Isle Royale. During that winter, a single pair of wolves crossed the ice on Lake Superior, reaching the island. During the next ten years, the population of wolves reached about twenty individuals. **Figure 5** shows some of the results from the long-term study conducted by population biologists. Notice that the rise and fall of the numbers of each group was dependent on the other group. For example, follow the wolves' line on the graph. As the number of wolves decreased, the number of moose increased.

Disease Another density-dependent factor is disease. Outbreaks of disease tend to occur when population size has increased and population density is high. When population density is high, disease is transmitted easily from one individual to another because contact between individuals is more frequent. Therefore, the disease spreads easily and quickly through a population. This is just as true for human populations as it is for populations of protists, plants, and other species of animals.

Competition Competition between organisms also increases when density increases. When the population increases to a size so that resources such as food or space become limited, individuals in the population must compete for the available resources. Competition can occur within a species or between two different species that use the same resources. Competition for insufficient resources might result in a decrease in population density in an area due to starvation or to individuals leaving the area in search of additional resources. As the population size decreases, competition becomes less severe.

The lemmings shown in **Figure 6** are an example of a population that often undergoes competition for resources. Lemmings are small mammals that live in the tundra biome. When food is plentiful, their population increases exponentially. As food becomes limited, many lemmings begin to starve and their population size decreases significantly.

Parasites Populations also can be limited by parasites, in a way similar to disease, as population density increases. The presence of parasites is a density-dependent factor that can negatively affect population growth at higher densities.

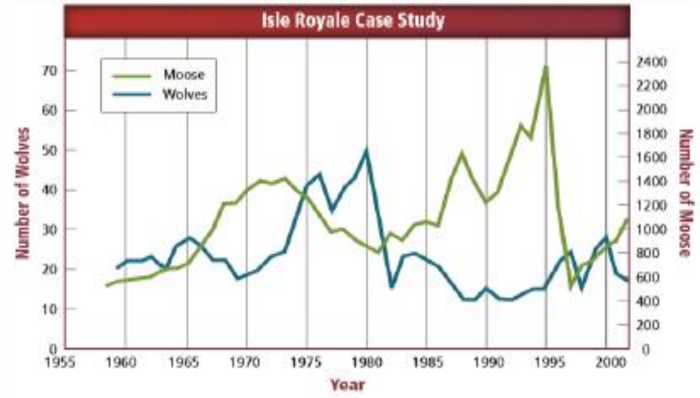
Figure 6 Lemmings are mammals that produce offspring in large numbers when food is plentiful. When the food supply diminishes, lemmings starve and many die.

186 Chapter 7 • Population Ecology

Predation

The number of each group is dependent on the other group.

Example:



As the number of wolves decreased, the number of moose increased and vise versa

Fire:

Fires kills many trees and destroys forests (ex: pine forests)

Question: Fires destroy completely developed trees in forests, but ground fires have a positive impact on population. THINK HOW!

By thinning lower growing plants that use up nutrients.

Example 4

21	BIO.3.4.01.042 Use mathematical and /or computational representations tosupport explanations of factors that affect carrying capacity of ecosystems at different scales	تمرين 26	200
	BIO.3.4.01.042 يستخدم التمثيلات الرياضية أو الحاسوبية ليدعم الأدلة التي تشرح العوامل المؤثرة في القدرة الاستيعابية للنظام بيئي على مستويات مختلفة	exercise 26	

Chapter 7 Assessment

14. **Short Answer** What is the population density of Canada and the United States if they have a combined area of approximately 12.4 million square kilometers and a combined population of approximately 524 million?

15. **Short Answer** How does the carrying capacity affect *k* strategists?

16. **Open Ended** Give two examples of how two different density independent factors can limit a specific population.

17. **Open Ended** Give two examples of how two different density dependent factors can limit a specific population.

18. **Short Answer** Explain how competition limits a population's growth.

Think Critically

19. **Predict** the shape of a population growth curve for a game park in which a male and a female rhinoceros are released.

Use the photo below to answer question 20.

20. **Infer** the reproductive strategy of the animal in the photo. Explain your answer.

21. Opossums are solitary animals that usually meet in nature only to mate. What is their probable dispersion pattern?

22. Select from the following list the species that are r strategists: minnow, giraffe, human, beetle, bacteria, eagle, and cougar.

Section 2

Vocabulary Review

Using the list of vocabulary words from the Study Guide, identify the term described by the scenario.

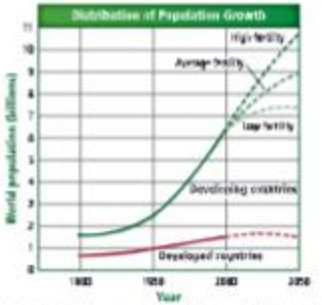
23. A population has an equal number of births and deaths.

24. Twenty percent of a population is in pre reproductive years, 50 percent is in the reproductive years, and 30 percent is in the post reproductive years.

25. The size, density, and birth and death rates of a human population are studied.

Understand Main Ideas

Use the graph below of the growth of the human population through history to answer questions 26 and 27.



26. What is the projected population of developed countries by 2050?
    A. 1.5 billion
    B. 7.3 billion
    C. 9 billion
    D. 10.5 billion

27. What is the approximate population difference between developing countries that have low fertility rates and developing countries that have high fertility rates in 2050?
    A. 1.5 billion
    B. 1.7 billion
    C. 3.2 billion
    D. 9 billion

Understand Main Ideas

Use the graph below of the growth of the human population through history to answer questions 26 and 27.

26. What is the projected population of developed countries by 2050?
    A. 1.5 billion
    B. 7.3 billion
    C. 9 billion
    D. 10.5 billion

26. A

22	BIO.3.4.01.042	الربط بالرياضيات	192
	BIO.3.4.01.042 يستخدم التمثيلات الرياضية أو الحاسوبية لدعم الأدلة التي تشرح العوامل المؤثرة في القدرة الاستيعابية لنظام بيئي على مستويات مختلفة	connection to math	

VOCABULARY
WORD ORIGIN
Demography
demo- from the Greek word *demos*, meaning *people*
-ography from the French word *graphie*, meaning *writing*

Review Based on what you've read about populations, how would you now answer the analysis questions?

Trends in Human Population Growth

The graph in **Figure 12** is somewhat deceptive. Population trends can be altered by events such as disease and war. **Figure 13** shows a few historical events that have changed population trends. **Figure 12** could also easily be misinterpreted because human population growth is not the same in all countries. However, population growth trends are often similar in countries that have similar economies.

For example, one trend that has developed during the previous century is a change in the population growth rate in industrially developed countries such as the United States. An industrially developed country is advanced in industrial and technological capabilities and has a population with a high standard of living. In its early history, the United States had a high birthrate and a high death rate. It was not uncommon for people to have large families and for individuals to die by their early forties. Many children also died before reaching adulthood. Presently, the birthrate in the United States has decreased dramatically and the life expectancy is greater than seventy years. This change in a population from high birth and death rates to low birth and death rates is called a **demographic transition**.

Connection to Math How do population growth rates (PGR) compare in industrially developed countries and developing countries? As an example, we will compare the 2008 populations for the United States and Honduras, a small country in Central America. The calculation for PGR is

$$\frac{\text{birthrate} - \text{death rate} + \text{migration rate}}{10} = \text{PGR (\%)}$$

because the rates are calculated per 1000.

The United States has birthrate 14.1 (per 1000), death rate 8.3 (per 1000), and migration rate 2.9 (per 1000). This gives a PGR of 0.87 percent for the United States. Honduras has birthrate 26.9 (per 1000), death rate 5.4 (per 1000), and migration rate -1.3 (per 1000). This gives a PGR of 2.02 percent for Honduras.

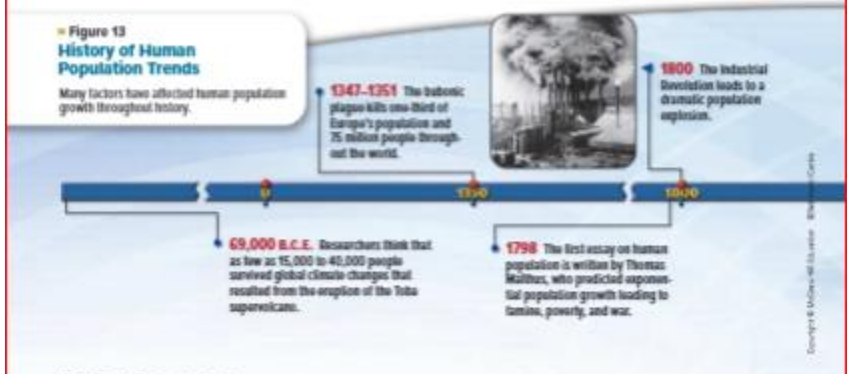


Figure 13
History of Human Population Trends
Many factors have affected human population growth throughout history.

Connection to Math How do population growth rates (PGR) compare in industrially developed countries and developing countries? As an example, we will compare the 2008 populations for the United States and Honduras, a small country in Central America. The calculation for PGR is

$$\frac{\text{birthrate} - \text{death rate} + \text{migration rate}}{10} = \text{PGR (\%)}$$

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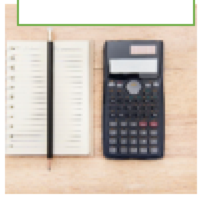
The United States has birthrate 14.1 (per 1000), death rate 8.3 (per 1000), and migration rate 2.9 (per 1000). This gives a PGR of 0.87 percent for the United States. Honduras has birthrate 26.9 (per 1000), death rate 5.4 (per 1000), and migration rate -1.3 (per 1000). This gives a PGR of 2.02 percent for Honduras.

How to calculate population growth rate

$$PGR(\%) = \frac{\text{Birth rate} - \text{Death rate} + \text{migration rate}}{10}$$

Hondura	Developing countries
Birth rate: 26.9	
Death rate: 5.4	
migration rate : 1.3-	
2.02	PGR (%)

Per 1000



United state	industrial developed countries
Birth rate: 14.1	
Death rate: 8.3	
migration rate : 2.9	
0.87	PGR (%)

4. The age-sex structure of a quickly growing population would probably have التركيب العمري الذي يصف النمو السريع للجماعة

0 / 0 pts
Auto-graded

- a wide base, showing many young individuals. قاعدة عريضة وزيادة في عدد صغار السن ✓
- a wide top, showing many older individuals. قمة التركيب عريضة توضح كثرة كبار السن
- .a wide middle area, showing many middle-aged individuals منتصف الشكل يوضح كثرة متوسطي السن
- all of the above

5. Population growth can be represented by the equation r = يمكن حساب معدل النمو عن طريق
الهجرة الداخلية=i معدل الوفيات=d الهجرة الخارجية=e معدل الولادات=b

0 / 0 pts
Auto-graded

- (b + e) - (d + i)
- (b + i) - (d + e) ✓
- (b + d) - (i + e)
- (d + i) - (b + e)

29. Asia (excluding China) had a birthrate of 24 and a death rate of eight in 2004. What was the PGR?

A. 0.16 percent
B. 1.6 percent
C. 16 percent
D. 160 percent

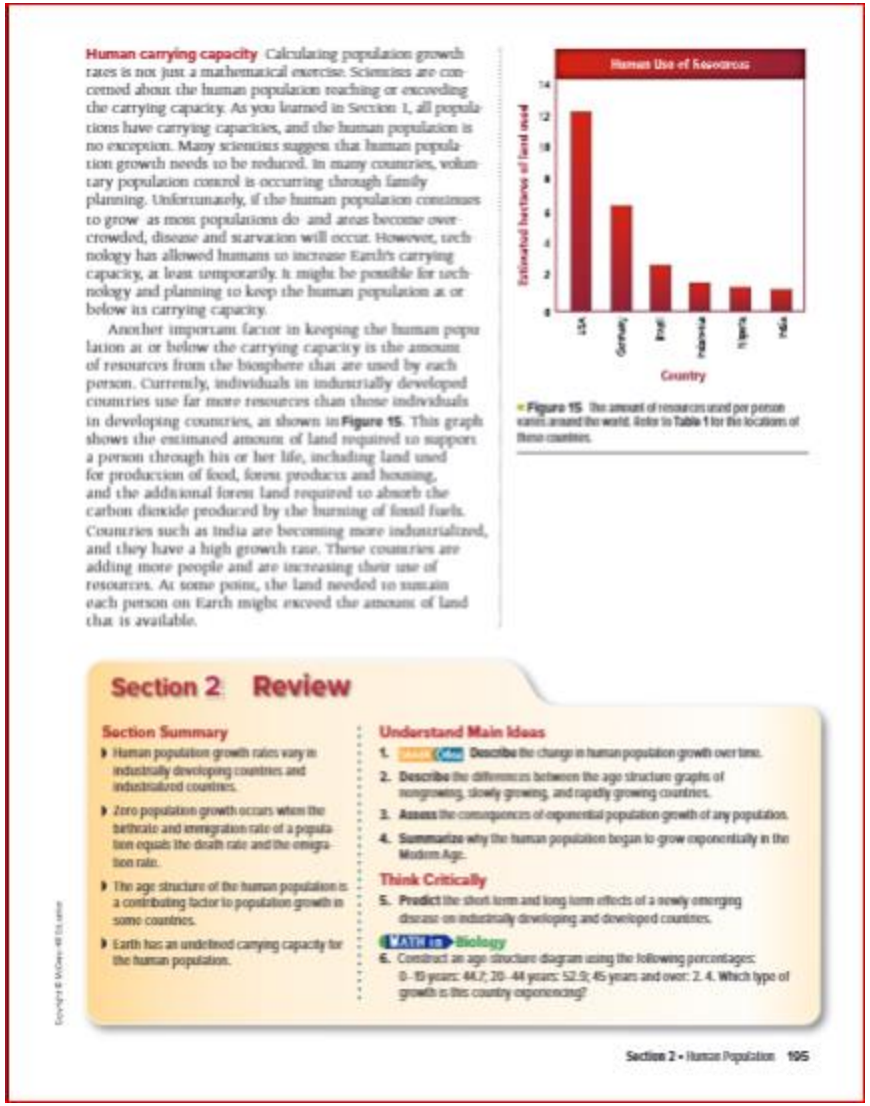
30. Georgia, a country in Western Asia, had a birth-rate of 11 and a death rate of 11 in 2004. What was the PGR of Georgia in that year?

A. 0 percent
B. 0.11 percent
C. 1.1 percent
D. 11 percent

29. C
30. A

In these questions where calculations not mentioned per 1000 , we don`t divide by 10. instead, just subtract (N-M)

23	BIO.3.4.01.042 Use mathematical and /or computational representations tosupport explanations of factors that affect carrying capacity of ecosystems at different scales	الشكل 15	195
	BIO.3.4.01.042 يستخدم التمثيلات الرياضية أو الحاسوبية لبدعم الأدلة التي تشرح العوامل المؤثرة في القدرة الاستيعابية للنظام بيئي على مستويات مختلفة	Figure 15	


Human carrying capacity Calculating population growth rates is not just a mathematical exercise. Scientists are concerned about the human population reaching or exceeding the carrying capacity. As you learned in Section 1, all populations have carrying capacities, and the human population is no exception. Many scientists suggest that human population growth needs to be reduced. In many countries, voluntary population control is occurring through family planning. Unfortunately, if the human population continues to grow as most populations do and areas become overcrowded, disease and starvation will occur. However, technology has allowed humans to increase Earth's carrying capacity, at least temporarily. It might be possible for technology and planning to keep the human population at or below its carrying capacity.

Another important factor in keeping the human population at or below the carrying capacity is the amount of resources from the biosphere that are used by each person. Currently, individuals in industrially developed countries use far more resources than those individuals in developing countries, as shown in **Figure 15**. This graph shows the estimated amount of land required to support a person through his or her life, including land used for production of food, forest products and housing, and the additional forest land required to absorb the carbon dioxide produced by the burning of fossil fuels. Countries such as India are becoming more industrialized, and they have a high growth rate. These countries are adding more people and are increasing their use of resources. At some point, the land needed to sustain each person on Earth might exceed the amount of land that is available.

Section 2 Review

Section Summary
- Human population growth rates vary in industrially developing countries and industrialized countries.
- Zero population growth occurs when the birthrate and immigration rate of a population equals the death rate and the emigration rate.
- The age structure of the human population is a contributing factor to population growth in some countries.
- Earth has an undefined carrying capacity for the human population.

Understand Main Ideas
1. **Describe** the change in human population growth over time.
2. **Describe** the differences between the age structure graphs of nongrowing, slowly growing, and rapidly growing countries.
3. **Assess** the consequences of exponential population growth of any population.
4. **Summarize** why the human population began to grow exponentially in the Modern Age.

Think Critically
5. **Predict** the short-term and long-term effects of a newly emerging disease on industrially developing and developed countries.

MATH in Biology
6. Construct an age structure diagram using the following percentages: 0–19 years: 44.7; 20–44 years: 52.9; 45 years and over: 2.4. Which type of growth is this country experiencing?

Section 2 • Human Population 195

Thae amount of resources used per person

This graph shows the amount of land required to support a person through his or her life,

(ex: food, housing and land required to absorb the CO_2 produced by the burning of fossil fuels)

The amount of resources used by the individual in developed countries is greater than that used by the individual in developing countries

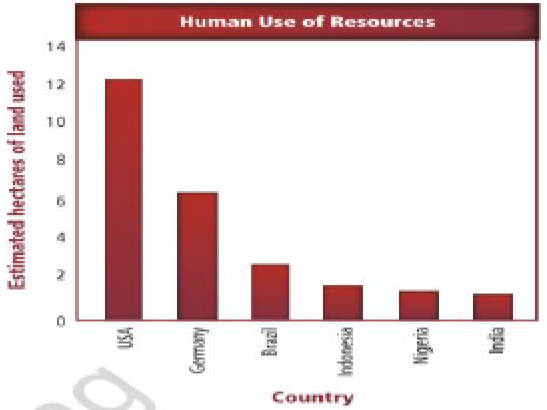


Figure 15 The amount of resources used per person varies around the world. Refer to Table 1 for the locations of these countries.

Ho we can keep the human population below or at the carrying capacity ?

- Plan and search for new resources
- Using technologies to increase the carrying capacity
- Decrease the amount of resources from the biosphere that are used by each person

24	BIO.3.4.01.042 Use mathematical and /or computational representations tosupport explanations of factors that affect carrying capacity of ecosystems at different scales	الشكل 14	194
	BIO.3.4.01.042 يستخدم التمثيلات الرياضية أو الحاسوبية ليدعم الأدلة التي تشرح العوامل المؤثرة في القدرة الاستيعابية لنظام بيئي على مستويات مختلفة	Figure 14	

Study Tip

Interactive Reading As you read, write three questions on sticky notes about human population dynamics. The questions should begin with why, how, where, or when. Use the notes to ask a partner questions about the content in the chapter.

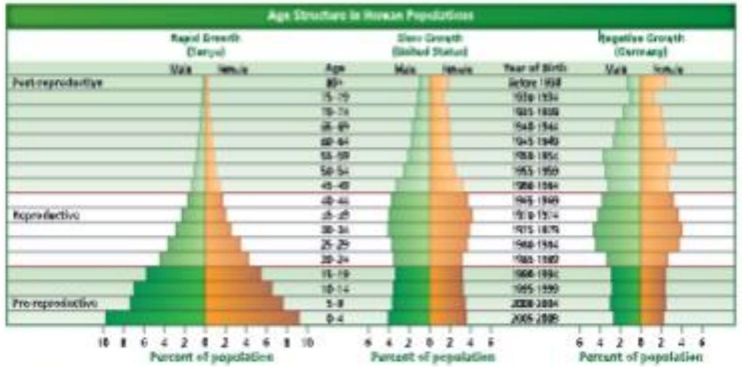
Zero population growth Another trend that populations can experience is zero population growth. **Zero population growth** (ZPG) occurs when births plus immigration equals deaths plus emigration. One estimate is that the world will reach ZPG between 2020 with 6.64 billion people and 2029 with 6.90 billion people. This will mean that the population has stopped growing, because births and deaths occur at the same rate. Once the world population reaches ZPG, the age structure eventually should be more balanced with numbers at pre-reproductive, reproductive, and post-reproductive ages being approximately equal.

Age structure Another important characteristic of any population is its age structure. A population's **age structure** is the number of males and females in each of three age groups: pre-reproductive stage, reproductive stage, and post-reproductive stage. Humans are considered to be pre-reproductive before age 20 even though they are capable of reproduction at an earlier age. The reproductive years are considered to be between 20 and 44, and the post-reproductive years are after age 44.

Analyze the age structure diagrams for three different representative countries in **Figure 14**—their locations are shown in **Table 1**. The age structure diagrams are typical of many countries in the world. Notice the shape of the overall diagram for a country that is rapidly growing, one that is growing slowly, and one that has reached negative growth. The age structure for the world's human population looks more like that of a rapidly growing country.

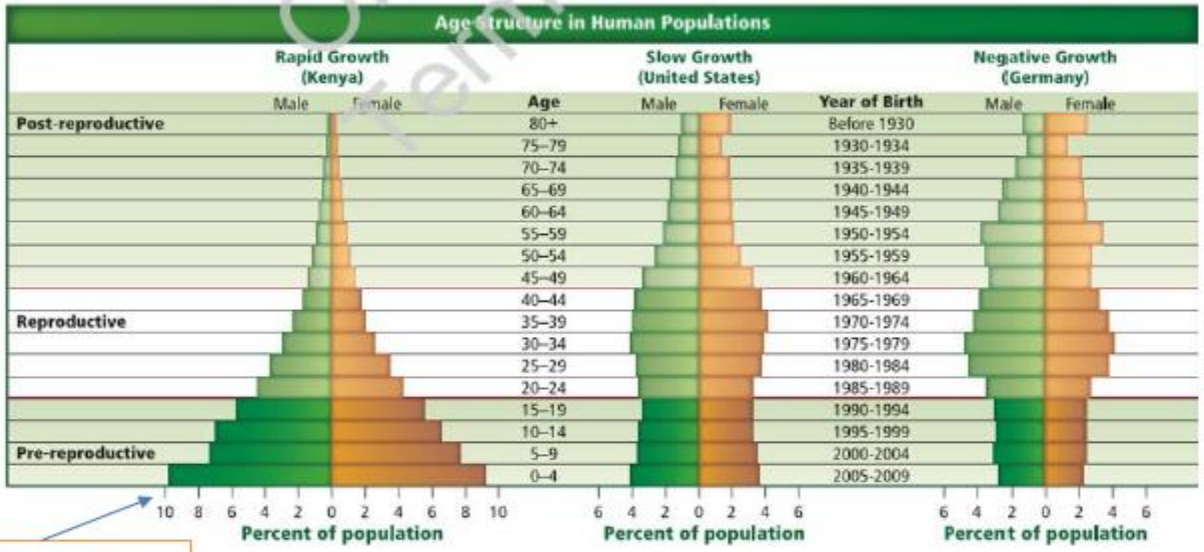
Reading Check **Compare and contrast** the age structures of the countries shown in **Figure 14**.

Figure 14 The relative numbers of individuals in pre-reproductive, reproductive, and post-reproductive years are shown for three representative countries.



pre-reproductive stage	19-0
Reproductive stage	44-20
post-reproductive	45+

Note: The age structure eventually should be more balanced with numbers at pre-reproductive, reproductive , and post-reproductive ages being approximately equal.



The large base indicate that there will be individuals who are able to have children in the future.

- The age structure of the whol world is rapid growth.
- Developing countries are often represented by rapid growt
- Developed countries are represented by negative or slow growth.
- The age structure of uae is rapid growth.

38. describes the relative numbers of organisms of each age within a population and is often represented by a graphيصف الأعداد النسبية للكائنات الحية في كل فئة عمرية من السكان ، وغالبًا ما يمثله رسم بياني

0 / 0 pts

Auto-graded

- age structure diagram مخطط التركيب العمري ✓
- population growth rate معدل النمو السكاني
- demographic transition التحول السكاني
- fertility rate معدل الخصوبة

39. Countries with high growth rates usually have an age structure that hasالبلدان ذات معدلات النمو المرتفعة عادة ما يكون لها تركيب عمري

0 / 0 pts

Auto-graded

- more older people than young people كبار السن أكثر من الشباب
- an even distribution over all ages توزيع متساوي لجميع الأعمار
- more younger people than older people.أكثر شبابا من كبار السن. ✓
- more middle-aged people than younger people.أكثر في منتصف العمر من الشباب.

50. change in a population from high birth and death rates to low birth and death rates التغيير في السكان من معدلات المواليد والوفيات المرتفعة إلى معدلات المواليد والوفيات المنخفضة

0 / 0 pts

Auto-graded

- demographic transition. التحول السكاني ✓
- demography علم الاحصاء السكاني
- change season تغير المواسم
- Population Growth Rates معدل النمو السكاني

51. occurs when births plus immigration equals deaths plus emigration. يحدث عندما تساوي المواليد والهجرة الداخليةمع الوفيات بالإضافة إلى الهجرة الخارجية.

0 / 0 pts

Auto-graded

- Zero population growth النمو الصفري للجماعة ✓
- high population growth معدل النمو العالي
- low population growth,معدل النمو منخفض
- demographic transition. التحول السكاني

6. During exponential growth, أثناء النمو الأسي

0 / 0 pts

Auto-graded

- population growth eventually slows and population size levels off.يقل معدل النمو ويتوقف حجم الجماعة
- as population size increases, the growth rate also increases. مع زيادة حجم الجماعة الاحيائية يزيد معدل النمو ✓
- all of the above

7. exponential growth shape يمثل النمو الأسي علي شكل حرف

0 / 0 pts

Auto-graded

- J ✓
- s
- r
- k

8. The carrying capacity of a population القدرة الاستيعابية لجماعة

0 / 0 pts

Auto-graded

- is reached as resources become limiting. الوصول اليها عندما تكون الموارد محدودة ✓
- is reached at the end of exponential growth.تصل اليها بنهاية النمو الأسي
- is reached in r-selected populations. تكون في استراتيجية r
- is reached when the environment begins to be harmed تصل لها عندما تكون البيئة ضارة

36. If a population grows larger than its environmental carrying capacity, then إذا كان عدد السكان ينمو أكبر من القدرة الاستيعابية البيئية ،

0 / 0 pts

Auto-graded

- death rate may riseقد يرتفع معدل الوفيات ✓
- death rate may fall significantly,قد ينخفض معدل الوفيات بشكل ملحوظ
- birth rate may rise significantly,قد يرتفع معدل المواليد بشكل ملحوظ.
- immigration rate may increase قد يزيد معدل الهجرة الداخلية

37. What does the term carrying capacity describe? ماذا يصف مصطلح القدرة الاستيعابية؟

0 / 0 pts

Auto-graded

- The maximum number of birth rates for a population.الحد الأقصى لعدد معدلات المواليد للسكان.
- The ability of a population to accept new immigrants.قدرة السكان على قبول المهاجرين الجدد.
- The ratio of birth rates to death rates in a population.نسبة معدلات المواليد إلى معدلات الوفيات بين السكان.
- The population size that the environment can sustain حجم السكان الذي يمكن أن تحافظ عليه البيئة ✓

25	BIO.3.4.01.042 Use mathematical and /or computational representations tosupport explanations of factors that affect carrying capacity of ecosystems at different scales	جدول 1	193
	BIO.3.4.01.042 يستخدم التمثيلات الرياضية أو الحاسوبية ليدعم الأدلة التي تشرح العوامل المؤثرة في القدرة الاستيعابية لنظام بيئي على مستويات مختلفة	Table 1	

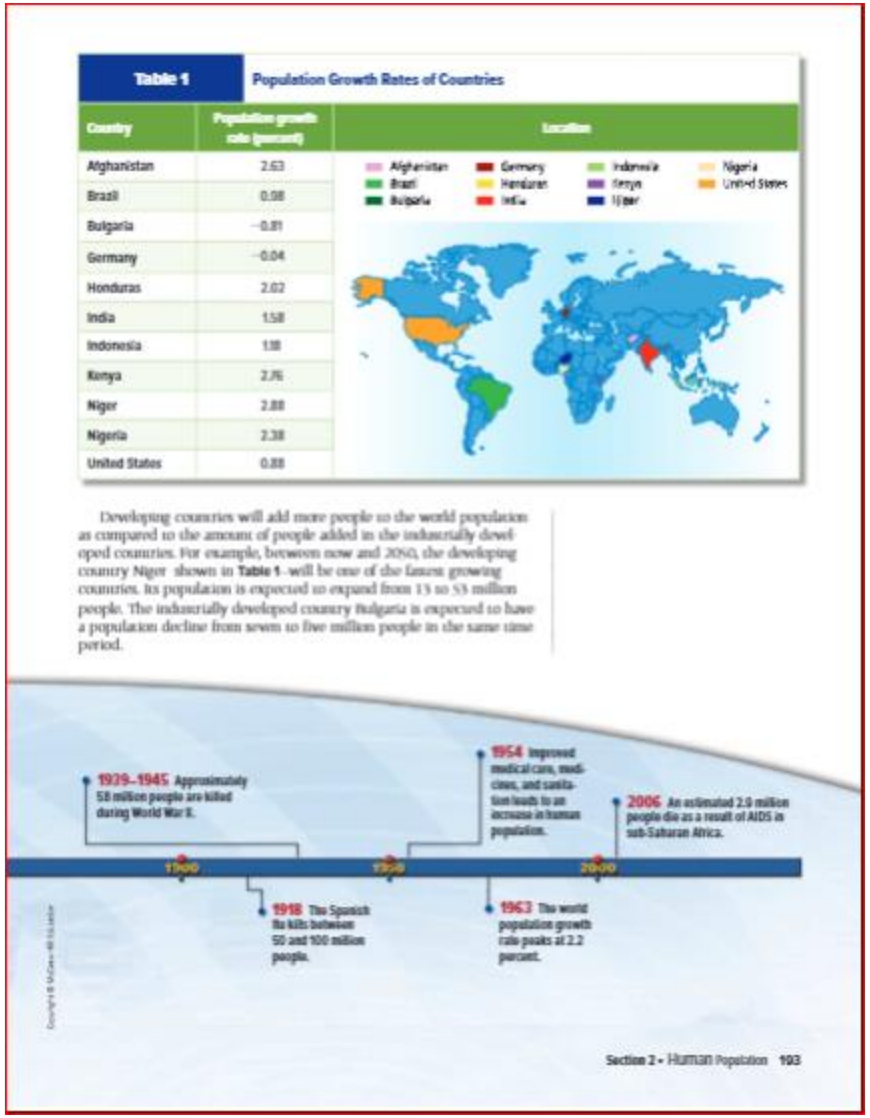
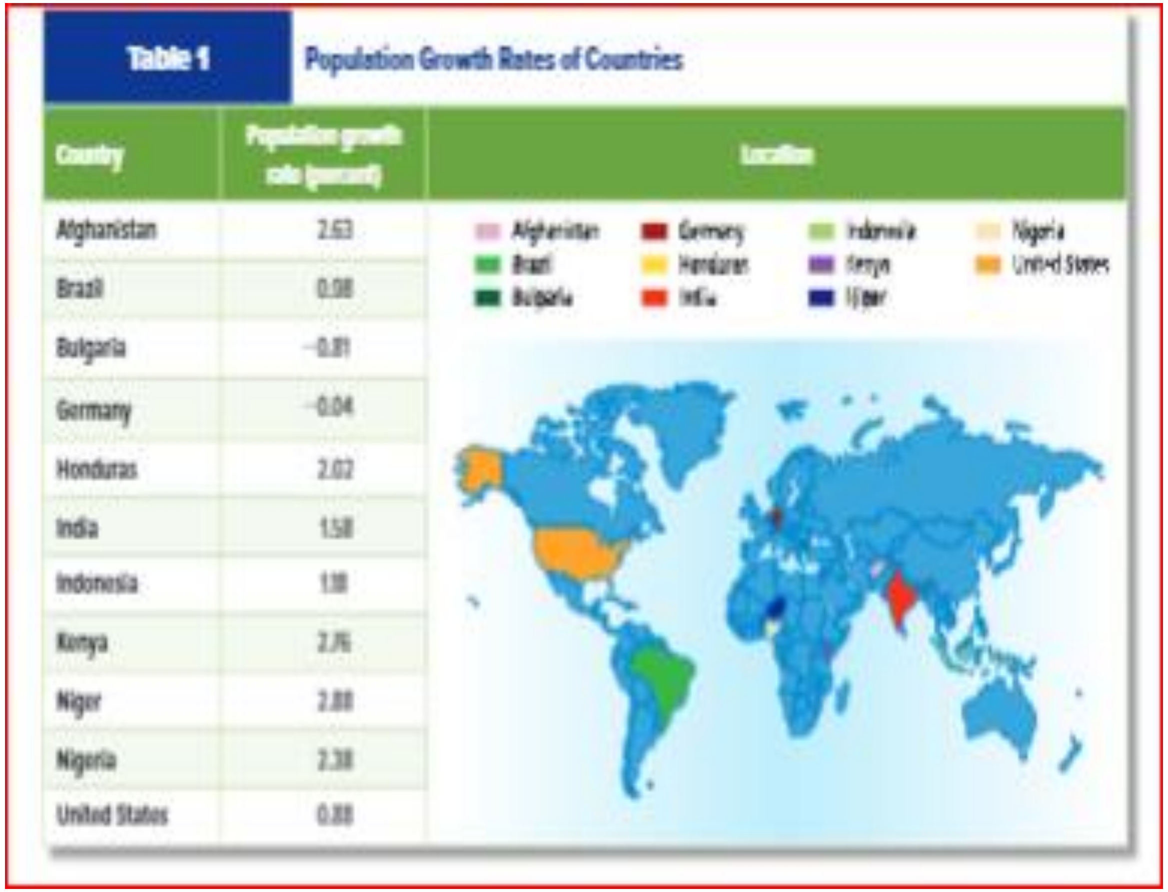


Table 1 Population Growth Rates of Countries

Country	Population growth rate (percent)	Location
Afghanistan	2.63	
Brazil	0.98	
Bulgaria	−0.81	
Germany	−0.04	
Honduras	2.02	
India	1.58	
Indonesia	1.18	
Kenya	2.76	
Niger	2.88	
Nigeria	2.38	
United States	0.88	

Developing countries will add more people to the world population as compared to the amount of people added in the industrially developed countries. For example, between now and 2050, the developing country Niger shown in **Table 1** will be one of the fastest growing countries. Its population is expected to expand from 13 to 53 million people. The industrially developed country Bulgaria is expected to have a population decline from seven to five million people in the same time period.



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Nigeria	2.38	
United States	0.88	

10. When organisms must compete for resources, they will usually have a _________ distribution.عندما تتنافس الكائنات علي مورد يكون نمط توزيعها

0 / 0 pts
Auto-graded

- uniform منتظم
- random عشوائي
- clumped تكتلي ✓
- competitive تنافسي

11. how fast a population changes in size over time يوضح سرعة تغير حجم جماعة مع الوقت

0 / 0 pts
Auto-graded

- emigrationالهجرة الخارجية
- immigration الهجرة الداخلية
- population growth rate معدل نمو الجماعة ✓
- population density كثافة الجماعة

12. leaving the population for another area مغادرة الجماعة لمكان أخر

0 / 0 pts
Auto-graded

- emigrationالهجرة الخارجية ✓
- immigration الهجرة الداخلية
- population growth rate معدل نمو الجماعة
- population density كثافة الجماعة

13. coming into the population from somewhere else الدخول لجماعة أحيائية

0 / 0 pts
Auto-graded

- emigrationالهجرة الخارجية
- immigration الهجرة الداخلية ✓
- population growth rate معدل نمو الجماعة
- population density كثافة الجماعة

14. the average number of individuals in a population per unit of area or volumeالنسبة بين عدد الافراد علي وحدة المساحة

0 / 0 pts
Auto-graded

- emigrationالهجرة الخارجية
- immigration الهجرة الداخلية
- population growth rate معدل نمو الجماعة
- population density كثافة الجماعة ✓

15. the largest population size that can be supported in an area without harming the environment أكبر عدد لحجم الجماعة الحيائية التي تستطيع البيئة دعمها دون ضرر

0 / 0 pts
Auto-graded

- carrying capacity القدرة الاستيعابية ✓
- exponential growth النمو الأسي
- K-selected استراتيجية
- r-selected استراتيجية

19. population growth under limiting conditions

0 / 0 pts

Auto-graded

- exponential growth النمو الاسي
- logistic growth النمو اللوجيستي ✓
- population density الكثافة
- population pyramid هرم الجماعة

16. population growth under ideal conditions نمو الجماعة الاحيائية تحت الظروف المثالية

0 / 0 pts

Auto-graded

- carrying capacity القدرة الاستيعابية
- exponential growth النمو الاسي ✓
- K-selected استراتيجية
- r-selectedاستراتيجية

Which statement is true about energy in an ecosystem?

ما العبارة الصحيحة حول الطاقة في نظام بيئي ما؟

Learning Outcomes Covered

- 3-4-1-2

a. تنشأ الطاقة في معظم الأنظمة البيئية من الشمس.
Energy for most ecosystems originates from the Sun

b. تُحرر الطاقة غالبًا في صورة ضوء من النظام البيئي.
Energy most often is released as light from an ecosystem.

c. تتدفق الطاقة من الكائنات غير ذاتية التغذية إلى الكائنات ذاتية التغذية.
Energy flows from heterotrophs to autotrophs

d. تزيد مستويات الطاقة كلما اتجهنا نحو قمة السلسلة الغذائية
Energy levels increase toward the top of the food chain

How does energy first enter a pond ecosystem? كيف تدخل الطاقة لأول مرة في نظام بيئي لبركة ما؟

Learning Outcomes Covered

- 3-4-1-1
- 3-4-1-2
- 3-4-1-5

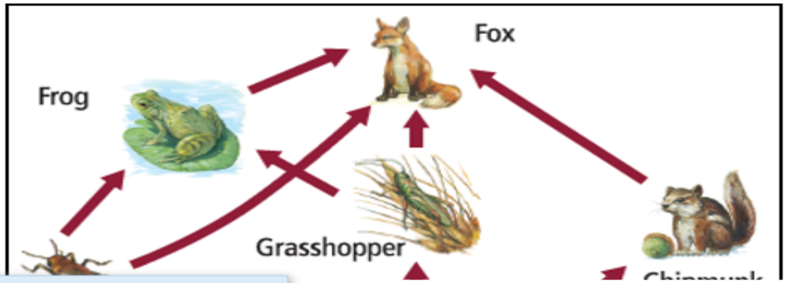
- من خلال نمو الطحالب
  through growth of algae
- من خلال ضوء الشمس
  through light from the Sun
- من خلال تحلل الأسماك الميتة
  through decay of dead fish
- من خلال الجريان السطحي للحقول
  through runoff from fields

Mark(s): 10/10

answer the following question:

ما الذي يمثله الرسم التوضيحي؟

What does the illustration below show?



Learning Outcomes Covered

- 3-4-1-1
- 3-4-1-2
- 3-4-1-3
- 3-4-1-5

- an ecological pyramid هرمًا بيئيًا
- a food chain سلسلة غذائية
- a food web شبكة غذائية ✓
- a pyramid of energy هرم طاقة

Mark(s):

answer the following question:

What term best describes the bee's role of gathering pollen?

ما المصطلح المناسب لوصف دور النحلة في جمع حبوب اللقاح؟

Learning Outcomes Covered

a. predator مفترِس

b. parasite طفيل

c. habitat موطن بيئي

d. niche موقع ملائم

Which of the following levels of organization includes all the other levels?

أي من مستويات التنظيم الآتية تضم كل المستويات الأخرى؟

Learning Outcomes Covered

- 3-4-1-1

a. community المجتمع الأحيائي

b. individual الفرد

c. population الجماعة الأحيائية

d. ecosystem النظام البيئي

Use the illustration below to answer the question:

استخدم الشكل أدناه للإجابة عن السؤال:

Which of the following types of heterotrophs best describes this snake?

ما نوع الكائن غير ذاتي التغذية الذي يصف هذه الأفعى وصفًا مناسبًا؟

Learning Outcomes Covered

- [x] Carnivore آكل لحوم
- [ ] Detritivore كائن كانس
- [ ] Omnivore كائن متنوع التغذية
- [ ] Herbivore آكل نباتات

Which of the following is an abiotic factor for a tree in the forest?

ما الذي يشكّل عاملًا غير حيوي لشجرة في الغابة؟

Learning Outcomes Covered

- 3-4-1-1

يرقة فراشة تأكل أوراقها
a caterpillar eating its leaves

طائر يبني عشه بين أغصانها
a bird nesting in its branches

فطريات تنمو على جذورها
fungus growing on its roots

رياح تهب بين أغصانها
wind blowing through its branches

answer the following question:

The insect in the photo is gathering pollen and nectar for food, but at the same time is aiding in the plant's reproduction. What does this relationship demonstrate?

تجمع الحشرة المبيّنة في الشكل ادناه حبوب اللقاح والرحيق من أجل غذائها لكنها في الوقت نفسه تساعد في تكاثر النبات. ماذا توضِّح هذه العلاقة؟

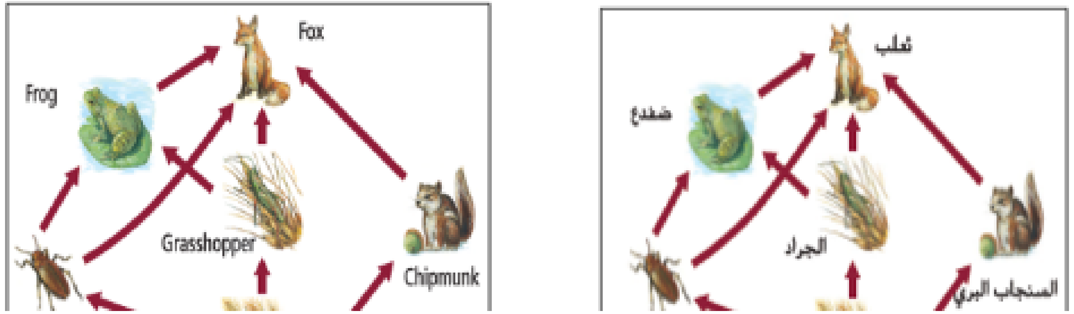
- [ ] predation افتراس
- [ ] commensalism تعايش
- [ ] parasitism تطفل
- [x] mutualism تبادل منفعة

Use the illustration below to answer question:

استخدم الشكل أدناه للإجابة عن السؤال التالي:

Which organism in the illustration is an autotroph?

أي كائن حي في الرسم التوضيحي ذاتي التغذية؟



a. الضفدع frog

b. الجراد grasshopper

c. الثعلب fox

d. العشب grass

Which of the following is a detritivore?

أي مما يلي من الكائنات الكانسة؟

Learning Outcomes Covered

- 3-4-1-1
- 3-4-1-2
- 3-4-1-3
- 3-4-1-5

a. cat القط

b. mouse الفأر

c. sunflower دوّار الشمس

d. crayfish الروبيان

العلامة: 5/5

Which of the following is a density-independent factor?

أي عامل مما يلي لا يعتمد على الكثافة؟

a. an intestinal parasite طفيل في الأمعاء

b. severe overcrowding الازدحام الشديد

c. a fatal virus فيروس قاتل

d. a severe drought الجفاف الشديد

What is the dispersion pattern of herding animals, birds that flock together, and fish that form schools?

ما نمط انتشار حيوانات تعيش في قطيع، وطيور، وأسماك تعيش في أسراب؟

a. uniform منتظم

b. random عشوائي

c. unpredictable لا يمكن توقعه

d. clumped تكتلي

Georgia, a country in western Asia, had a birthrate of 11 and a death rate of 10 in 2008. What was the PGR of Georgia in that year?	في جورجيا، وهي دولة في غرب آسيا، كان معدل المواليد 11 ومعدل الوفيات 10 عام 2008. ما كان معدل النمو السكاني لجورجيا في ذلك العام؟

a. %1

b. %1.1

c. %11.0

d. %11

Which of the following is an example of population density?

أي مما يلي يشكل مثالاً على الكثافة السكانية؟

a. دولة ذات عدد سكان كبير
country with a large population

b. العدد الإجمالي للتماسيح في فلوريدا
total number of alligators in Florida

c. عدد الذئاب في الغابة يبلغ حده الأقصى
maximum number of wolves in a forest

d. غزالان اثنان في كل ألف هكتار
two jaguars per thousand hectares

Humans will reach zero population growth when:

يبلغ البشر صفراً للنمو السكاني عندما:

a. يتم الوصول إلى القدرة الاستيعابية
Carrying capacity is reached.

b. يتوقف البشر عن الإنجاب
humans stop giving birth

c. يتوقف عدد السكان في العالم عن النمو
world population stops growing

d. يساوي معدل الولادات نفس معدل الوفيات
birthrate equals death rate

Which of the following is an example of uniform dispersal?

أي مما يلي يشكل مثالاً على الانتشار المتجانس؟

a. قطيع كبير من الجواميس
one large buffalo herd

b. مجموعات عشوائية من الأفيال
random elephant groups

c. سرب من سمك الكشكوشة
school of silverside fish

d. أزواج غزلان
territorial jaguar pairs

Use the illustration below

استخدم الشكل أدناه للإجابة عن السؤال.

to answer the question.

ما نوع الكائن غير ذاتي التغذية الذي يصف

Which of the following types of heterotrophs

هذه الأفعى وصفًا مناسبًا؟

best describes this snake?

a. كائن كانس Detritivore

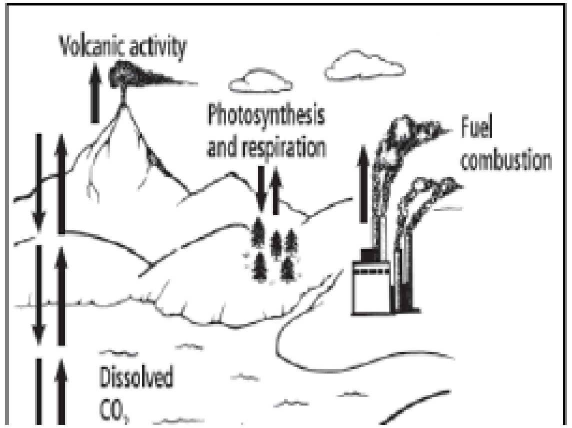
b. آكل نباتات Herbivore

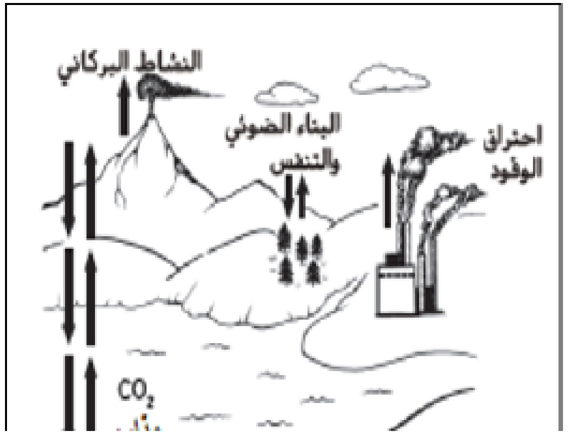
c. كائن متنوع التغذية Omnivore

d. آكل لحوم Carnivore

Which part of the diagram below relates to carbon leaving a long-term cycle?

أي من أجزاء الرسم التالي يرتبط بإطلاق الكربون من دورة طويلة المدى؟





a. Fuel combustion احتراق الوقود

b. Dissolved CO2 ثاني أكسيد الكربون (CO2) المذاب

c. Photosynthesis and respiration البناء الضوئي والتنفس

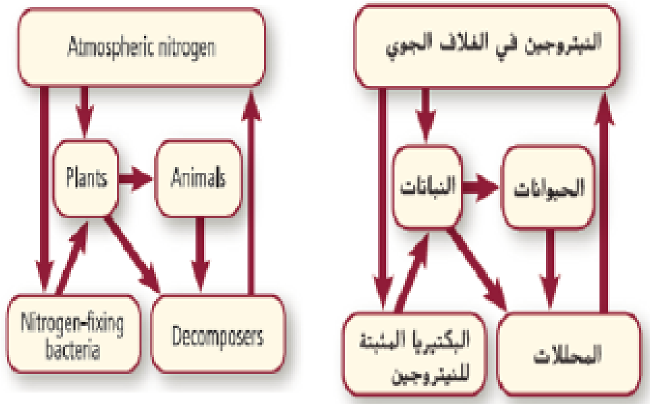
d. Volcanic activity النشاط البركاني

Use the illustration below to answer the following question:

استخدم الشكل أدناه للإجابة عن السؤال التالي:

Where is the largest concentration of nitrogen found?

أين يوجد التركيز الأكبر للنيتروجين؟



a. Animals الحيوانات

b. Bacteria البكتيريا

c. Plants النباتات

d. Atmosphere الغلاف الجوي ✔

ما اسم العملية التي تحوِّل فيها البكتيريا والبرق النيتروجين إلى مركبات مفيدة للنباتات؟

it is the name of the process in
ch bacteria and lightning convert
ogen into compounds that are
ful to plants?

a. ammonification إنتاج الأمونيا
b. nitrate cycling تدوير النيترات
c. denitrification إزالة النيتروجين
d. nitrogen fixation تثبيت النيتروجين ✓

Which of the following is a weakness of traditional food webs when they are applied to complex ecological problems?

أي مما يلي يشكل نقطة ضعف بالنسبة للشبكات الغذائية عند تطبيقها على المشاكل البيئية المعقدة؟

a. الشبكة الغذائية لا تمثل كافة الروابط في نظام بيئي حقيقي
A food web does not represent all the links in an actual ecosystem

b. الشبكات الغذائية لا تشمل الأنواع المستقدمة في البيئة.
Food webs do not account for non-native species in the environment

c. كثرة السلاسل الغذائية في الشبكة الغذائية يجعلها معقدة لحد لا يسمح باستخدامها.
The many food chains of a food web make it too complicated to use

d. لا تؤخذ المستويات الغذائية في الحسبان عند تشكيل شبكة غذائية.
Trophic levels are not taken into account when creating a food web

تجمع الحشرة المبيّنة في الشكل ادناه حبوب اللقاح والرحيق من أجل غذائها لكنها في الوقت نفسه تساعد في تكاثر النبات. ماذا توضِّح هذه العلاقة؟

- ○ predation افتراس
- ○ commensalism تعايش
- ○ parasitism تطفل
- ✔ mutualism تبادل منفعة

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - **2020-2019**

أي من المهام التالية يمكن لعالم البيئة القيام بها؟

Which of the following tasks would be completed by an ecologist?

a. اكتشاف الاستخدامات الدوائية للرحيق

Explore the medicinal uses of nectar

b. تلقيح بقرة ضد العدوى

Inoculate cattle against infection

c. اختبار تأثير السيانيدات على الطحالب

Test the effect of cyanide on algae

d. مسح وتصنيف الرخويات

Survey and classify mollusk fossils

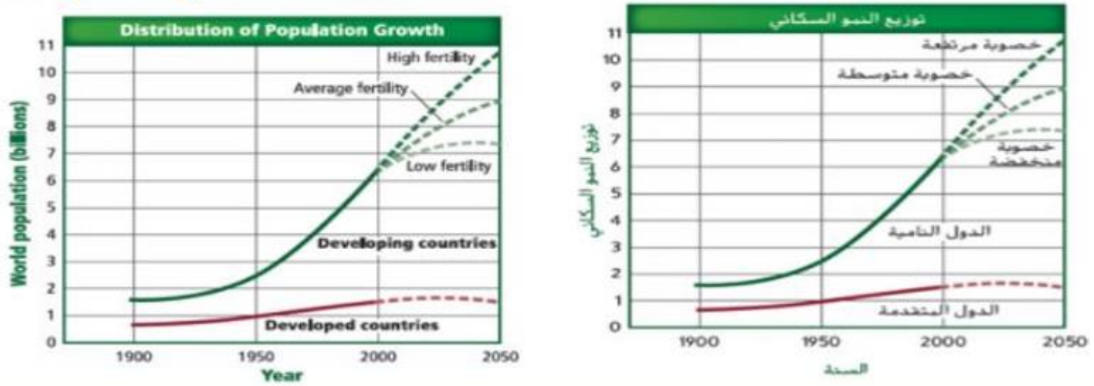
اختبار نهاية الفصل الدراسي **الثالث** ـ المادة : **أحياء** - **2020-2019**

Use the graph below of the growth of the human population through history to answer the following question:

What is the approximate population difference between developing countries that have low fertility rates and developing countries that have high fertility rates in 2050?

استخدم الشكل أدناه الذي يمثل النمو السكاني للبشر عبر التاريخ للإجابة عن السؤال التالي:

ما الفرق التقريبي في عدد السكان بين الدول النامية ذات معدلات الخصوبة المنخفضة والدول النامية ذات معدلات الخصوبة المرتفعة في عام 2050؟



- 1.7 billion 1.7 مليار
- 3.2 billion 3.2 مليار
- 9 billion 9 مليار
- 1.5 billion 1.5 مليار

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

Which is a density–independent factor for a flock of Canada geese on a large lake?	ما العامل الذي لا يعتمد على الكثافة وراء تواجد قطيع من الإوز الكندي على بحيرة كبيرة؟

- ○ Intestinal worms — الديدان المعوية
- ○ Infectious virus — فيروس معدٍ
- ○ Dwindling food supply — إمداد غذاء متضائل
- ○ Unusually cold winter — شتاء أبرد من العادة

أي مما يلي يُعد سمة من سمات الزيادة السكانية الأسية؟

Which of the following is a characteristic of exponential population growth?

- يتم استهلاك الموارد بشكل أسي طوال كافة المراحل
  Resources are consumed exponentially during all phases
- الزيادة السكانية الأولية سريعة
  Initial population growth is rapid
- معدل الزيادة يتطابق بشكل عكسي مع عدد السكان
  Growth rate is inversely proportional to population size
- مرحلة التباطؤ تتبع النمو السريع
  The lag phase follows rapid growth

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

Which is an adverse effect of a negative-growth human population trend?

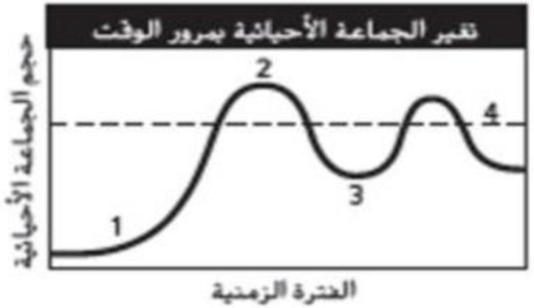
أي من الآثار السلبية التالية تنتج عن انخفاض النمو السكاني عند البشر؟

- عبء مفرط على الموارد الطبيعية العالمية
  An excess burden on global natural esources
- نقص الموارد المالية المناسبة لرعاية الأطفال
  Inadequate financial resources to care for children
- قلة الوظائف الداعمة للطبقة السكانية الكبيرة الشبابية
  Too few jobs to support a large, young population
- الافتقار للأيادي العاملة القائمة بمساعدة السكان المسنين
  Too few workers to support an aging population

اختبار نهاية الفصل الدراسي **الثالث** ـ المادة : **أحياء** - 2019-2020

Which part of the graph below indicates the carrying capacity of the habitat?

أي جزء من الرسم البياني أدناه يمثل القدرة الاستيعابية للموطن البيئي؟



- ○ 1
- ○ 3
- ○ 2
- ○ 4

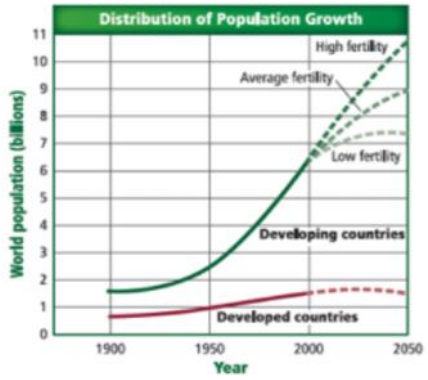
اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

Use the graph below of the growth of the human population through history to answer the following question:

What is the projected population of developed countries by 2050?

استخدم الشكل أدناه الذي يمثل النمو السكاني للبشر عبر التاريخ للإجابة عن السؤال التالي:

ما عدد السكان المتوقع في الدول المتقدمة في عام 2050؟



- ○ 1.5 billion 1.5 مليار
- ○ 10.5 billion 10.5 مليار
- ○ 7.3 billion 7.3 مليار
- ○ 9 billion 9 مليار

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

Which organism follows an ***r–strategy*** for reproduction?

ما الكائن الذي يتبع *استراتيجية r–* للتكاثر؟

- ○ Zebra الحمار الوحشي
- ○ Robin طير أبو الحناء
- ○ Mayfly ذباب مايو
- ○ Human الإنسان

أي من المعايير التالية لا يُستخدَم لوصف عدد الدببة الرمادية في كندا؟

Which of the following is not used to describe a population of grizzly bears in Canada?

- ○ التاريخ الديموغرافي Demographic history
- ○ الكثافة السكانية Population density
- ○ التوزيع الجغرافي Geographic distribution
- ○ معدل النمو الإجمالي Overall growth rate

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

أي مما يلي يصف الزيادة السكانية لدى البشر حالياً؟

Which of the following describes the current human population growth?

- ارتفاع الزيادة ومعدل النمو
  Increasing growth and rate of growth
- انخفاض الزيادة ومعدل النمو
  Decreasing growth and rate of growth
- انخفاض الزيادة وارتفاع معدل النمو
  Decreasing growth and increasing rate of growth
- ارتفاع الزيادة وانخفاض معدل النمو
  Increasing growth and decreasing rate of growth

تصل الجماعة الأحيائية الى القدرة الاستيعابية:

A population reaches the carrying capacity:

تكون في استراتيجية r

is reached in r–selected populations

تصل اليها عندما تكون الموارد محدودة

is reached as resources become limiting

تصل اليها بنهاية النمو الأسي

is reached at the end of exponential growth

تصل لها عندما تكون البيئة ضارة

is reached when the environment begins to be harmed

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

أي مما يلي يعتمد على عدد الأعضاء في المجتمع لكل وحدة مساحة؟

Which of the following depends on the number of members in a population per unit area?

- An abiotic factor عامل غير حيوي
- A density-dependent factor عامل يعتمد على الكثافة
- A density-independent factor عامل لا يعتمد على الكثافة
- A biotic factor عامل حيوي

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

The density–independent factor: العامل الذي لا يعتمد على الكثافة هو:

- parasites الطفيليات
- disease المرض
- predation الافتراس
- temperature الحرارة

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

يمكن حساب معدل النمو السكاني (%) عن طريق:

Population growth rate (%) can be calculated by:

- ○ $\frac{\text{معدل المواليد + معدل الوفيات − معدل الهجرة}}{10}$

  $\frac{\text{brithrate + death rate − migration rate}}{10}$

- ○ $\frac{\text{معدل المواليد + معدل الوفيات + معدل الهجرة}}{10}$

  $\frac{\text{brithrate + death rate + migration rate}}{10}$

- ○ $\frac{\text{معدل الهجرة + معدل الوفيات − معدل المواليد}}{10}$

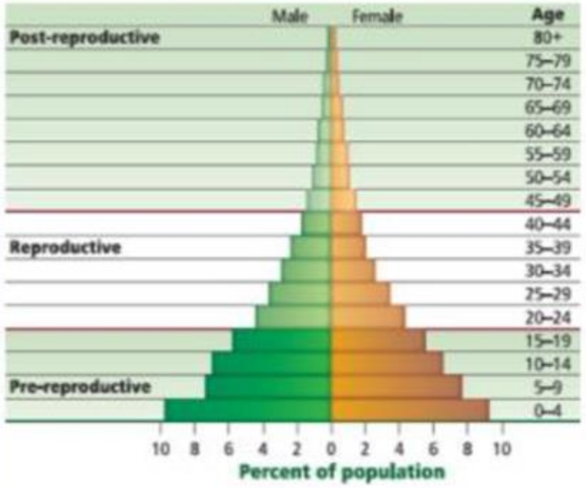
  $\frac{\text{migration rate + death rate − brithrate}}{10}$

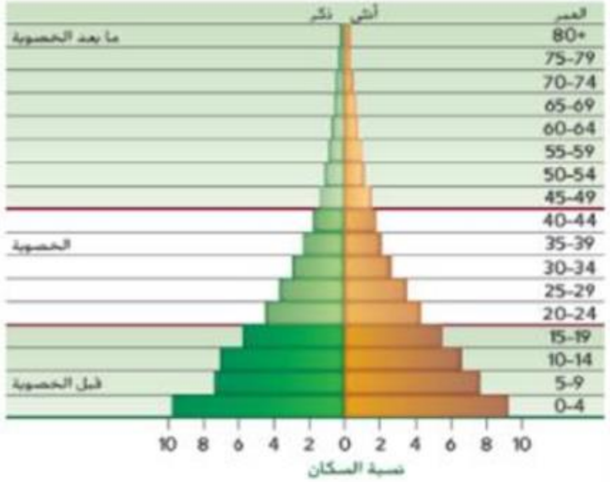
- ○ $\frac{\text{معدل المواليد − معدل الوفيات + معدل الهجرة}}{10}$

  $\frac{\text{brithrate − death rate + migration rate}}{10}$

What is the type of population Growth in the figure below?

ما نوع النمو السكاني في الشكل التالي؟





- ○ slow growth النمو البطيء
- ○ negative growth النمو السلبي
- ○ Zero growth النمو الصفري
- ○ rapid growth النمو السريع

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

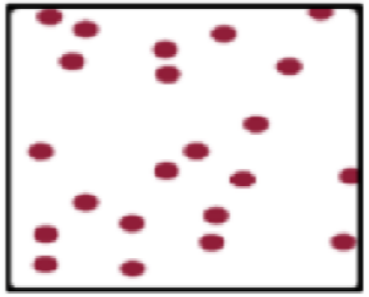
إذا كان عدد السكان ينمو أكبر من القدرة الاستيعابية للبيئة:

If a population grows larger than its environmental carrying capacity, then:

- قد يرتفع معدل المواليد بشكل ملحوظ
  birth rate may rise significantly
- قد يرتفع معدل الوفيات
  death rate may rise
- قد يزيد معدل الهجرة الداخلية
  immigration rate may increase
- قد ينخفض معدل الوفيات بشكل ملحوظ
  death rate may fall significantly

What is the type of dispersion shown in the figure below?

ما نوع التوزيع المبين في الشكل أدناه؟



- uniform منتظم
- clumped تكتلي
- random عشوائي
- The type can not be determined لا يمكن تحديد نوعه

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - 2020-2019

دراسة حجم السكان والكثافة والتوزيع والحركة ومعدلات الولادة ومعدلات الوفاة يسمى:

The study of human population size, density, distribution, movement, birth rate and death rate is called:

- التركيب العمري
  age structure
- التحول السكاني
  demographic transition
- الانفصال أو الخروج من جماعة أحيائية
  Emigration
- علم الاحصاء السكاني
  Demography

اختبار نهاية الفصل الدراسي **الثالث** - المادة : **أحياء** - **2020-2019**

Q.3: أي من المسارات التالية لتحوّل الطاقة يحدث فقط في الكائنات ذاتية التغذية؟

Learning Outcomes Covered

- 3-1-1-2
- 3-1-1-7

a. من الطاقة الكهربائية إلى الطاقة الحرارية

b. من الطاقة الميكانيكية إلى الطاقة الحرارية

c. من الطاقة الضوئية إلى الطاقة الكيميائية

d. من الطاقة الكيميائية إلى الطاقة الميكانيكية

Q.10: .

Mark(s): 10/10

Which is an autotroph? أي مما يلي يعد ذاتي التغذية؟

Learning Outcomes Covered

- 3-4-1-2

a. mushroom عيش الغراب

b. sparrow عصفور الدوري

c. wolf الذئب

d. alga الطحالب

What happens to the energy that the fox uses for maintaining its Body temperature?

ما الذي يحدث للطاقة التي يستخدمها الثعلب للحفاظ على اتزان درجة حرارة جسمه؟

Learning Outcomes Covered

- 3-4-1-3

a. تنتقل إلى المستوى الغذائي التالي عندما يؤكل الثعلب
It travels to the next trophic level when the fox is eaten

b. تبقى في الثعلب خلال عملية أيض الغذاء
It stays in the fox through the metabolism of food

c. تحصل عليها المحللات التي تتغذى على الثعلب
It is taken up by decomposers that consume the fox

d. تنتقل إلى البيئة المحيطة
It moves into the surrounding environment

Which is a weakness of traditional food webs when they are applied to complex ecological problems؟

أي مما يلي يشكل نقطة ضعف بالنسبة للشبكات الغذائية عند تطبيقها على المشاكل البيئية المعقدة؟

Learning Outcomes Covered

- 3-4-1-3

a. الشبكات الغذائية لا تشمل الأنواع المستقدمة في البيئة.
Food webs do not account for non-native species in the environment

b. كثرة السلاسل الغذائية في الشبكة الغذائية يجعلها معقدة لحد لا يسمح باستخدامها.
The many food chains of a food web make it too complicated to use.

c. لا تؤخذ المستويات الغذائية في الحسبان عند تشكيل شبكة غذائية.
Trophic levels are not taken into account when creating a food web

d. الشبكة الغذائية لا تمثل كافة الروابط في نظام بيئي حقيقي.
A food web does not represent all the links in an actual ecosystem

Response Review - Google Chrome

sa.moe.gov.ae/Analytics/QRevAll.aspx?...

Which is an abiotic factor? أي مما يلي يعد من العوامل غير الحيوية؟

Learning Outcomes Covered

- 3-4-1-1

a. غابة من الأشجار النفضية
A forest of deciduous trees

b. دب قطبي على كتلة جليدية
A polar bear on an ice flow

c. الفطريات والحزازيات على خشبة ميتة
Fungi and moss on a rotting log

d. تيار محيطي من المياه الباردة
An ocean current of cold water

Which is a waste product of the photosynthesis process?

أي من مما يلي يعد من نواتج عملية البناء الضوئي؟

Learning Outcomes Covered

- 3-4-1-2

a. carbon dioxide ثاني أكسيد الكربون

b. nitrogen النتروجين

c. water vapor بخار الماء

d. oxygen الأكسجين

Q.7:

Mark(s): 10/10

Which is an example of mutualism?

أي مما يلي مثال على تبادل المنفعة؟

Learning Outcomes Covered

- 3-4-1-5

a. نوعان من الأفاعي ذات علامات مماثلة لترويج الزعاف السام
Two snake species with similar markings advertising their toxic venom

b. جراد البحر والبلم اللذان يستريحان تحت نفس الصخرة.
Crayfish and minnows resting under the same rock

c. النمر يطارد الغزالة
A peacock courting and mating with a peahen

d. سمكة تحمي الروبيان، الذي يبني جحراً ليتشاركاه.
A fish protecting a shrimp, who builds a burrow for the pair to share

Mark(s): 10/10

Q.6:

Exams Results - SwiftAsse

Response Review - Google Chrome

sa.moe.gov.ae/Analytics/QRevAll.aspx?smtreq=X9P6jbYTd6K1+WyMBC6IGKDKYiDTM+L1kFeOnAsKQ2UqgSXb9HwBa/2uCjkAwTfg

Which is an example of predation?

أي مما يلي مثال على الافتراس؟

Learning Outcomes Covered

- 3-4-1-2

a. سمكة المهرج التي تحمي صغارها
Clownfish protecting its anemone

b. القراد في جلد الذئب
Tick lodging in the skin of a wolf

c. كبشان يتصارعان على الإناث
Two male rams fighting for females

d. بطة برية تتغذى على اللافقاريات البحرية
Mallard eating aquatic invertebrates

Ecology is the scientific discipline that studies all the interactions between:

علم البيئة مجال علمي يدرس كافة التفاعلات بين:

Learning Outcomes Covered

- 3-4-1-1

a. كافة الأقاليم المختلفة على كوكب الأرض.
All the different regions of Earth

b. أشكال المواد المختلفة للأرض.
Different forms of matter on Earth

c. البشر وتصرفاتهم فيما يخص الملوثات.
Humans and their polluting behaviors

d. الكائنات الحية وبيئاتها.
Organisms and their environments

Which task would be completed by an Ecologies

أي من المهام التالية يمكن لعالم البيئة القيام بها؟

Learning Outcomes Covered

- 3-4-1-1

a. اكتشاف الاستخدامات الدوائية للرحيق
explore the medicinal uses of nectar

b. تلقيح بقرة ضد العدوى
inoculate cattle against infection

c. مسح وتصنيف الرخويات
survey and classify mollusk fossils

d. اختبار تأثير السيانيدات على الطحالب
test the effect of cyanide on algae

The region of land—approximately 4 km2—a jaguar must roam to collect food would be an example of a(n):

مساحة الأرض–حوالي اربعة كيلومترات مربعة التي يجب على الغزال قطعها لجمع الطعام تشكل مثالاً على:

Learning Outcomes Covered

- 3-4-1-1

a. biome المجال الحيوي البيئي.

b. ecosystem النظام البيئي.

c. Habitat. الموطن.

d. population الجماعة الأحيائية.

Mark(s): 10/10

34. Which process locks phosphorus in a long term cycle?
تدوير الفوسفات لوقت طويل جدا

- organic materials buried at the bottom of oceans من المواد العضوية في قاع المحيطات
- phosphates released into the soil انطلاقه من التربة
- animals and plants eliminating wastes من فضلات النباتات والحيوانات
- rain eroding mountains من تعرية الامطار للجبال ✓ X

Revision in Links

Revision Activity

- https://forms.office.com/Pages/ResponsePage.aspx?id=ZN_eq0qrBUuqA_TbXZ4ii0pQ0bJdQuFBptDWbq9_GPRUN09KSFgwVVNaWlBYNElFNlVIN1ROOENJSS4u

Revision Activity

- https://forms.office.com/Pages/ResponsePage.aspx?id=ZN_eq0qrBUuqA_TbXZ4ii0pQ0bJdQuFBptDWbq9_GPRUODI5MlBGWEhTMlFRS1dVUVBZNUNGVzhaUi4u

أسئلة وزارية سابقة

اسئلة تفكير ناقد

1- علم البيئة مجال علمي يدرس كافة التفاعلات بين :
- البشر وتصرفاتهم فيما يخص الملوثات
- الكائنات الحية وبيئاتها
- كافة الاقاليم المختلفة على كوكب الارض
- اشكال المواد المختلفة للارض

2- اي مما يلي يعد من العوامل غير الحيوية ؟
- غابة من الاشجار
- تيار محيطي من المياه الباردة
- الفطريات والحزازيات على خشبة ميتة
- دب قطبي

3- اي مما يلي يعد ذاتي التغذية :
- فطر عيش الغراب
- طائر الحبارى
- الطحالب
- الثعلب

4- اي من المهام التالية يمكن لعالم البيئة القيام بها ؟
- اكتشاف الاستخدامات الدوائية للرحيق
- اختبار تاثير المبيد على الطحالب
- دراسة وتصنيف الرخويات
- تلقيح بقرة ضد العدوى

5- اي مما يلي مثال على الافتراس ؟
- كبشان يتصارعان على الاناث
- بطة برية تتغذى على اللافقاريات البحرية
- سمكة المهرج التي تحمي صغارها
- القراد في جلد الذئب

6- اي مما يلي يشكل نقطة ضعف بالنسبة للشبكات الغذائية عند تطبيقها على المشاكل البيئية المعقدة :
- الشبكات الغذائية لا تشمل الانواع المستقدمة في البيئة
- لا تؤخذ المستويات الغذائية في الحسبان عند تشكيل شبكة غذائية
- الشبكة الغذائية لا تمثل كافة الروابط في نظام بيئي حقيقي
- كثرة السلاسل الغذائية في الشبكة الغذائية تجعلها معقدة لحد لا يسمح باستخدامها

7- اي مما يلي يعد من نواتج عملية البناء الضوئي
- بخار الماء - النتروجين - الاكسجين - ثاني اكسيد الكربون

8- اي من الكائنات الحية تلتقط النتروجين في الغلاف الجوي و تقوم بعملية تثبيت النتروجين :
- الحيوانات - النباتات - الفطريات - البكتريا

9- في اي دراسة علمية يشارك عالم الاحياء :
- تتبع طريقة استعمار المرجان للسفينة الغارقة
- تصنيف ثلاثة انواع جديدة من الحشرات في الغابات المطيرة
- مقارنة انواع النمل المتحجرة في الكهرمان
- تقييم خطر الاصابة بداء الكلب الذي يشكله الراكون

10- عادة ما يستعمل عالم الاحياء التمثيل بدلا من الدراسات الميدانية لانها :
- تسمح له بالتحكم في كل المتغيرات المتضمنة
- تساعده في جمع المزيد من العينات
- تكلفتها اقل من العمل في الميدان
- تتيح له دراسة العديد من الكائنات الحية في ان واحد

11- مساحة الارض حوالي 4 كيلومترات مربعة التي يجب على الغزال قطعها لجمع الطعام تشكل مثالا على :
- المجال الحيوي البيئي
- النظام البيئي
- الموطن
- الجماعة الاحيائية

12- اي مما يلي مثالا على التكافل :
- نوعان من الافاعي ذات علامات مماثلة لترويع الزعاف السام
- سمكة تحمي الروبيان الذي يبني جحرا ليتشاركاه
- النمر يطارد الغزالة
- جراد البحر والبلم اللذان يستريحان على نفس الصخرة

13- اي مما يلي جزء من الدورة الحيوية الجيولوجية الكيميائية :
- غاز الهليوم الذي ينبعث على الفضاء
- تدفق الحمم البركانية من بركان نشط
- كربون يتم حبسه في قاع المحيط
- الاشعاع الشمسي الذي يصيب الارض

اسئلة تفكير ناقد

1- علم البيئة مجال علمي يدرس كافة التفاعلات بين :
- البشر وتصرفاتهم فيما يخص الملوثات
- الكائنات الحية وبيئاتها
- كافة الاقاليم المختلفة على كوكب الارض
- اشكال المواد المختلفة للارض

2- اي مما يلي يعد من العوامل غير الحيوية ؟
- غابة من الاشجار
- تيار محيطي من المياه الباردة
- الفطريات والحزازيات على خشبة ميتة
- دب قطبي

3- اي مما يلي يعد ذاتي التغذية :
- فطر عش الغراب
- طائر الحبارى
- الطحالب
- الثعلب

4- اي من المهام التالية يمكن لعالم البيئة القيام بها ؟
- اختبار تأثير المبيد على الطحالب
- اكتشاف الاستخدامات الدوائية للرحيق
- تلقيح بقرة ضد العدوى
- دراسة وتصنيف الرخويات

5- اي مما يلي مثال على الافتراس ؟
- كبشان يتصارعان على الاناث
- خنفساء تربة تتغذى على اللافقاريات المجهرية
- سمكة المهرج التي تحمي صغارها
- القراد في جلد الذئب

6- اي مما يلي يشكل نقطة ضعف بالنسبة للشبكات الغذائية عند تطبيقها على المشاكل البيئية المعقدة :
- الشبكات الغذائية لا تشمل الانواع المستقدمة في البيئة
- لا توجد المستويات الغذائية في الحسبان عند تشكيل شبكة غذائية
- الشبكة الغذائية لا تمثل كافة الروابط في نظام بيئي حقيقي
- كثرة السلاسل الغذائية في الشبكة الغذائية تجعلها معقدة لحد لا يسمح باستخدامها

7- اي مما يلي يعد من نواتج عملية البناء الضوئي
- بخار الماء
- النتروجين
- الاكسجين
- ثاني اكسيد الكربون

8- اي من الكائنات الحية تلتقط النتروجين في الغلاف الجوي و تقوم بعملية تثبيت النتروجين :
- الحيوانات
- النباتات
- الفطريات
- البكتريا

9- في اي دراسة علمية يشارك عالم الاحياء :
- تتبع طريقة استعمار المرجان للسفينة الغارقة
- تصنيف ثلاثة انواع جديدة من الحشرات في الغابات المطيرة
- مقارنة انواع النمل المتحجرة في الكهرمان
- تقييم خطر الاصابة بداء الكلب الذي يشكله الراكون

10- عادة ما يستعمل علم الاحياء التمثيل بدلا من الدراسات الميدانية لانها :
- يسمح له بالتحكم في كل المتغيرات المتضمنة
- تساعده في جمع المزيد من العينات
- تكلفتها اقل من العمل في الميدان
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ISRAA AL DABBAGH

أتمنى دعوة صالحة منكم في ظهر الغيب