DATE: NAME: CLASS:

UNIT 1

Unit 1 Summary

BLM 1-1

Goal • Use this summary to review the concepts in Unit 1, Interactions Within Ecosystems.

Chapter 1 An ecosystem is all the living and non-living things in a particular place.

- All ecosystems include biotic (living) and abiotic (non-living) things. (1.1)
- Ecosystems such as oceans and deserts may cover huge areas. Other ecosystems are quite small—such as a rock pool or a rotting log. (1.1)
- Abiotic parts of an environment include such things as temperature, light, air, water, soil, and climate. (1.2)
- Each type of organism is adapted to a particular set of abiotic conditions. (1.2)
- Individual members of the same species living together in the same area at the same time form a population. (1.3)
- Populations of different species interact in communities. (1.3)

Chapter 2 Living and non-living things interact in ecosystems.

- Symbiotic relationships include parasitism, mutualism, and commensalism. (2.1)
- Feeding relationships can affect the population size of the organisms that are eaten and of the organisms that eat them. (2.1)
- Animals obtain their food from the biotic environment by consuming other organisms. They are called consumers. (2.2)
- Plants produce their food from the abiotic environment by the process of photosynthesis. They are called producers. (2.2)
- Waste and dead matter are a source of food for scavengers and decomposers. (2.2)
- Energy from sunlight is transferred through ecosystems in food chains and food webs. Energy is lost at each step in a food chain. (2.3)
- Nutrients are continuously recycled through the biotic and abiotic environment. (2.4)

Chapter 3 Natural events and human activities cause changes in ecosystems.

- Ecosystems may be disturbed by natural events such as storms and floods and by human activities such as logging and fishing. (3.1)
- An area of bare rock can gradually change over centuries into a complex community of species by the process of succession. (3.1)
- Humans have a major impact on ecosystems because of our powerful technologies and large human population. (3.2)
- The main impacts include loss of habitat, introduction of alien species, overharvesting of natural resources, and pollution. (3.2)
- Environmental monitoring is used to detect changes in ecosystems. (3.3)
- Information from monitoring can be used to help manage and protect ecosystems. (3.3)

DATE: NAME: CLASS:

CHAPTER 2 # Food Preservation BLM 1-10

Goal • Use the table below to complete Think About It 2-2A, Food Preservation.

Title _____

Food Product	Preservation Method	How It Works

DATE: NAME: CLASS:

CHAPTER 2

Eating at the Copepod Café

BLM 1-11

Goal • Record your results for Find Out Activity 2-3A, Eating at the Copepod Café, and answer the questions that follow.

Title _____

	Copepods	Fish	Herons
Trial 1			
Start of game (0 min)			
After 1 min			
After 2 min			
After 3 min			

Title _____

	Copepods	Fish	Herons
Trial 2			
Start of game (0 min)			
After 1 min			
After 2 min			
After 3 min			

Analyze

1. Compare the starting populations of copepods, fish, and herons in Trial 1 and Trial 2. Which trial is closer to the situation found in nature? Explain your answer.

_____

_____

_____

2. Predict what might happen to all three populations if the food supply for copepods was reduced by one half.

_____

_____

_____

_____

3. Suppose that there were no fish in the estuary. What might happen to:

(a) the copepod population?

_____

_____

(b) the heron population?

_____

_____

4. Suppose this model included other species, forming an estuary food web. What effect might this have?

_____

_____

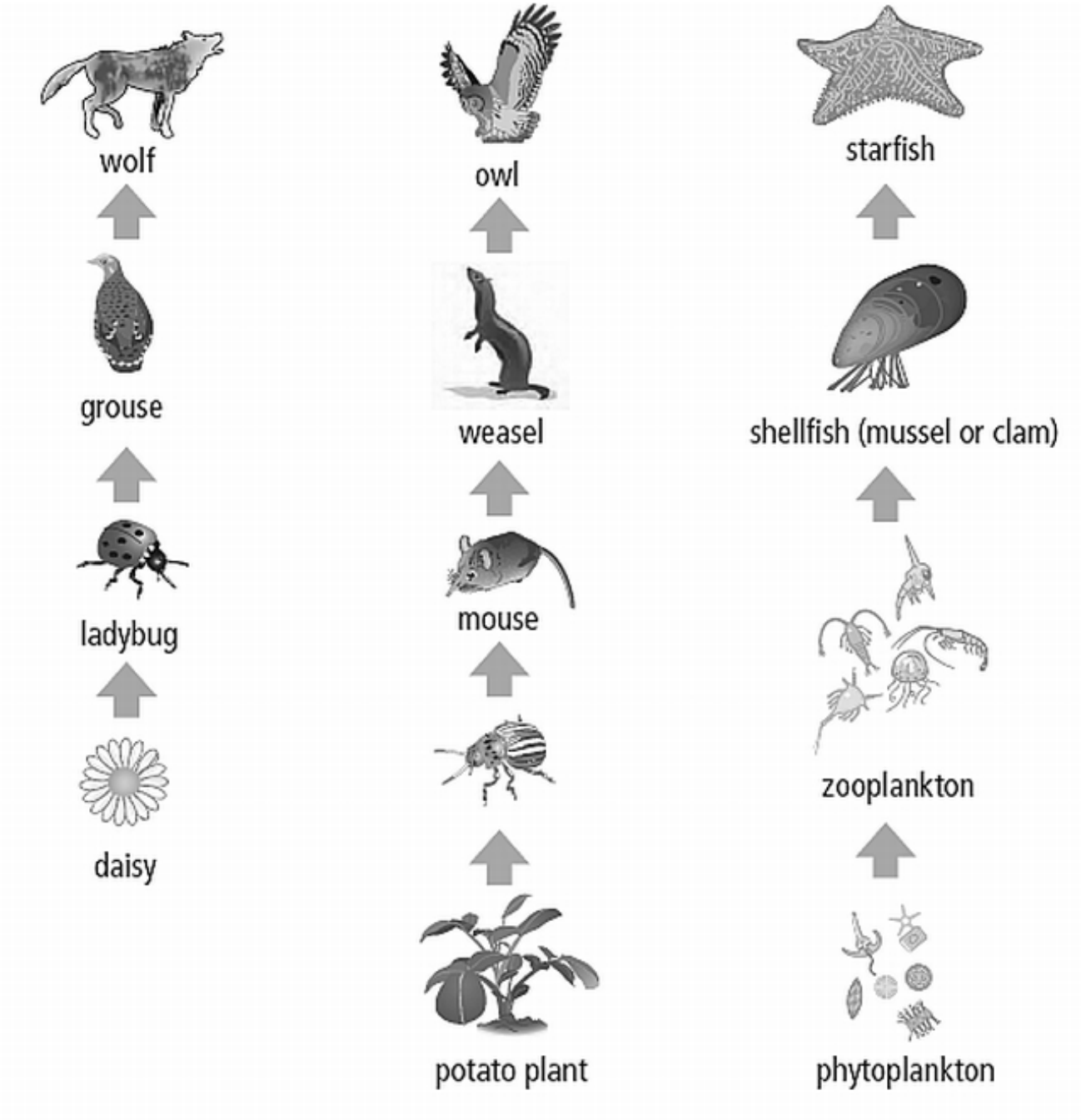
_____

DATE: NAME: CLASS:

CHAPTER 2

Three Food Chains

BLM 1-12

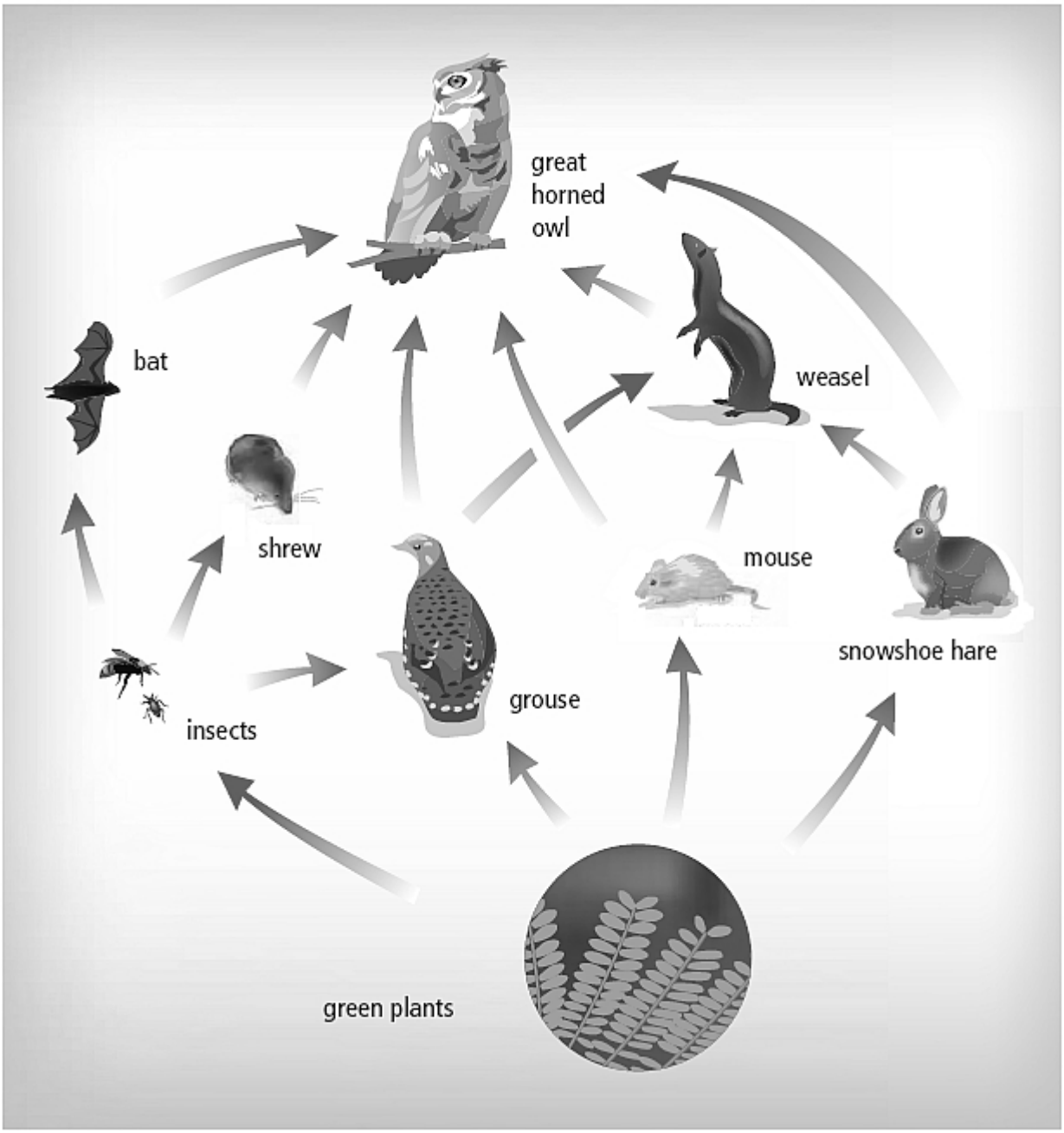


DATE: NAME: CLASS:

CHAPTER 2

Food Web

BLM 1-13

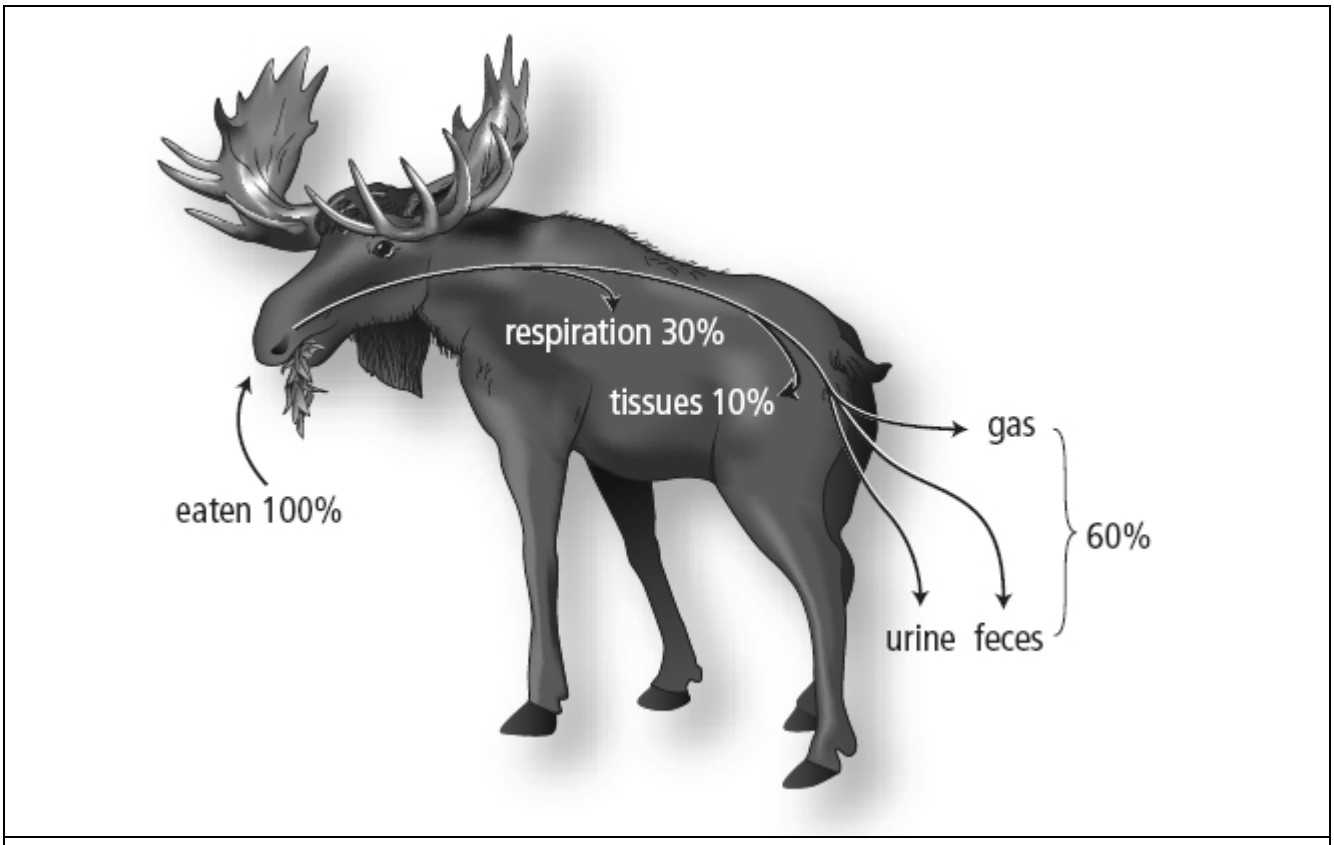


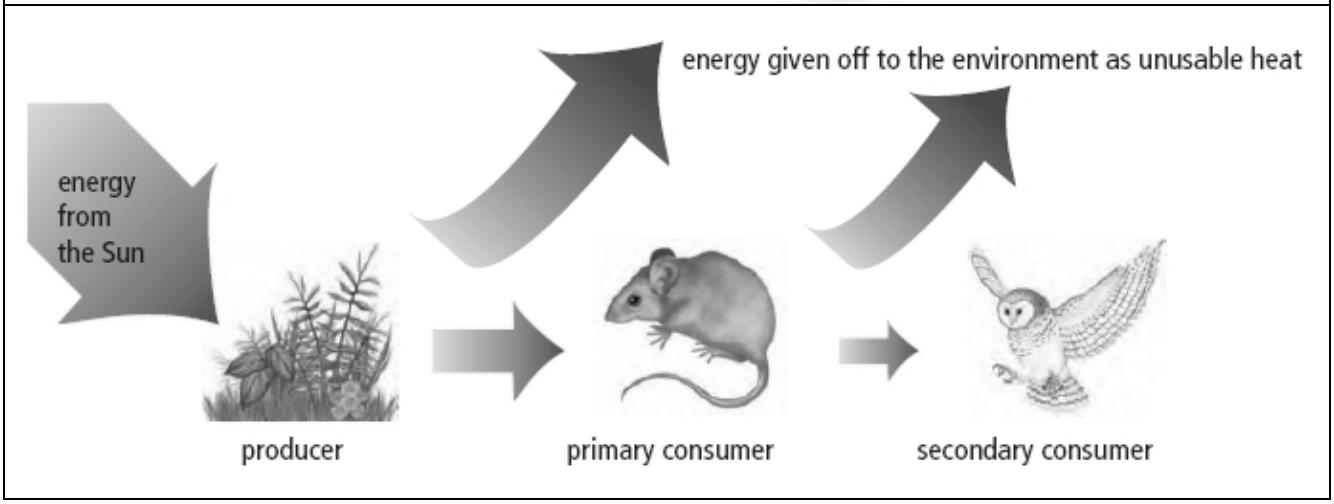
DATE: NAME: CLASS:

CHAPTER 2

Energy Transfer Figures

BLM 1-14





DATE: NAME: CLASS:

CHAPTER 2

Energy Transfer Quiz

BLM 1-15

Goal • Show your understanding of energy transfer occurs in ecosystems.

Questions

1. Explain the difference between a food chain and a food web.

_____

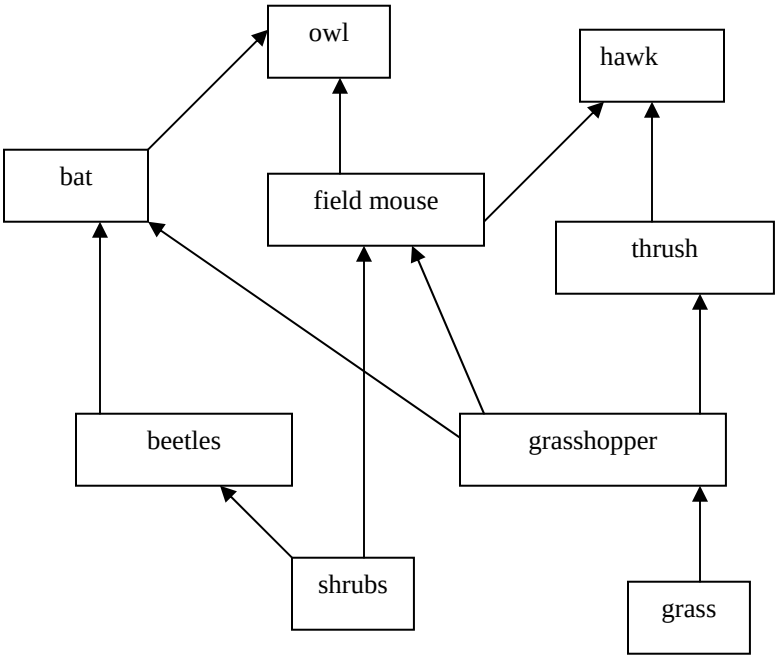
_____

2. Why are food chains limited in length?

_____

_____

3. Study the food web below and fill in the blanks for the questions that follow.



3. (a) The producers in the food web are_____.

   (b) A(n) _____ is a herbivore in the food web.

   (c) The bat is an example of a_____ consumer.

   (d) The grasshopper is an example of a _____ consumer.

   (e) The thrush population in this community has been decreasing due to loss of habitat. As a result, the hawk population will _____ and the grasshopper population will _____.

4. Isle Royale is a small island located in Lake Superior. The island is home to a population of wolves and moose that live in balance with one another. Wolves are the main predators of moose. Foxes also feed on the moose carcasses if there is anything remaining. They also eat grass-eating snowshoe hares. Insects such as ticks and mosquitoes feed on moose blood. Moose themselves are primary consumers that eat a variety of woody plant materials, including balsam fir and birch. Aquatic plants make up a large percentage of the herbivore's summer food resource.

   (a) In the space provided below, create a food web for Isle Royale that includes the organisms mentioned above.

(b) Explain why there is more energy available to the snowshoe hares than to the foxes in this food web.

_____

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 2

Chapter 2 Review

BLM 1-16

Goal • Check your understanding of Chapter 2.

What to Do

Circle the letter of the best answer.

1. After a rainfall, the Sun evaporates puddles on the ground. This is best described as what sort of an interaction?
   A. abiotic-abiotic
   B. abiotic-biotic
   C. abiotic-symbotic
   D. biotic-biotic

2. Which of the following statements is true?
   A. A flea and a dog are partners in a parasitic relationship.
   B. Commensalism is a relationship in which one partner benefits and the other is harmed.
   C. Mutualism is a relationship in which one partner benefits and the other is harmed.
   D. The relationship that exists between a barnacle and a whale is parasitism.

3. What term is used to identify an animal that eats only other animals?
   A. consumer
   B. carnivore
   C. omnivore
   D. scavenger

4. Which of the following statements describes the role of decomposers in nutrient cycles?
   A. They eat decaying animals and waste materials.
   B. They move through the food chain from one organism to another.
   C. They obtain food from the abiotic environment by eating other organisms.
   D. They release nutrients from wastes and dead organisms into the environment.

5. What does a food web model?
   A. energy flow from consumers to producers
   B. the gradual gain of energy in food chains
   C. the linking of several different food chains to show a complex feeding relationship
   D. the transfer of energy from biotic to abiotic parts of an ecosystem

6. Which of the following statements is true about nutrient cycles?
   A. Decomposers play a key role in nutrient cycles.
   B. Nutrients are only cycled between abiotic parts of the environment.
   C. There is an unlimited supply of nutrients available.
   D. Without the continuous recycling of nutrients, life on Earth would still be possible.

Match the term on the left with the best description on the right.
Each description may be used only once.

Term	Description
_____ 7. food chain _____ 8. producer _____ 9. energy pyramid _____ 10. omnivore _____ 11. parasitism _____ 12. commensalism	A. a symbiotic relationship in which one partner benefits and the other is harmed B. a model that illustrates the transfer of energy from one organism to another C. a symbiotic relationship in which both partners benefit D. an animal that eats only plants E. an organism that makes its own food F. a model that shows the gradual loss of energy in food chains G. a symbiotic relationship in which one partner benefits and the other is not affected H. an animal that eats both plants and animals

Short Answer Questions

13. Give an example of each of the following:

(a) consumer _____

(b) decomposer _____

(c) scavenger _____

(d) herbivore _____

(e) carnivore _____

14. An energy pyramid illustrates the gradual gain of energy in food chains. Explain why this statement is false.

_____

_____

_____

_____

15. Identify five conditions that may affect the growth of micro-organisms.

_____ _____

_____ _____

_____

16. In the space below, draw a food chain using the following three organisms: mouse, owl, and grain.

17. Explain how a predator species, such as wolves, can change the population size of a prey species, such as moose. What effect would the change in size of the prey population have upon the size of the predator population over time?

_____

_____

_____

_____

18. Explain why is there less energy available to a population of wolves than to a population of moose.

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 3

Primary Succession

BLM 1-17

A Lichens grow on bare rock. They produce acids that start to break down the rock. Particles of rock and decaying matter from dead lichens begin to form soil.

B The resulting soil is thin and does not have many nutrients. However, plants such as small mosses and ferns can tolerate these conditions. The plants and soil create habitats for insects and other small animals.

C Organisms add more decaying matter and build up the soil. Deeper soils hold water and allow grasses and other plants to grow. More species of animals find food and shelter.

D Taller shrubs create shade. Their deep roots help stop soil erosion. Different communities of plants and animals replace earlier ones. Bushes and trees provide niches for a greater diversity of species.

1DATE: NAME: CLASS:

CHAPTER 3 Primary Succession BLM 1-18

DATE: NAME: CLASS:

CHAPTER 3

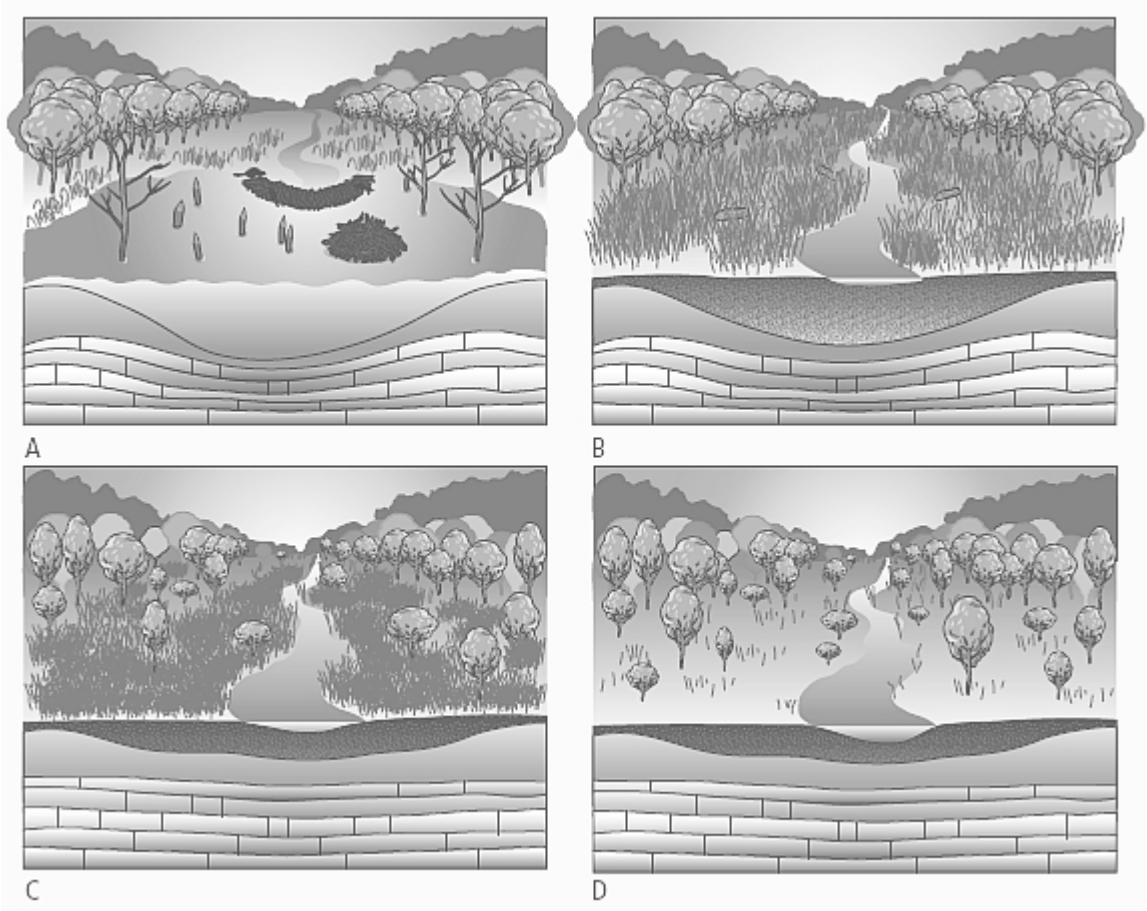
Secondary Succession From Beaver Pond to Bog to Forest

BLM 1-19

Goal	• Use the figures below to complete Think About It 3-1B, Secondary Succession From Beaver Pond to Bog to Forest.

What To Do

1. The diagrams below show the stages of secondary succession in a forest ecosystem that was flooded by a beaver pond. Add labels to identify parts of the ecosystem (for example, beaver pond, bog plants).



2. Describe what is happening during each stage. Refer to changes in

   (a) soil,
   (b) plants,
   (c) animals,
   (d) amount of sunlight.

(a)_____

_____

_____

(b)_____

_____

_____

(c)_____

_____

_____

(d)_____

_____

_____

3. Look at panel C of the diagram on previous page. Suppose you walked in a straight line from the edge of the river through the bog plants and shrubs to the forest trees. Describe how the changes in habitat along your walk represent different stages of succession.

_____

_____

_____

_____

4. (a) Construct your own flow chart of images to illustrate the changes that occur during primary succession, starting with bare rock and ending with boreal forest.

(b) How do these changes compare with those that occur during secondary succession?

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 3

The Effects of Human Activities on Ecosystems

BLM 1-20

Goal • In the table, list any physical impacts on ecosystems that may result from each of the activities listed.

The Effects of Human Activities on Ecosystems

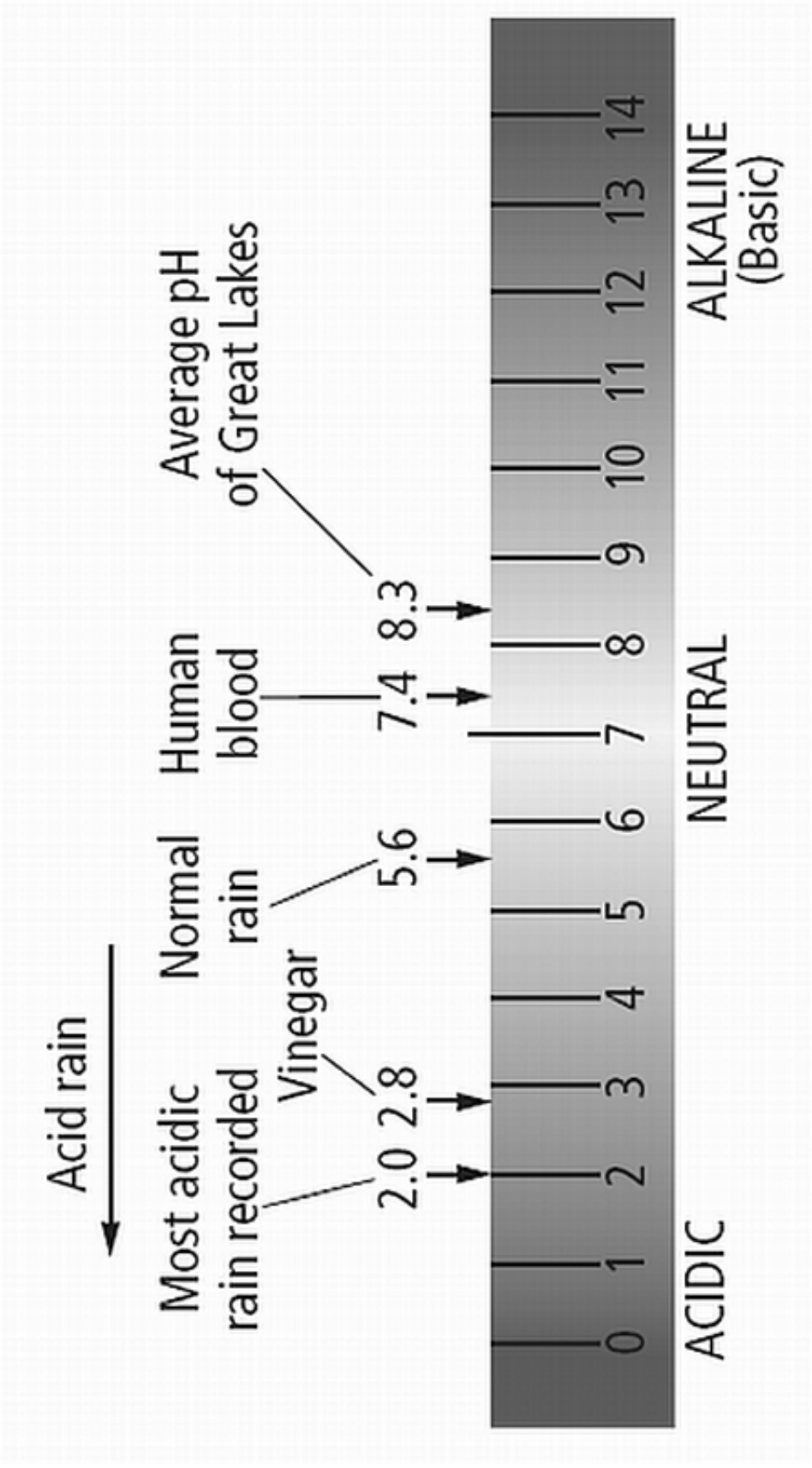
Activity	Physical Impact on Ecosystems
Construction of roads and buildings	
Mining	
Dam building	
Logging	
Farming	
Manufacturing and consumption of goods	
Oil drilling, refining, and transportation	
Outdoor recreation	

DATE: NAME: CLASS:

CHAPTER 3

The pH Scale

BLM 1-21



DATE: NAME: CLASS:

CHAPTER 3

Environmental Infomercial

BLM 1-22

Goal	• Design and produce a two-minute infomercial for television or radio to increase public awareness of a current environmental conservation issue.

What You Need

Possible materials, depending on your chosen medium:

- art supplies
- poster board
- video camera
- recording equipment
- various props

What to Do

1. With your partner or group, choose one of the environmental conservation issues discussed in Chapter 3 (for example, habitat loss, endangered species, introduced species, overharvesting, or pollution) to address in your infomercial. Try to be as specific as possible when choosing an issue (i.e., overharvesting of cod as opposed to overharvesting in general). Write your topic below.

_____

2. In the space below, write down the critical scientific points that you want to convey to the public in your infomercial.

_____

_____

_____

_____

_____

3. Brainstorm a list of techniques or approaches you could use to persuade your audience of the issue's importance.

_____

_____

_____

_____

4. Write the script for your infomercial below.

5. Gather your materials together and create your infomercial. When you are done, present your infomercial to your classmates.

DATE: NAME:

What Did You Find Out?

1. Which of the infomercials presented by other students did you find the most effective? Why was this the case?

_____

_____

_____

_____

2. Do you think a two-minute infomercial could have an effect on public opinion regarding an environmental issue? Explain.

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 3

Checking the pH

BLM 1-23

Goal • Use the table below to complete Find Out Activity 3-2C, Checking the pH, and answer the questions that follow.

Title _____

Water Sample	pH
Sample #1 Tap Water	
Sample #2 _____	
Sample #3 _____	
Sample #4 _____	
Sample #5 _____	
Sample #6 _____	
Sample #7 _____	

What Did You Find Out?

1. Were your neighbourhood water samples acidic, basic, or neutral?

_____

2. Was your tap water sample acidic, basic, or neutral?

_____

3. Based on your results, has the water in your local area been affected by acid precipitation? Explain why or why not.

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 3 # Ecosystem Monitoring BLM 1-24

Goal • Complete this activity to show your understanding of ecosystem monitoring

The Gully is an ecologically sensitive underwater canyon 260 km off the coast of Halifax and 40 km east of Sable Island. It is up to 1.5 km deep in spots, has steep slopes, and has an extension far onto the continental shelf (which geologists call the Scotian Shelf). This ocean abyss is larger than the Grand Canyon. Organisms that live in The Gully include numerous species of deep-sea coral, sperm whales, seals, and a population of northern bottlenose whales.

The Gully is a lucrative source of oil and natural gas. Although The Gully is now protected, other areas around The Gully are under exploration and development for these resources. Dangers posed by the oil industry to the endangered whale population, as well as other organisms in The Gully, include acoustic (noise) pollution, which could potentially disrupt the whales' communication system for feeding and mating; floating debris (such as plastic packaging), in which many marine animals get entangled; and chemical pollution.

Think About It

As a biologist, the government of Newfoundland and Labrador has asked you to design a long-term monitoring program for a sensitive ecosystem near The Gully that is currently undergoing oil exploration and development.

What to Do

1. In the space provided, list the various methods of environmental monitoring that you would use to monitor this sensitive ecosystem.

_____

_____

_____

2. Explain how you would monitor this ecosystem to determine if it is changing in response to the oil exploration and development currently taking place.

_____

_____

_____

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 3

Chapter 3 Review

BLM 1-25

Goal • Check your understanding of Chapter 3.

What to Do

Circle the letter of the best answer.

1. What is the name of the process by which a biological community changes over time?
   A. adaptation
   B. progression
   C. speciation
   D. succession

2. Which statement describes the species of organisms of a climax community?
   A. They can establish themselves in areas with little or no soil and few nutrients.
   B. They quickly change in response to ecosystem disturbance.
   C. They form an unstable ecosystem which will continue to change for centuries.
   D. They form a stable ecosystem which can remain relatively unchanged for centuries.

3. What is the largest single cause of decline in populations of wildlife?
   A. habitat loss
   B. introduced species
   C. overharvesting
   D. pollution

4. What leads to the formation of acid rain?
   A. atmospheric gas and water vapour are superheated in the atmosphere.
   B. burning fossil fuels produces waste gases that combine with water vapour in the atmosphere.
   C. carbon dioxide combines with water vapour in the atmosphere.
   D. oxygen and hydrogen combine with water vapour in the atmosphere.

5. Groups of bird watchers across Canada carry out counts of the different species of birds they observe in their area each year. What is this an example of?
   A. atmospheric monitoring
   B. chemical monitoring
   C. long-term monitoring
   D. migratory monitoring

6. Which of the following best describes an environmental impact assessment?
   A. a plan to minimize ecological harm in an ecosystem
   B. a plan to maximize ecological change in an ecosystem
   C. a report that outlines how an activity has affected the environment
   D. a report that outlines how an activity will affect the environment

Match the term on the left with the best description on the right.
Each description may be used only once.

Term	Description
_____ 7. pioneer species _____ 8. permanent plot _____ 9. introduced species _____ 10. renewable resources _____ 11. environmental monitoring _____ 12. unsustainable	A. species that have spread beyond their natural range into new locations as a result of human activities B. when resources are used faster than they can be renewed C. species that have lived in their environment since before humans settled the land D. checking and measuring different parts of the environment at regular intervals E. measurements that form a starting point from which later changes can be monitored F. species that can establish themselves in areas with little or no soil and few nutrients G. sample areas of a habitat that scientists monitor year after year H. resources that grow and reproduce in a fairly short time to replace those taken from the environment

Short Answer Questions

13. Explain the difference between primary and secondary succession.

_____

_____

_____

14. Use an example to explain how an introduced species may alter an ecosystem.

_____

_____

_____

_____

15. Explain why acid rain is a greater problem in some parts of Canada than in others.

_____

_____

16. In the space below, draw a flowchart that illustrates the steps involved in secondary succession following a forest fire and ending at a climax community.

17. Describe how you would use baseline data from a permanent plot to determine whether the number of native ladybugs is declining in your area.

. _____

_____

_____

_____

18. Explain why long-term monitoring is required to detect significant changes in the environment.

_____

_____

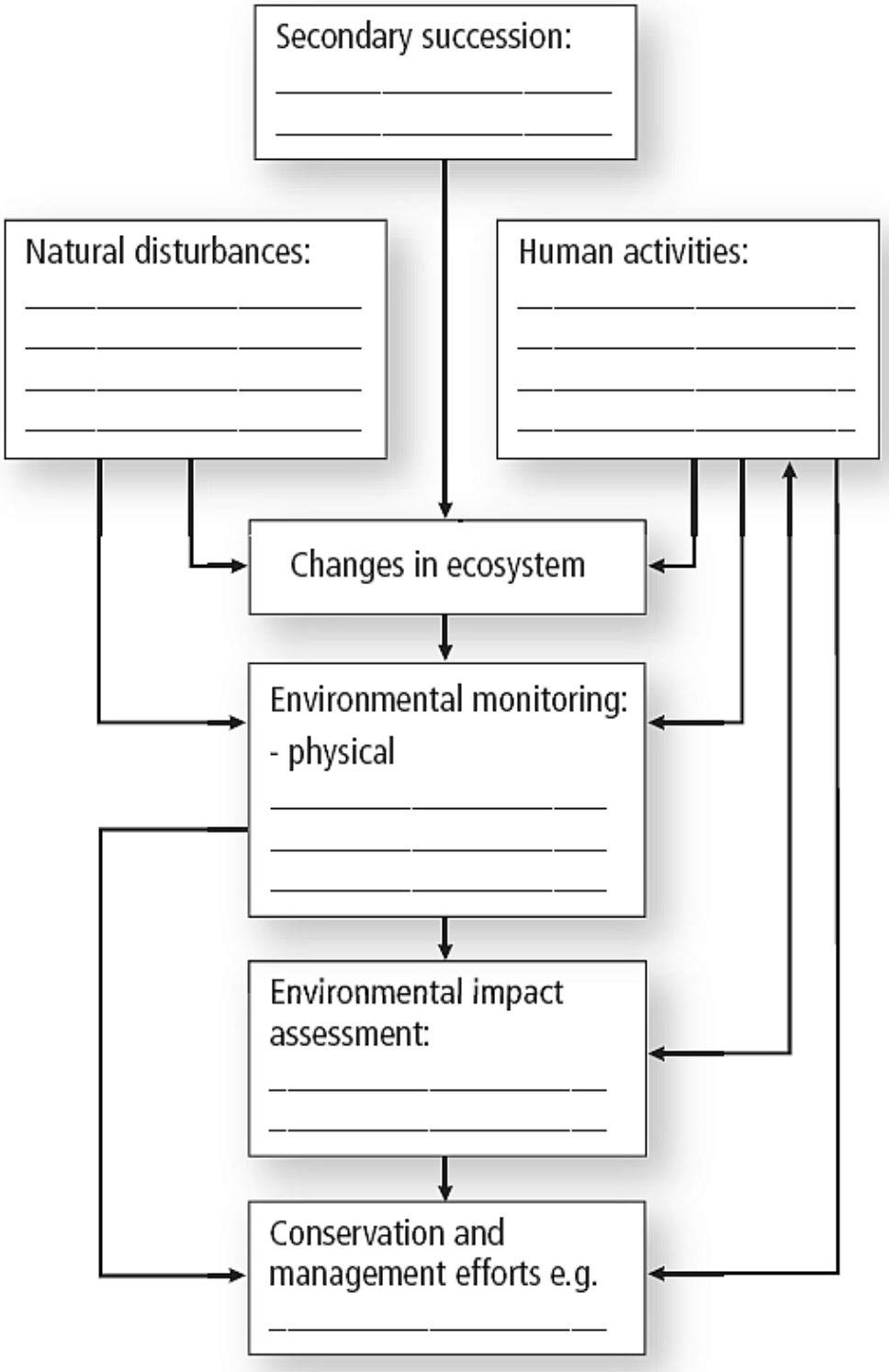
_____

DATE: NAME: CLASS:

CHAPTER 3

Visualizing Key Ideas Recording Sheet

BLM 1-26



DATE: NAME: CLASS:

Unit 3 Review

BLM 1-27

Goal • Check your understanding of Unit 3.

What to Do

Circle the letter of the best answer.

1. Which of the following statements is false?
   A. A particular place where an organism lives is called its habitat.
   B. A pioneer species is typically found in a climax community.
   C. A single member of a species is referred to as an individual.
   D. Water is an abiotic part of an ecosystem.

2. Which of the following is an example of an ecosystem?
   A. a rock
   B. a grain of sand
   C. a snowflake
   D. soil

3. What term is used to describe organisms that are the first link of a food chain?
   A. consumers
   B. herbivores
   C. omnivores
   D. producers

4. A lizard warms itself in the Sun. This is best described as what sort of an interaction?
   A. abiotic-abiotic
   B. abiotic-biotic
   C. mutualism
   D. symbiosis

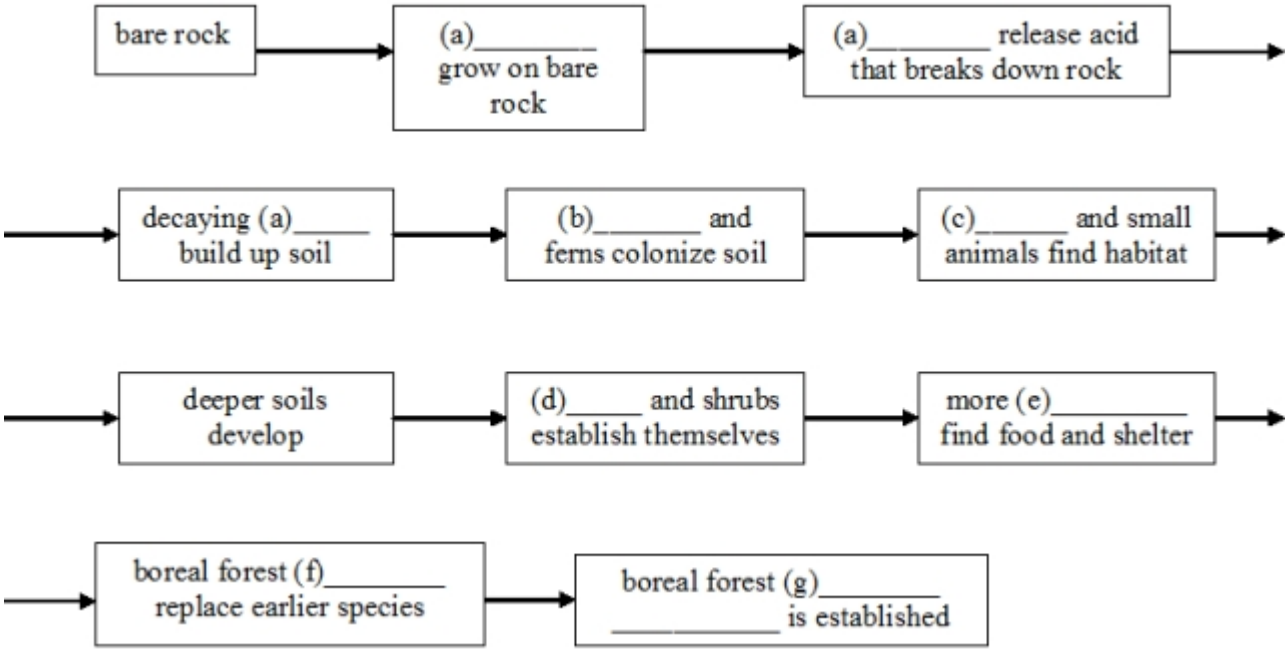
5. Pioneer species play an important role in primary succession. Which of the following best describes a pioneer species?
   A. can establish itself in areas with little or no soil and few nutrients
   B. has lived in its environment since before humans settled the land
   C. has spread beyond its natural range to new locations as a result of human activities
   D. forms a stable ecosystem which can remain relatively unchanged for centuries

6. What term best describes a species with such a low population that it's nearly extinct?
   A. endangered
   B. extirpated
   C. invasive
   D. unsustainable

DATE: NAME: CLASS:

BLM 1-27
continued

In the space that is provided beside each term below, write the letter from the flowchart that is the best match.



7. climax community _____
8. mosses _____
9. trees _____
10. animals _____
11. lichen _____
12. insects _____
13. grasses _____

14. In the space below, write a suitable title for the flowchart.

_____

Short Answer Questions

15. Read the statements below. In the space provided, indicate whether each statement is true (T) or false (F).

___ (a) A cow is a secondary consumer.

___ (b) A group of interacting populations is known as a species.

___ (c) Humans have a major impact on ecosystems because of our powerful technologies and large population.

___ (d) Physical monitoring is a form of environmental monitoring that tracks changes in the landscape over time.

16. One type of ecosystem that can be found in Atlantic Canada is a forest. Name two other ecosystems that can be found in Atlantic Canada.

_____ _____

17. Explain why decomposers are necessary for life on Earth.

_____

_____

_____

_____

18. Explain why only about ten percent of the food energy in the herbivores is transferred to the next level in a food chain.

_____

_____

19. Many human activities have a physical impact upon ecosystems. Identify four activities that illustrate this statement.

(1) _____ (3) _____

(2) _____ (4) _____

20. The range of conditions within which an organism can survive is called the organism's range of tolerance. Give three examples of conditions that the above statement is referring to.

(1) _____

(2) _____

(3) _____

21. Explain why loss of habitat is the largest single cause of decline in populations of wildlife.

_____

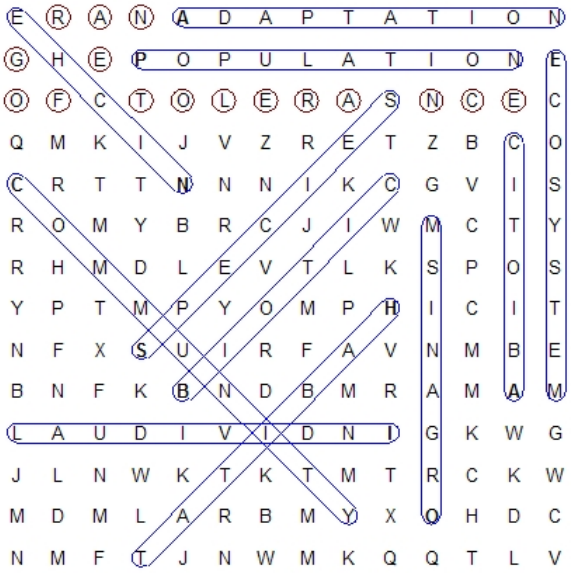
_____

_____

_____

BLM 1-2A, Unit 1 Key Terms
1. habitat
2. abiotic
3. niche
4. community
5. population
6. biotic
7. individual
8. species
9. adaptation
10. organism
11. ecosystem

Hidden message: range of tolerance

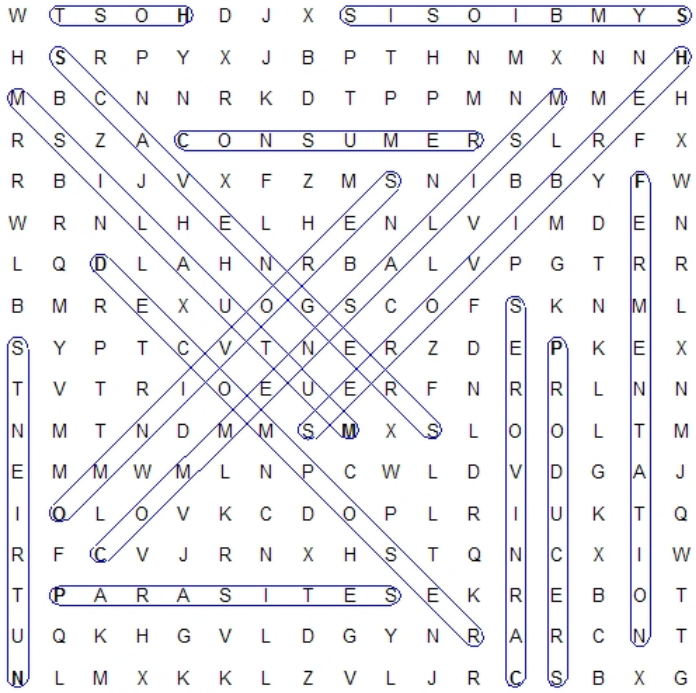


BLM 1-2B, Unit 1 Key Terms
population
niche
ecosystem
habitat
abiotic
species
biotic
individual
adaptation

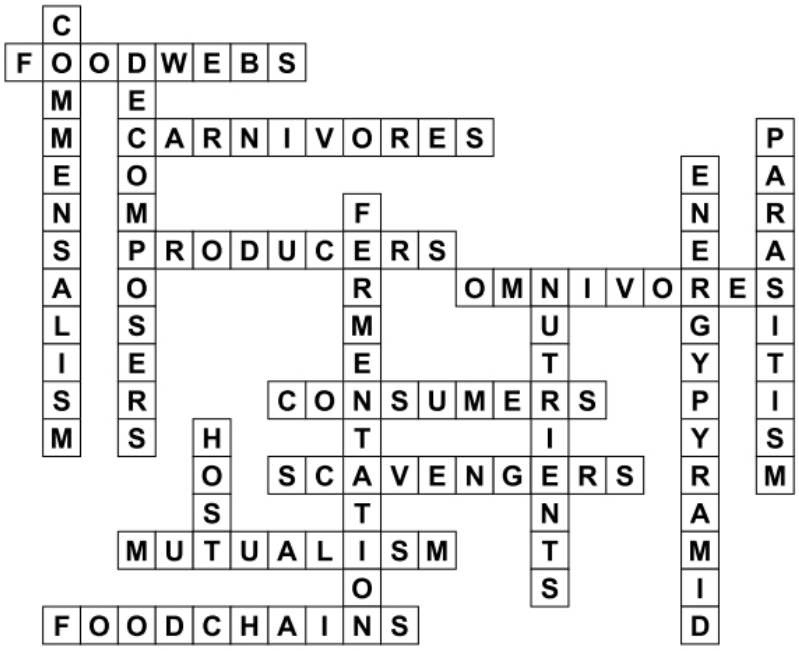
Populations of different species interact in communities.

BLM 1-2C, Unit 1 Key Terms

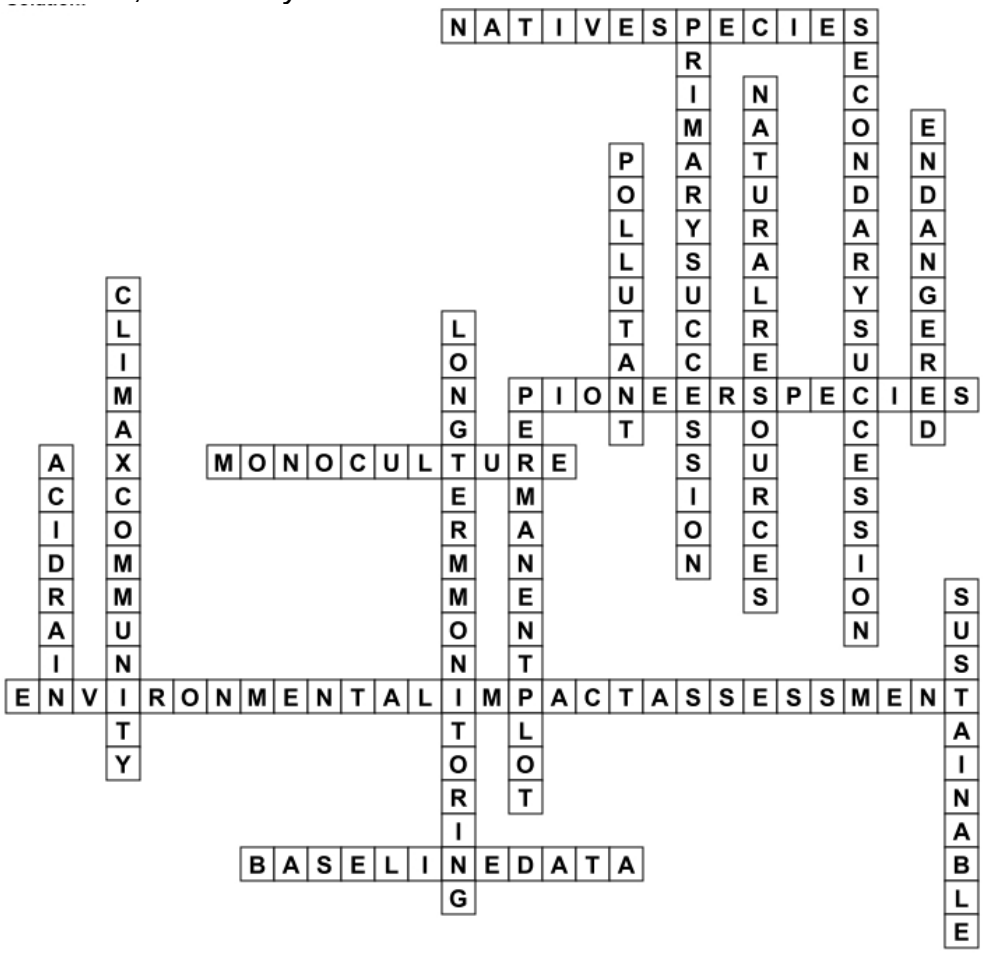
1. carnivores
2. commensalism
3. consumer
4. decomposers
5. fermentation
6. herbivores
7. host
8. mutualism
9. nutrients
10. omnivores
11. parasites
12. scavengers
13. producers
14. symbiosis



BLM 1-2D, Unit 1 Key Terms



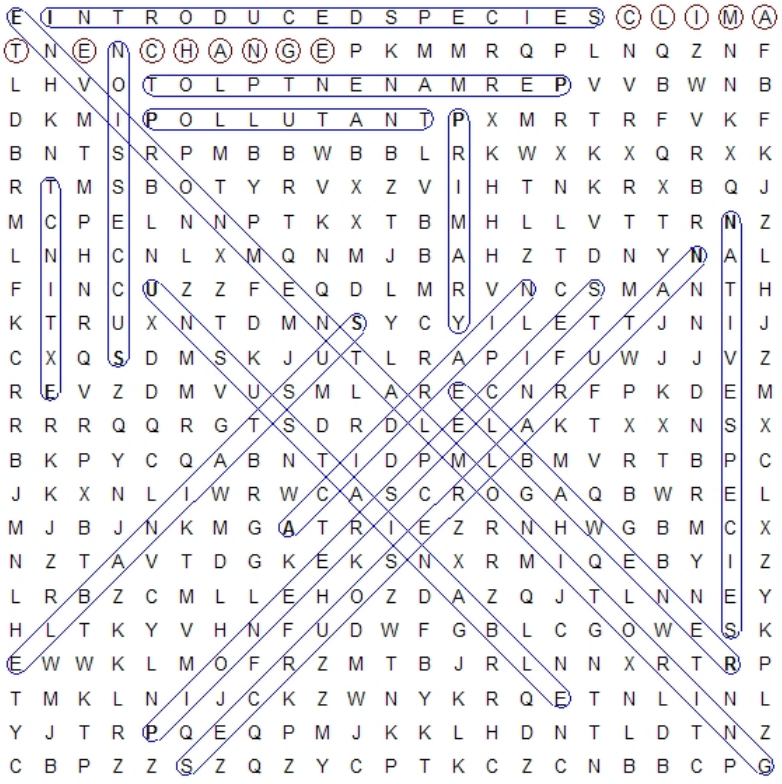
BLM 1-2E, Unit 1 Key Terms



BLM 1-2F, Unit 1 Key Terms

1. extinct
2. pioneer species
3. introduced species
4. environmental monitoring
5. native species
6. natural resources
7. permanent plot
8. sustainable
9. succession
10. acid rain
11. pollutant
12. unsustainable
13. primary
14. sustainable

Hidden message: climate change



BLM 1-3, What is an Ecosystem? answers can be found within TR Chapter 1, page 1-3.

BLM 1-5, Interactions in Atlantic Ecosystems

1.(a) Accept any interaction between two living things in an Atlantic forest ecosystem (such as bears, moose, martens, red foxes, lynxes, birds, frogs, insects, balsam fir, white birch, mountain ash, or black spruce).
(b) Accept any interaction between a non-living thing (such as water, air or wind, soil,
temperature, and light) and a living thing in an Atlantic forest ecosystem.
2.(a) Accept any interaction between two non-living things.
(b) Accept any interaction between a non-living thing and a living thing in an Atlantic coastline/ocean ecosystem (such as a cod, gull, plankton, whale, seal, seaweed, barnacle, mussel, starfish, or jellyfish).
3.(a) Accept any interaction between two living things in an Atlantic freshwater ecosystem (such as willow, tamarack, whitefish, stickleback, ducks, geese, snails, frogs, waterweeds, beavers, or insects).
(b) Accept any interaction between a non-living thing and a living thing in an Atlantic freshwater ecosystem.
4.(a) Accept any interaction between a non-living thing and a living thing in an arctic ecosystem (such as a caribou, arctic hare, lemming, musk ox, wolf, arctic fox, polar bear, seal, moss, or lichen.)
(b) Accept any interaction between two non-living things.

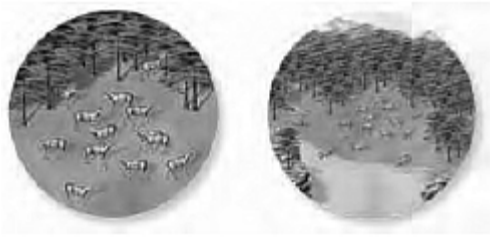
BLM 1-6 Seabirds! Identification Key – Please refer to TR Chapter 1, page 1-16 for answers to this activity.

BLM 1-7, Studying a Pond Ecosystem
1. An individual frog would eat various species of dragonflies.
2. A niche is a role a species plays in its community. This role includes where the species lives, how it obtains its food, and how it affects its environment. Dragonflies fly in the air and catch insects. They are a source of food for other organisms, such as frogs. Waterweeds are anchored to the bottom of the pond and float in the upper level of the water where sunlight reaches. They are a source of food for other organisms, such as ducks and insects.
3. The biotic interactions occurring the community would change. The various insect populations would increase in size because they would now have fewer predators. These insects would eat more of the food they regularly eat, such as plants and other insects. As a result, populations of these organisms would decrease in size as well. Any organisms that consume frogs as a main food source would also decrease in number, as these organisms would now have less food to eat.

BLM 1-8, Chapter 1 Review
1. A
2. B
3. C
4. C

5. B
6. C
7. F
8. B
9. H
10. D
11. G
12. C
13. (a) F—A rotting tree stump on a forest floor is considered an ecosystem.
(b) T
(c) T
(d) T
14. Mosquitoes and dragonflies live in the same freshwater habitat. Dragonflies catch insects while mosquitoes feed on blood. Because they eat different foods, they fill different roles, or niches, in their ecosystem.
15. Possible answers: a duck breathes and flies in the air; a duck drinks, finds food, and swims in water; the duck uses water and oxygen in the air to carry out its life processes; the Sun warms the air so the duck can carry out its life processes.
16.

individual population



community ecosystem

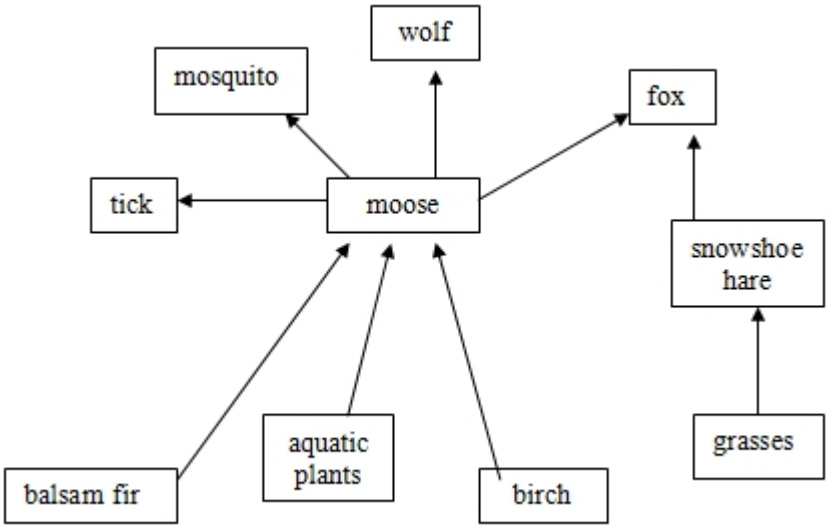
17. A polar bear cannot survive in a desert because the abiotic conditions that prevail in this ecosystem are outside of the polar bear's range of tolerance. For example, its adaptations to cold temperatures, such as thick fur and excess body fat, make it ill suited to the hot desert climate. Its diet of fish and seal make it impossible for a polar bear to survive in a dry desert.

BLM 1-9, Symbiotic relationships
1. mutualism

2. commensalism
3. parasitism
4. mutualism

BLM 1-15, Energy Transfer Quiz

1. A food chain is model that shows the transfer of energy from organism to organism. It differs from a food web, which shows the interconnection of several different food chains to produce a more complex model of feeding relationships. Students may also note that a food chain is linear and a food web is not.
2. Food chains are limited in length because energy is lost to the environment as heat and waste with each consecutive transfer along the food chain.
3.(a) shrubs, grass
(b) snowshoe hare
(c) secondary
(d) primary
(f) decrease, increase
4. (a)



(b) Energy is lost to the environment as heat and waste with each consecutive transfer along a food chain within the food web. A small percentage of the Sun's energy absorbed by grass is available to the snowshoe hares. However, when a fox consumes a snowshoe hare, it is only reaping a small percentage of the energy consumed by the hare. Thus there is more energy available to the hares.

BLM 1-16, Chapter 2 Review

1. A
2. A
3. B
4. D
5. C
6. A

7. B
8. E
9. F
10. H
11. A
12. G
13. (a) Any organism other than a plant.
(b) Possible answers include: fungus, bacterium.
(c) Possible answers include: vulture, dung beetle, housefly, crow, gull.
(d) Possible answers include: moose, hare, duck, cow, sheep, horse, hare, aphid, panda.
(e) Possible answers include: Spiders, cats, owls, snakes, seals, sharks, lynxes, cod, polar bears, otters, hawks, sea lions, and eagles.
14. An energy pyramid shows the gradual loss in the total energy available to organisms at each consecutive level of a food chain. With each transfer, most of the energy is lost as unusable heat or waste. Because there is less energy available to organisms at each link in a food chain, the animals at the top of a food chain are generally less numerous than those below, as shown in an energy pyramid.
15. Temperature, moisture, light, acidity, salinity
16. GRAIN -----> MOUSE -----> OWL
17. If a population of predators increases in number, they will consume more prey. The number of prey in the ecosystem would thus decrease. The predators would then have less to eat, and eventually their population would decrease as well.
18. Wolves are further along the food chain than moose. Each time energy is transferred from one organism to another along a food chain, most of it is lost as waste or heat. This lost energy is not available to organisms further along the food chain, such as wolves.

BLM 1-19, Secondary Succession from Beaver Pond to Bog to Forest. Please refer to TR Chapter 3, page 1-44 for answers to this activity.

BLM 1-20, The Effects of Human Activities on Ecosystems
Refer to the completed version of this chart on page 77 of the student textbook.

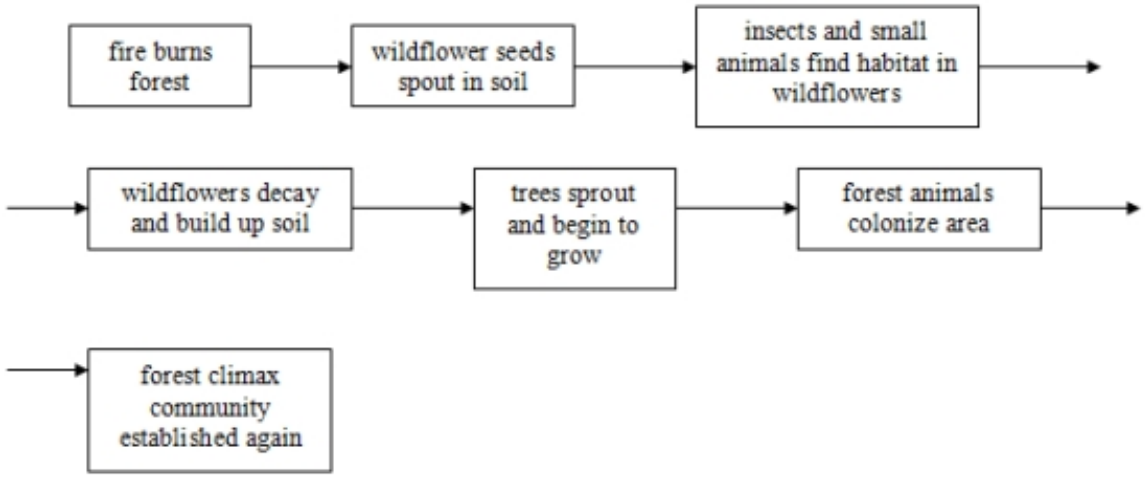
BLM 1-24, Ecosystem Monitoring
1. Answers should refer the four main types of environmental monitoring, physical, chemical, biological, and atmospheric monitoring. They should also mention the importance of carrying out long-term monitoring and establishing baseline data. Some students may realize that establishing a permanent plot (if possible) would also be important.
2. Answers should mention that, because ecosystems change naturally overtime, a long-term monitoring program must be established in order to determine if this

sensitive ecosystem is changing in a significant way. Baseline data should be established by completing physical, chemical, biological, and atmospheric monitoring of the ecosystem. Biological monitoring may involve sending a submarine down to take samples of organisms living on the seafloor. Fish and marine mammals may be tagged or monitored with sonar to establish population numbers. Chemical monitoring could include testing the water or various marine animal tissues for chemical pollutants. Physical monitoring might include monitoring the seabed for changes as a result of oil drilling, as well as monitoring acoustic changes in the water due to boat traffic and drilling. Atmospheric monitoring also includes monitoring changes in water temperature, which may provide useful data. Accept any reasonable answers that refer to the monitoring methods mentioned in question 1.

BLM 1-25, Chapter 3 Review

1. D
2. D
3. A
4. B
5. C
6. D
7. F
8. G
9. A
10. H
11. D
12. B
13. Primary succession refers to the re-growth of a community following a disturbance, such as glaciation, that removes all soil and life, leaving only bare rock. Secondary succession refers to the re-growth of a community in an area where soil and possibly seeds remain after a disturbance, such as a fire.
14. Sample answer 1: Introduced species often spread rapidly, displacing or destroying native species and damaging ecosystems. Purple loosestrife is a garden plant introduced to Canada from Europe. It grows so well in wetland areas that native species cannot become established. Over time, the loosestrife removes much of the water from wetland areas, making them unsuitable for species of native plants and animals that depend on wetlands.
Sample answer 2: Introduced species often spread rapidly, displacing or destroying native species and damaging ecosystems. Eurasian water milfoil is a water plant found in ponds and lakes in parts of Canada. It grows rapidly to form huge mats of vegetation. When the plants die and decay, large amounts of nutrients are added to the aquatic ecosystem, unbalancing the normal nutrient cycle.
15. In some parts of Canada, such as Newfoundland and Labrador, much of the land is formed of granite rock, which lacks the ability to neutralize acid rain.

16.



17. You would establish the number of native ladybugs in a specific area (a permanent plot) over time. You would then compare the early data (the baseline data) with more recent data to determine if the number of insects is declining.
18. Ecosystems may change naturally from year to year. In order to discover if the environment is changing in a significant way, long-term monitoring is required over a period of many years.

BLM 1-27, Unit 1 Review
1. B
2. D
3. D
4. B
5. A
6. A
7. g
8. b
9. f
10. e
11. a
12. c
13. d
14. Stages of Primary Succession
15. (a) F—A cow is a primary consumer.
(b) F—A group of interacting populations is known as a community.
(c) T
(d) T
16. Two of arctic; freshwater (river, pond, lake, bog); or coastline and ocean.
17. Decomposers play a key role in the nutrient cycle. They break down waste matter and dead organisms. This releases nutrients into the soil, air, or water. Producers take up the nutrients to help them grow. Thus decomposers return nutrients to the biotic part of the environment and life on Earth continues.

18. At each consecutive level of a food chain, about 90 percent of the energy taken up by an organism is lost to the environment as heat or waste. Only 10 percent is available to an organism at the next level in a food chain.
19. Any four of the following: logging, mining, land clearance, dam building, waste dumping, construction, oil drilling, outdoor recreation, farming, transportation, introduction of invasive species, fishing.
20. Any three of moisture, light, temperature, acidity, or salinity (salt level).
21. Most species cannot survive if their habitat is destroyed because they have a specific range of tolerance within which they can survive. If their habitat is destroyed they may not be able to find conditions they can tolerate nearby and often die as a result.

DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2A

Goal • Use this word search puzzle to review Key Terms from Chapter 1.

Create a list of 11 words from the descriptions below, and find the words in the puzzle that follows. When you are done, the unused letters in the puzzle will spell out a hidden message related to Chapter 1. Find the hidden message by reading the unused letters from left to right and starting at the top line.

1. A particular place where an organism lives (7 letters)	
2. Non-living parts of the environment (7 letters)	
3. The role a species plays in its community, including where it lives, how it obtains its food, and how it affects its environment (5 letters)	
4. Interacting populations (9 letters)	
5. An entire group of individuals of the same species that live together in one ecosystem at the same time (10 letters)	
6. Living parts of the environment (6 letters)	
7. One member of a species (10 letters)	
8. A group of organisms that can reproduce among themselves to produce offspring of the same type that can also reproduce successfully (7 letters)	
9. A characteristic that makes an organism well-suited to its environment (10 letters)	
10. Another term that means “living thing” (8 letters)	
11. All the interacting non-living and living things in a part of the environment (9 letters)	
Hidden message: the span of non-living conditions within which a living thing can survive (3 words)	

DATE: NAME:

BLM 1-2A
continued

E	R	A	N	A	D	A	P	T	A	T	I	O	N
G	H	E	P	O	P	U	L	A	T	I	O	N	E
O	F	C	T	O	L	E	R	A	S	N	C	E	C
Q	M	K	I	J	V	Z	R	E	T	Z	B	C	O
C	R	T	T	N	N	N	I	K	C	G	V	I	S
R	O	M	Y	B	R	C	J	I	W	M	C	T	Y
R	H	M	D	L	E	V	T	L	K	S	P	O	S
Y	P	T	M	P	Y	O	M	P	H	I	C	I	T
N	F	X	S	U	I	R	F	A	V	N	M	B	E
B	N	F	K	B	N	D	B	M	R	A	M	A	M
L	A	U	D	I	V	I	D	N	I	G	K	W	G
J	L	N	W	K	T	K	T	M	T	R	C	K	W
M	D	M	L	A	R	B	M	Y	X	O	H	D	C
N	M	F	T	J	N	W	M	K	Q	Q	T	L	V

DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2B

Goal • Use this word puzzle to review Key Terms from Chapter 1.

Unscramble each of the clue words. Then copy the letters in the numbered squares to other squares that have the same number to spell out a statement that describes groups of organisms in ecosystems.

TOOPULPANI

20			38	5		28	14		34

HIENC

10		35		15

TYSMEOCES

29		9	11		25	7	21	37

DOANITAPTA

	13		3	40		32	26	36	17

TIAHTAB

			23		6	

BAICOTI

			2			

SECSIEP

42	1	24	22	39	16	19

TIBICO

	8	12	18	41	31

LUVNIIDIDA

33	27						4	30	

1	2	3	4	5	6	7	8	9	10	11

12	F

13	14	F	F	15	R	16	17	18

19	20	21	22	23	24	25

26	27	28	29	R	30	31	32

33	34

35	36	37	37	38	27	39	40	41	24	42

DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2C

Goal • Use this word search puzzle to review Key Terms from Chapter 2.

Create a list of 14 words from the descriptions below. Then find the words in the puzzle that follows.

1. Animals that eat only other animals (10 letters)	
2. A type of symbiotic relationship in which one partner benefits and the other appears neither to lose nor gain (12 letters)	
3. An organism that eats producers (8 letters)	
4. Organisms that break down dead and waste materials (11 letters)	
5. A process that is used, for example, to make cheese and wine (12 letters)	
6. Animals that eat only plants (10 letters)	
7. The organism on which a parasite feeds (4 letters)	
8. A symbiotic relationship in which both partners benefit (9 letters)	
9. Substances that are cycled through the biotic and abiotic environment (9 letters)	
10. Animals that eat both plants and animals (9 letters)	
11. Organisms that live on or in another organism and feed on it (9 letters)	
12. Organisms that eat decaying animals and waste material (10 letters)	
13. Organisms that produce their own food rather than consume other organisms (9 letters)	
14. A biological interaction in which two species live closely together over time (9 letters)	

DATE: NAME:

BLM 1-2C
continued

W	T	S	O	H	D	J	X	S	I	S	O	I	B	M	Y	S
H	S	R	P	Y	X	J	B	P	T	H	N	M	X	N	N	H
M	B	C	N	N	R	K	D	T	P	P	M	N	M	M	E	H
R	S	Z	A	C	O	N	S	U	M	E	R	S	L	R	F	X
R	B	I	J	V	X	F	Z	M	S	N	I	B	B	Y	F	W
W	R	N	L	H	E	L	H	E	N	L	V	I	M	D	E	N
L	Q	D	L	A	H	N	R	B	A	L	V	P	G	T	R	R
B	M	R	E	X	U	O	G	S	C	O	F	S	K	N	M	L
S	Y	P	T	C	V	T	N	E	R	Z	D	E	P	K	E	X
T	V	T	R	I	O	E	U	E	R	F	N	R	R	L	N	N
N	M	T	N	D	M	M	S	M	X	S	L	O	O	L	T	M
E	M	M	W	M	L	N	P	C	W	L	D	V	D	G	A	J
I	O	L	O	V	K	C	D	O	P	L	R	I	U	K	T	Q
R	F	C	V	J	R	N	X	H	S	T	Q	N	C	X	I	W
T	P	A	R	A	S	I	T	E	S	E	K	R	E	B	O	T
U	Q	K	H	G	V	L	D	G	Y	N	R	A	R	C	N	T
N	L	M	X	K	K	L	Z	V	L	J	R	C	S	B	X	G

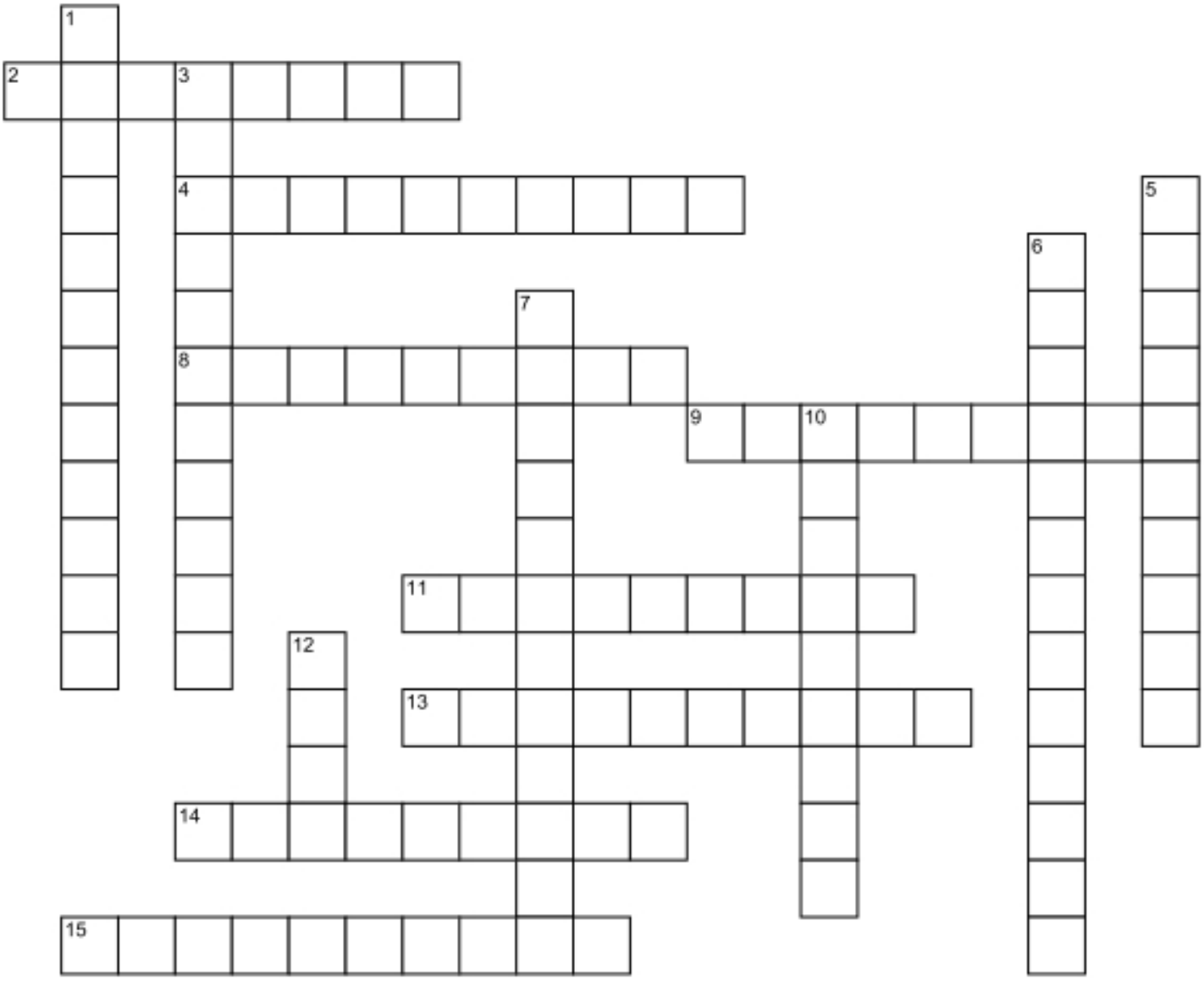
DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2D

Goal • Complete this crossword puzzle to review Key Terms from Chapter 2.



Across

2. a network of interconnected food chains in an ecosystem (2 words)
4. meat-eating organisms
8. organisms that are able to make their own food
9. animals that eat plants as well as other animals
11. organisms that eat other organisms
13. organisms that eat decaying plant or animal material
14. a relationship between two different types of organisms in which both benefit
15. models that show how food energy passes from one organism to another in the environment (2 words)

Down

1. a relationship between two different types of organisms in which one benefits and the other is neither helped nor harmed
3. organisms that use the wastes and dead tissues of other organisms for food
5. a relationship between two different types of organisms in which one benefits and the other is harmed
6. a model that shows how energy is lost as organisms feed on one another in the environment
7. a process used by yeast cells, for example, to obtain nutrients
10. substances in food that are used to repair cells and tissues
12. an organism on which another organism lives and feeds

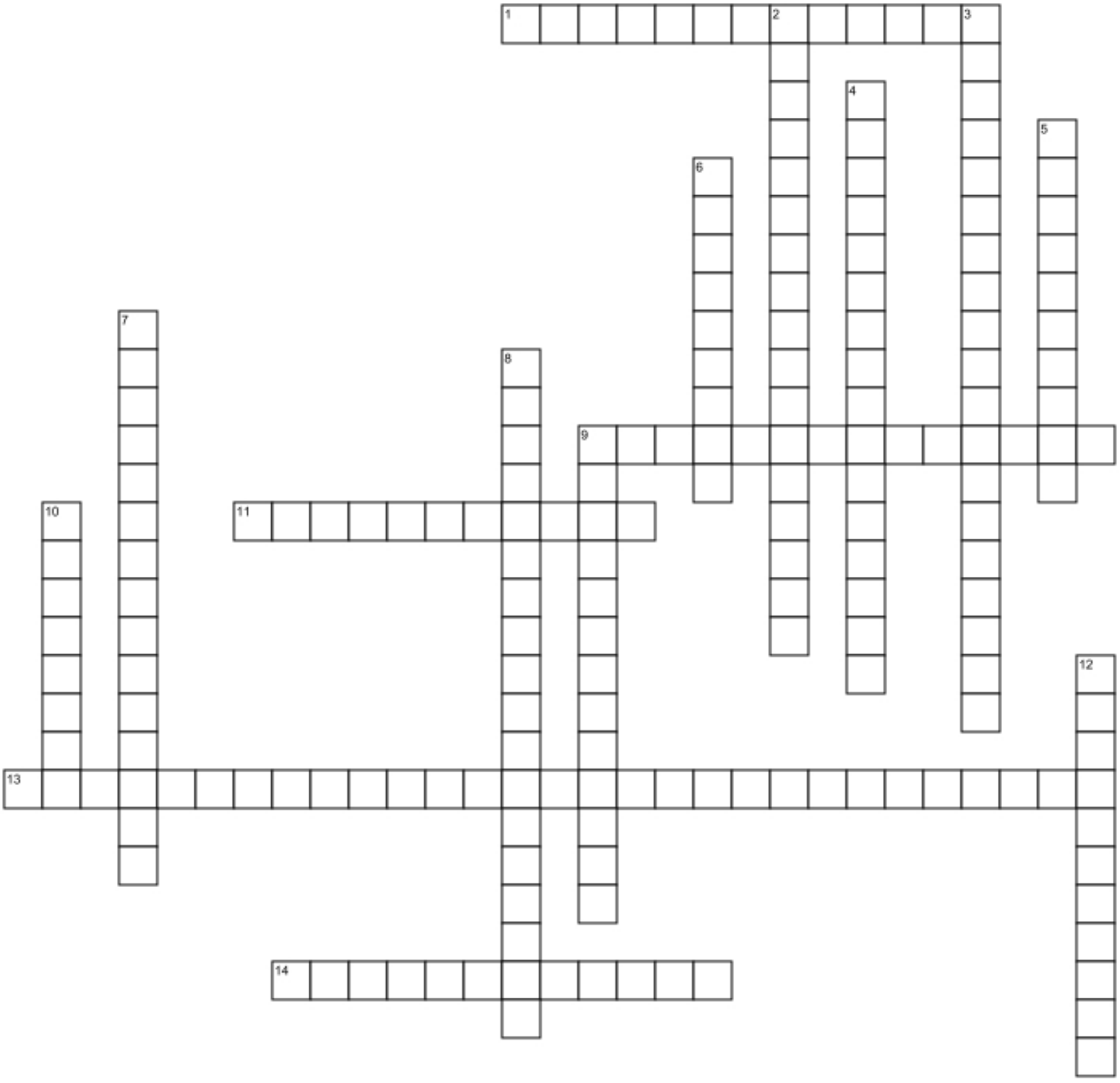
DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2E

Goal • Complete this crossword puzzle to review Key Terms from Chapter 3.



Across

1. wild organisms that have lived in their environment since before people settled there (two words)
9. first types of organisms to appear in an area that has little or no soil (two words)
11. farmer's field in which a single crop has been planted
13. keeping an eye on different parts of the environment at regular intervals (three words)
14. measurements that serve as a starting point from which later changes can be monitored (two words)

Down

2. development of a community of plants and animals in an area that has never supported a community before (two words)
3. development of a community of plants and animals in an area that has changed after a fire or other dramatic occurrence (two words)
4. metals and lumber are two examples of this group of materials that people use to meet their needs (two words)
5. a population of a species that is so small that it is nearly extinct
6. a substance that is released into the environment and that can harm living things
7. a variety of species that form a stable ecosystem in an area that does not experience disturbances (two words)
8. checking a part of the environment over a period of many years (two words)
9. sample areas of the environment that are checked year after year (two words)
10. precipitation that has a pH of less than 7 (two words)
12. term to describe resources that are replaced at the same rate as they are used

DATE: NAME: CLASS:

UNIT 1

Unit 1 Key Terms

BLM 1-2F

Goal • Use this word search puzzle to review Key Terms from Chapter 3.

Create a list of 14 words from the descriptions below, and find the words in the puzzle that follows. When you are done, the unused letters in the puzzle will spell out a hidden message related to Chapter 1. Find the hidden message by reading the unused letters from left to right and starting at the top line.

1. A species that no longer exists anywhere in nature (7 letters)	
2. Lichens are an example (14 letters; 2 words)	
3. Influenza and purple loosestrife are examples (17 letters; 2 words)	
4. Checking and measuring the environment at regular intervals (23 letters; 2 words)	
5. Populations of organisms that are original inhabitants of an area (13 letters; 2 words)	
6. Products such as petroleum and gemstones are examples of these (16 letters; 2 words)	
7. A sampling area that can be monitored over a period of time (13 letters; 2 words)	
8. A resource that can be replaced within a human lifetime (11 letters)	
9. A process by which populations of one species replace another populations of another species over a period of time in an area (10 letters)	
10. Precipitation that results when nitrogen and sulfur from burning fossil fuels combine with water vapour in the air (8 letters; 2 words)	
11. A substance present in air, water, or land that is harmful to living things (9 letters)	
12. Practices that use up resources at a rate faster than they can be replaced (13 letters)	
13. A type of succession that occurs, for example, on a newly formed volcanic island (7 letters)	
14. Practices that use up resources at a rate that is the same as they are replaced (11 letters)	
Hidden message: Event happening across the whole planet in response to changes in atmospheric gases, air and ocean temperatures, and other data (2 words)	

DATE: NAME:

BLM 1-2F
continued

E I N T R O D U C E D S P E C I E S C L I M A
T N E N C H A N G E P K M M R Q P L N Q Z N F
L H V O T O L P T N E N A M R E P V V B W N B
D K M I P O L L U T A N T P X M R T R F V K F
B N T S R P M B B W B B L R K W X K X Q R X K
R T M S B O T Y R V X Z V I H T N K R X B Q J
M C P E L N N P T K X T B M H L L V T T R N Z
L N H C N L X M Q N M J B A H Z T D N Y N A L
F I N C U Z Z F E Q D L M R V N C S M A N T H
K T R U X N T D M N S Y C Y I L E T T J N I J
C X Q S D M S K J U T L R A P I F U W J J V Z
R E V Z D M V U S M L A R E C N R F P K D E M
R R R Q Q R G T S D R D L E L A K T X X N S X
B K P Y C Q A B N T I D P M L B M V R T B P C
J K X N L I W R W C A S C R O G A Q B W R E L
M J B J N K M G A T R I E Z R N H W G B M C X
N Z T A V T D G K E K S N X R M I Q E B Y I Z
L R B Z C M L L E H O Z D A Z Q J T L N N E Y
H L T K Y V H N F U D W F G B L C G O W E S K
E W W K L M O F R Z M T B J R L N N X R T R P
T M K L N I J C K Z W N Y K R Q E T N L I N L
Y J T R P Q E Q P M J K K L H D N T L D T N Z
C B P Z Z S Z Q Z Y C P T K C Z C N B B C P G

DATE: NAME: CLASS:

UNIT 1

What Is an Ecosystem?

BLM 1-3

Goal • Use the chart below to complete Find Out Activity, What Is an Ecosystem?, and answer the questions that follow.

Title _____

Living Things	Local Conditions

DATE: NAME: CLASS:

BLM 1-3
continued

What Did You Find Out?

1. The prefix eco- means home. Based on this fact and the ideas you have shared with your class, write your own definition of the term ecosystem.

_____

_____

2. Could one of the living things on your list also live in a different ecosystem? Give an example. (Hint: For example, could a coniferous (evergreen) tree live in a prairie ecosystem? Could a prairie grass such as wheat grow in a forest ecosystem?)

_____

_____

_____

3. Could one of the conditions on your list also be found in a different ecosystem? Give an example. (Hint: For example, would you expect to find damp conditions in an arctic ecosystem? Would you expect it to be chilly in a forest ecosystem?)

_____

_____

_____

4. Name an ecosystem in which you would not expect to find any of the living things on your list.

_____

DATE: NAME: CLASS:

CHAPTER 1

Life in a Strange Ecosystem Story

BLM 1-4

Goal	• Complete this activity to show your understanding of an organism's range of tolerance.

In this activity, you will write a story describing the experiences of an organism that finds itself in a strange ecosystem. In your story, you will describe how an organism placed in an ecosystem different from its own encounters abiotic conditions that are outside of its range of tolerance, as well as unique biotic conditions (different organisms). For example, a polar bear living on a Florida beach.

What to Do

1. In the space below, write the different biotic and abiotic conditions that an organism (of your choice) placed in an ecosystem different from its own (of your choice) would encounter.

_____

_____

_____

_____

_____

_____

2. Explain how the abiotic conditions are outside of the organism's range of tolerance.

_____

_____

_____

_____

_____

_____

DATE: NAME:

BLM 1-4
continued

3. In the space below, write your story. Remember to include a title.

DATE: NAME: CLASS:

CHAPTER 1

Interactions in Atlantic Ecosystems

BLM 1-5

Goal	• Complete this activity to show your understanding of interactions that occur in Atlantic ecosystems.

What to Do

Provide examples of specific interactions that may occur in each of the Atlantic ecosystems listed below.

1. An Atlantic forest ecosystem

   (a) biotic-biotic interaction

   _____

   _____

   (b) abiotic-biotic interaction

   _____

   _____

2. An Atlantic coastline and ocean ecosystem

   (a) abiotic-abiotic interaction

   _____

   _____

   (b) abiotic-biotic interaction

   _____

   _____

3. An Atlantic freshwater ecosystem

(a) biotic-biotic interaction

_____

_____

(b) abiotic-biotic interaction

_____

_____

4. An arctic ecosystem

(a) abiotic-biotic interaction

_____

_____

(b) abiotic-abiotic interaction

_____

_____

DATE: NAME: CLASS:

CHAPTER 1

Seabirds! Identification Key

BLM 1-6

Goal • Use the identification key below to complete Think About It 1-3A, Seabirds! Record your results in the spaces provided and answer the questions that follow.

Appearance of bird.	Go to
1. A. Has brown head and neck with black cap. B. Does not have brown head and neck.	2. 3.
2. A. Bill is quite thick; body colour medium brown. B. Bill is not particularly thick; body colour dark brown.	Pomarine Jaeger Parasitic Jaeger
3. A. Slender bird with long narrow wings, forked tail, black cap, and pointed bill. B. Sturdy and robust bird with white head.	Common Tern 4.
4. A. White wing tips. B. Larger bird with darker wings.	Iceland Gull 5.
5. A. Black across back and wings. B. White or grey across back.	Great Black-backed Gull 6.
6. A. Black ring around yellow bill. B. Bill solid yellow or orange.	Ring-billed Gull 7.
7. A. Solid black wing tips. B. White spots in black of wing tips.	Black-legged Kittiwake Herring Gull

A _____ E _____

B _____ F _____

C _____ G _____

D _____ H _____

What Did You Find Out?

1. Name three things that helped you distinguish one species of seabird from another.

_____

_____

2. Where could you find out more information about gulls and other seabirds? Name three other sources of information.

_____

_____

_____

_____

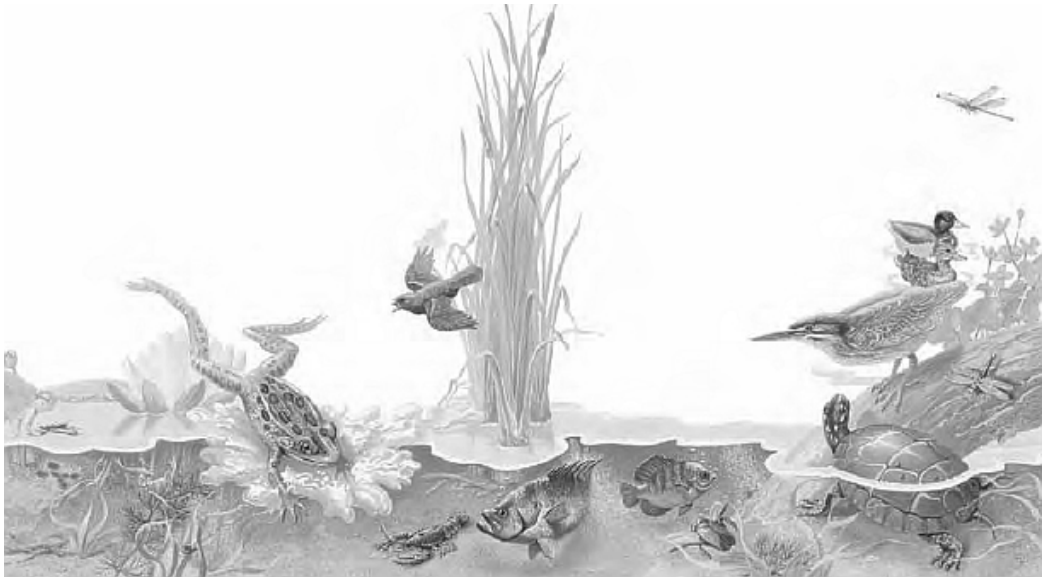
DATE: NAME: CLASS:

CHAPTER 1

Studying a Pond Ecosystem

BLM 1-7

Goal • Examine the following figure and answer the questions that follow.



1. Give an example of a biotic-biotic interaction that would take place between an individual frog and various species of dragonflies.

_____

_____

2. What is a niche? Describe the niches filled by the dragonflies and the waterweeds in this ecosystem.

_____

_____

_____

3. What do you think might happen to other populations in this community if the population of frogs suddenly declined in number? Explain your reasoning.

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 1

Chapter 1 Review

BLM 1-8

Goal • Check your understanding of Chapter 1.

What to Do

Circle the letter of the best answer.

1. Temperature is an example of which kind of ecosystem condition?
   A. abiotic
   B. biotic
   C. habitat
   D. niche

2. Which of the following ecosystems can be found in Newfoundland and Labrador?
   A. desert
   B. pond
   C. prairie
   D. rainforest

3. Which option arranges the given levels of environmental organization from smallest to largest?
   A. ecosystem, species, individual, population
   B. individual, community, population, ecosystem
   C. individual, population, community, ecosystem
   D. species, individual, community, ecosystem

4. Organisms can only survive within certain abiotic conditions. What is this span of conditions known as?
   A. adaptation
   B. niche
   C. range of tolerance
   D. treeline

5. Which of the following is a biotic component of soil in a forest?
   A. air
   B. fragments of dead plants
   C. small particles of rock
   D. water

6. Which of the following best describes an adaptation?
   A. A developed characteristic that helps a species survive in its population
   B. A developed role that a species carries out in its community
   C. An inherited characteristic that helps a species survive in its environment
   D. An inherited role that a species carries out in its ecosystem

Match the term on the left with the best description on the right.
Each description may be used only once.

Term	Description
_____ 7. species _____ 8. population _____ 9. habitat _____ 10. community _____ 11. biotic _____ 12. ecosystem	A. one member of a species B. an entire group of individuals of the same species that live together in one ecosystem at the same time C. the biotic parts of a community, together with the abiotic parts of the environment that affect the community D. a group of interacting populations E. non-living things F. a group of organisms that can reproduce among themselves to produce offspring of the same type that can also reproduce successfully G. living things H. a particular place where an organism lives

Short Answer Questions

13. Read the statements below. In the space provided, indicate whether each statement is true (T) or false (F). If the statement is false, rewrite it to make it true.

___ (a) A rotting tree stump on a forest floor is too small to be considered an ecosystem.

_____

___ (b) Rivers, lakes, and ponds are all freshwater ecosystems.

_____

___ (c) The altitude at which tree growth becomes impossible is called the treeline.

_____

___ (d) A community can include several populations of different species.

_____

14. Mosquitoes and dragonflies live in the same habitat, but have different niches. Explain why this statement is true.

_____

_____

15. Describe three interactions a duck may have with the abiotic parts of its ecosystem.

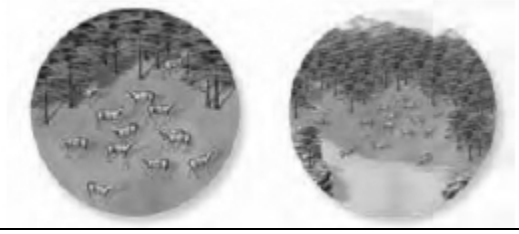
_____

_____

_____

16. Examine the four illustrations below. Choosing from the terms given below, correctly write the term that best matches the illustration in the space provided.

Terms: ecosystem, population, individual, community

	
_____ _____	_____ _____

17. Use the term “range of tolerance” to explain why a polar bear cannot survive in a desert. Refer to at least two specific abiotic conditions in your answer.

_____

_____

_____

_____

DATE: NAME: CLASS:

CHAPTER 2 # Symbiotic Relationships BLM 1-9

Goal	• Complete this activity to show your understanding of symbiotic relationships.

What to Do

Identify the correct symbiotic relationship for each of the biotic-biotic relationships described below.

1. In South America, some types of Acacia trees live closely with stinging ants. The tree makes a sugary liquid in its leaves, which the ants eat for nourishment. The ants live within the tree's hollow thorns, where they are protected from predators. The tree benefits because the ants attack herbivores that land on it. They also provide the tree with nutrients and cut down branches of other plants that grow too close to the Acacia. This way the tree always has enough light for photosynthesis.

   Symbiotic relationship: _____

2. Sharks live closely with suckerfish in nature. The small suckerfish hold onto the shark's body with special sucker-like dorsal fins. They get both protection and bits of food from the shark. Sharks do not seem to be affected by the presence of the suckerfish.

   Symbiotic relationship: _____

3. Mistletoe is a type of plant that grows on trees and shrubs. They do not have their own leaves to carry out photosynthesis, but instead get nourishment from conifer trees. Their roots grow right through the bark of these trees to obtain nutrients, and in doing so, weaken the trees and leave them open to disease.

   Symbiotic relationship: _____

4. Certain types of cowbirds hover around the hooves of cows and bison. The birds feed on the insects that the bison and cattle flush out of the grasses as they walk. In return, the birds remove insects and parasites from the large animals' hides.

   Symbiotic relationship: _____