Activity Preparation for Chapter 11

Activity/Investigation	Advance Preparation	Time Required	Other Considerations
Find Out: Build an Ecosystem (page 237) (TR page 266)	• 2 weeks before – Ask students to bring an empty 2 L plastic pop bottle from home. • 2 to 3 days before – Gather materials. – Photocopy **BLM 11–1 Build an Ecosystem** and **Assessment Master 2 Co-operative Group Work Rubric**. • Day of – Set out materials.	• 15 min to set up; 5–10 min for observation for 4 weeks	• You may have students set up the soil terrarium just before beginning Section 11.1.
Find Out: Symbiosis (page 246) (TR page 273)	• 1 week before – Book the library or computer lab. • 1 day before – Familiarize yourself with the game. – Photocopy **BLM 11–5 Symbiosis** and **Assessment Master 2 Co-operative Group Work Rubric** (optional). • Day of – Set out cards and markers.	• 40 min for research and making cards; 20 min for playing card game	

Materials Needed for Chapter 11

Activity/Investigation	Apparatus	Materials	Blackline Masters
Find Out: Build an Ecosystem (page 237) (TR page 266)	Per group: • scissors • 10 cm ruler	Per group: • 2 L plastic pop bottle • sand • potting soil • gravel or charcoal • 10 radish or lettuce seeds • water • 2 earthworms • small pieces of leaves or vegetables • adhesive tape • several snails and slugs	**Recommended** BLM 11–1 Build an Ecosystem Assessment Master 2 Co-operative Group Work Rubric
Find Out: Symbiosis (page 246) (TR page 273)	• blue, green, and yellow coloured pencils (optional) • markers	• index cards	**Recommended** BLM 11–5 Symbiosis **Optional** Assessment Master 2 Co-operative Group Work Rubric

CHAPTER 11 Interactions Among Communities (page 232)

SUGGESTED TIMING	MATERIALS	BLACKLINE MASTERS
15 min	• chart paper and markers	OHT C–8 Park Ecosystem

Overall Expectations

BLTV.01 – explain the strategies that organisms use for successful coexistence in populations and communities

Key Terms Teaching Strategies

Have students complete some or all of the following activities to help them learn and remember the key term:

- Discuss the two parts of the word "ecosystem." Ask for words that contain "eco." For example, ecology is the study of how living things interact within their environment. Ask what "system" means (i.e., combination of things forming a united whole). For example, the respiratory system is composed of several parts that work together to make you breathe. An ecosystem includes the abiotic (non-living) and biotic (living) factors that interact with each other.
- Write a definition for the term in their Science Log. You may wish to have students keep a glossary at the back of their Science Log.

Help students remember the key term by posting it on a science word wall.

Reading Icon Answers (page 232)

1. Students should highlight: An ecosystem includes all the organisms and the non-living factors in an environment.
2. Students should circle the term "abiotic."

Activity Planning Notes

Read the information on page 232 together. Have students find an example of each kind of interaction in the visual. For example:

- The squirrels interact with each other.
- Bees help move pollen. Flowers provide bees with nectar.
- Plants depend on the Sun to make food.

Before students complete and then discuss question 3, review the meaning of a community (i.e., a group of the same species interacting with each other in a common place).

You might discuss ways that the human community benefits and harms communities in a park.

Consider using the following overhead transparency:

- **OHT C–8 Park Ecosystem**

Check Your Understanding Answers (page 232)

3. a) Look for a circle around the following communities: trees, robins, grass, earthworms, flowers, bees.

b) Answers will vary. Look for two communities and an interaction for each one. For example,

- bees; pollinate flowers
- flowers; provide nectar for bees
- robins; depend on cedar trees for shelter
- robins; eat earthworms
- earthworms; get nutrients from dead organic matter in the soil

11.1 Biodiversity (page 233)

SUGGESTED TIMING	MATERIALS	BLACKLINE MASTERS
40–50 min 15 min to set up; 5–10 min for observation for 4 weeks for Find Out	• coloured pencils or markers	BLM 11–1 Build an Ecosystem Assessment Master 2 Co-operative Group Work Rubric

Specific Expectations

BLT1.02 – identify challenges that arise from organisms living together in communities, including human populations
BLT1.04 – use appropriate scientific terminology related to concepts of organisms living together
BLT2.06 – explain and interpret observations by summarizing patterns obtained from graphing data, organizing information, and communicating orally and in writing

Science Background

Biodiversity: Biodiversity changes from area to area depending on environmental conditions such as temperature, amount of rainfall, and type of soil. Even within the same area, the level of biodiversity can change in response to changes in environmental conditions. For example, over the last three decades, the Aral Sea (in Kazakhstan and Uzbekistan) has been reduced to two fifths of its original size due to irrigation. Less water means there is a higher salt and mineral content. As a result, there has been a drastic decrease in fish populations, which affects the food chain. Due to global warming in the Arctic, the Inuit have noted the presence of new species of plants and insects, which had never existed before. The influx of new plant species may alter the chemical composition of the soil and water, which can further change the biodiversity in the area. At the same time, species that cannot cope with warmer temperatures may die or move away.

Areas with low biodiversity are more susceptible to change after a pest is introduced since the balance of predator and prey in the food web is already delicate.

Importance of Biodiversity: For centuries, different cultures have used wild plants to treat illnesses. For example, Aboriginal groups drank tea made from the bark and leaves of the cedar tree to prevent scurvy, a disease caused by the lack of vitamin C.

Over 100 of the most commonly prescribed medicines come from nature or from chemicals found in nature. Steroids, penicillin, morphine, and Aspirin® are a few examples. Taxol™ fights breast and ovarian cancer. The working substance in the drug is derived from the Pacific yew tree.

Key Terms Teaching Strategies

Have students complete some or all of the following activities to help them learn and remember the two key terms:

- Write definitions for these terms in their Science Log. You may wish to have students keep a glossary at the back of their Science Log.
- Use an example to show the meaning of biodiversity and habitat. For example, after a drought, the water in a beaver dam disappears. The beavers lose their habitat. The biodiversity in the area decreases after the beavers move.

Help students remember the key terms by posting them on a science word wall.

Reading Icon Answer (page 233)

4. Students should circle species that interact. Look for an arrow that joins each circled species to the species it interacts with.

- caribou; moss and lichens
- birds; insects
- wolf; moose
- owl and hawk; rabbit and squirrel

Reading Icon Answers (page 235)

4. Students should highlight: Natural disturbances; Changes in the availability of resources; Introduction of a new species.

5. For each picture, biodiversity decreases (–).

Reading Icon Answer (page 238)

1. Students should highlight: Foods; Useful materials; Medicines from plants.

Activity Planning Notes

After you read the information on page 233 together, have students complete and then discuss questions 4 and 5. For question 4, suggest that students use a different coloured pencil for each pair of interacting species.

For question 5, refer to the picture and help students realize that biodiversity depends on adequate resources such as food and shelter for animals, and adequate air and soil conditions for plants to grow.

After reading the information on page 234, have students compare the number of organisms in the pictures. Ask them to consider how the environmental conditions vary, and how the conditions might account for more organisms living in wetlands than in a sand dune. Have students complete and then discuss questions 1 to 3.

On page 235, note that biodiversity usually decreases with each factor, except when there are increases in resources. Share some examples of how an increase in resources might increase biodiversity (e.g., planting shrubs encourages bird species that depend on low-growing plants for food and shelter to come into an area).

As a class read how a growing deer population affects biodiversity on page 236. Have students complete and then discuss question 1.

You might extend the discussion about the difficulty of sustaining biodiversity when changes occur by asking students to share examples with which they are familiar (e.g., introduction of zebra mussels into the Great Lakes). Discuss what

people can do to help protect biodiversity (e.g., slow down the conversion of grasslands for agricultural use or urban settlement; reduce the use of pollutants from agriculture; ban or limit hunting).

Read page 238 as a class. Ask students to consider the effects on people if food, useful materials, and medicines from plants were taken away or reduced. .

Have students complete and then discuss questions 2 and 3 on page 239.

Accommodations

- Pair ESL and LD Learners with students who have stronger language skills.
- Pair students who have difficulty writing with someone who can help record their answers. Alternatively, have them present answers orally.

Making Connections Answers (page 233)

5. Answers will vary. Expect a description of any two reasonable factors that contribute to biodiversity such as:

a) Animals need an adequate supply of food.

b) Plants need certain soil conditions and temperature in order to grow.

Check Your Understanding Answers (page 234)

1. Look for any two conditions that result in high biodiversity. For example:

a) lots of water

b) nutrient-rich soil

2. Look for any three conditions that result in low biodiversity. For example:

a) hot temperature

b) lack of water

c) nutrient-poor soil

Making Connections Answer (page 234)

3. Sand dune ecosystem. Explanations will vary. Sample answer:

- A sand dune ecosystem has low biodiversity and is more fragile. The loss of even one species would affect the other species in the food web.

Check Your Understanding Answers (page 236)

1. Answers will vary. Look for three effects of a high deer population on biodiversity. For example:

a) The population of low-growing ground cover and shrubs decreases.

b) Birds that depend on shrubs for food and shelter have to move elsewhere.

c) The sugar maple population decreases.

Check Your Understanding Answers (page 239)

2. a) and **b)** Answers will vary. Look for sources for five foods. Sample answer:

milk; animal
honey; animal
pop; other materials such as water, sugar, and carbon dioxide gas
oatmeal cereal; plant
apple; plant

3. a) and **b)** Answers will vary. Look for five products made from natural materials, and their sources. Sample answers:

t-shirt; cotton; cotton plant
candles; beeswax; bees
pencil; wood and graphite; cedar trees and mineral
paper money; wood; linen, cotton, or other plants
sweater; wool; sheep
shoes; leather; animal skins

c) Answers will vary. Accept any reasonable explanation for two plants or animals. Sample answer:

- Sheep depend on plants for food and shelter.
- Cotton plants depend on bees and other insects to pollinate them.

Find Out Activity (page 237)

Build an Ecosystem

Purpose

- Students build a soil terrarium and observe what happens to an ecosystem when biodiversity changes.

Science Background

The essential abiotic factors in the soil ecosystem include adequate sunlight, water, and soil conditions.

In an established ecosystem, there is a balance between the number of different types of plant and animals. However, introducing a new organism changes the biodiversity, and the ecosystem will be in an initial state of flux. For instance, there may be too many organisms competing for the same available resources.

Advance Preparation

WHEN TO BEGIN	WHAT TO DO
2 weeks before	• Ask students to bring an empty 2 L plastic pop bottle from home. • Gather materials.
2 to 3 days before	• Photocopy **BLM 11–1 Build an Ecosystem** and **Assessment Master 2 Co-operative Group Work Rubric**.
Day of	• Set out materials.

APPARATUS	MATERIALS
Per group: • scissors • 10 cm ruler	Per group: • 2 L plastic pop bottle • sand • potting soil • gravel or charcoal • 10 radish or lettuce seeds • water • 2 earthworms • small pieces of leaves or vegetables • adhesive tape • several snails and slugs

Suggested Timing

15 min to set up; 5–10 min for observation for 4 weeks

Safety Precautions 

- Caution students to be careful when handling scissors.
- The edges of the pop bottles may be sharp. Caution students to be careful when placing items in the bottle to avoid scratching their wrists.
- Have students clean up the work area and wash their hands thoroughly with soap and water after setting up the ecosystem.

Activity Planning Notes

If time is limited, set up a class terrarium in advance. Prepare a set of pictures of the results over four weeks. Use the pictures as overheads in a class discussion of the results. Have students answer the questions in the student resource and on the blackline master.

You may have students set up the soil terrariums just before beginning Section 11.1.

Divide students into small groups. Read through the directions together and make sure everyone understands what to do. Have students use the picture as a guide for adding different amounts of materials to the pop bottle.

As you circulate, troubleshoot for students who experience difficulty.

Ask students for predictions about what will happen in their terrarium (e.g., seeds will sprout roots and shoots; worms will make tunnels in the soil). Distribute copies of **BLM 11–1 Build an Ecosystem** for students to record their observations.

After students have observed every few days for two weeks, have students add snails and slugs to the ecosystem, and then predict how they will affect the ecosystem. Have students continue to record observations every few days for another two weeks.

Accommodations

- Team students with dexterity problems with those without such difficulties.

What Did You Observe? Answer (page 237)

4. Observations will vary. Sample answer:

- Seeds sprout roots and shoots
- Worms make tunnels in the soil.
- Worms are present in the leaves and vegetable scraps, which are rotting.

Activity Wrap-up

- Have students complete and then discuss question 4 on page 237, and the questions on **BLM 11–1 Build an Ecosystem**. Have student compare their observations at the end of four weeks. Ask what changes took place after slugs and snails entered the ecosystem.

Alternative Activities

- Have students work in groups to study the biodiversity in the schoolyard or a nearby park by observing and recording the number and types of plants and animals in a study area. Have students use four wooden pegs or nails, a measuring tape and 13 m of string to mark out a 3 m by 3 m square. Refer to Chapter 9 Find Out: Counting Populations of Plants for instructions about conducting a quadrat study. Students with allergies to pollen or grass should not participate outdoors. Consider asking them to help with identifying species indoors. Students could draw or describe the plants and animals they found. As a class, discuss the number and types of communities of species found, and rate the study area for level of biodiversity.
- If available, have students play a computer simulation game called Sim Park, in which they develop and maintain the ecosystem in a park.

Ongoing Assessment

- Use the discussions throughout the section and the Check Your Understanding questions on page 234 as a formative assessment for how well students understand biodiversity.
- Use **Assessment Master 2 Co-operative Group Work Rubric** to assess how well students worked together during the Find Out activity.

Technology Links

- For a computer game, in which students develop a prairie ecosystem, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Build a Prairie.
- For information about biodiversity in Canada, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Canadian Biodiversity.

11.2 Successful Co-existence (page 240)

SUGGESTED TIMING

60–65 min (including research for the Science and Literacy Link)

MATERIALS

- coloured pencils or markers
- 13 index cards
- ball of coloured yarn

BLACKLINE MASTERS

BLM 11–2 Worm Composting
OHT C–9 Producers and Consumers
OHT C–10 Food Chains and Food Webs
Assessment Master 15 Visual Presentation Checklist
Assessment Master 16 Visual Presentation Rubric

Specific Expectations

BLT1.02 – identify challenges that arise from organisms living together in communities, including human populations
BLT1.03 – compare the strategies used by various communities of organisms to successfully coexist
BLT1.04 – use appropriate scientific terminology related to concepts of organisms living together
SIM2.02 – research science-related information from a variety of electronic and other sources

Science Background

Composting turns organic material into soil-like material called compost. The organic material is broken down by microorganisms such as bacteria, worms, and fungi, and by chemical reactions. The decomposition process generates heat, and the more heat that is generated, the faster decomposition happens.

Composting needs air and moisture to work properly. There also needs to be a good balance of carbon and nitrogen for material to be well composted. Too much carbon or nitrogen results in poor compost.

Technology Links

- For lyrics that reinforce key terms about food chains, go to **www.mcgrawhill.ca/books/Se10** and follow the links to The Food Cycle.)
- For music about food chains and decomposers, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Science Songs for Teaching.

Key Terms Teaching Strategies

Have students complete some or all of the following activities to help them learn and remember the key terms:

- Write definitions for these terms in their Science Log. You may wish to have students keep a glossary at the back of their Science Log.
- Rewrite lyrics or listen to lyrics that include the key terms.

Help students remember the key terms by posting them on a science word wall.

Reading Icon Answers (page 240)

1. a) Students should circle two of the following producers: water lily, grasses, or algae.

b) Students should box two of the following consumers: frog, bird, crayfish, fish, turtle, insect, duck, snail, or dragonfly.

Reading Icon Answers (page 242)

1. Look for a line drawn from the Sun to the wolf and from the Sun to the hawk.

2. Students should circle the bear and hawk, and box the seeds.

Activity Planning Notes

In advance, use index cards to write the name of each species shown in the pond ecosystem, and add fungi. On the blackboard, write the following headings: producers, consumers, and decomposers. After reading the information about producers, consumers, and decomposers on pages 240 and 241, ask students to place each index card underneath its correct heading. Have students complete and then discuss the follow-up questions 2 to 5 on page 241.

Consider building a worm composter as a class project, before reading the Science and Literacy Link on page 241. Provide students with **BLM 11–2 Worm Composting** to help them research composting. In advance, book the computer lab and gather text references. You might refer students to the web site suggested on page 270 in the Technology Links. Allow time for students to do research before writing and designing a brochure. Consider providing class time for research and then assigning the brochure as a mini-project.

Use **Assessment Master 15 Visual Presentation Checklist** to review the criteria for the brochure.

After reading about food chains and food webs on page 242, recreate the food web using volunteers and a ball of yarn. Students will gain understanding about the complexity of feeding relationships when a species has more than one food source, and is eaten by predators that have more than one food source.

Have students complete and then discuss questions 3 to 7 on page 243.

Consider using the following blackline masters and overhead transparencies:
- **BLM 11–2 Worm Composting**
- **OHT C–9 Producers and Consumers**
- **OHT C–10 Food Chains and Food Webs**
- **Assessment Master 15 Visual Presentation Checklist**

Accommodations

- Display some sample brochures to help guide students.
- Pair ESL and LD Learners with students who have stronger language skills.
- If students have access to a computer, they may wish to use clip art and graphics software to create their brochure.
- Allow students some flexibility in choosing a format to present their information (e.g., flyer).
- Provide students who need more space to record their answer to question 7 on page 243 with a separate piece of paper. Remind them to put their name on it.

Check Your Understanding Answers (page 241)

2. A producer makes its own food using energy from the Sun.

A consumer cannot make its own food, so it eats producers or other consumers.

3. Look for a check mark under each of the following headings.

a) Herbivore

b) Carnivore

c) Omnivore

4. Decomposers return nutrients to the environment for plants to use.

5. a) carnivore

b) herbivore

c) producer

Check Your Understanding Answers (page 243)

3. A food chain begins with a source of energy, which is usually the Sun.

4. Arrows show the direction in which food energy flows from organism to organism.

5. Look for one possible food chain for each animal. Sample answer:

a) Sun → seeds → chipmunk → bear

b) Sun → grasses → insects → grouse → hawk

6. Answers may vary. Look for one similarity and one difference for a food chain and a food web. For example,

a) A food chain and a food web show how food energy is passed from organism to organism.

b) A food web shows all the possible food chains in an ecosystem. A food chain shows only one set of feeding relationships.

Making Connections Answers (page 243)

7. a) Answers will vary depending on the foods that students record. Sample answer:

scrambled egg; chicken
toast; wheat
orange juice; fruit tree

b) Answers will vary depending on the answers to a). Look for a food web that includes several possible food chains. The food web should end with the student.

Ongoing Assessment

- Use the Check Your Understanding questions on pages 241 and 243 as a formative assessment of how well students understand the key terms.
- Use **Assessment Master 16 Visual Presentation Rubric** to assess students' brochures about composting.

Technology Links

- For information about the process of composting, go to **www.mcgrawhill.ca/books/Se10** and follow the links to How Composting Works.
- For more information about building a worm composter, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Composting With Worms.
- For a food web activity related to the video, *The Living Edens: Yellowstone*, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Yellowstone Food Web.

Alternative Activities

- Have students make a worm composter and observe how decomposers work. Provide a large bin with a lid, newspaper, soil, food scraps, red worms, and the following instructions. Poke some holes at the bottom of the bin and line it with shredded newspaper. Add a few handfuls of soil and some crushed eggshells. Add the food scraps and red worms. Fasten the lid and let the worms do their job. Have students make observations periodically. After feeding worms for three to six months, students will able to collect brown, crumbly worm compost.
- Show a video called *The Living Edens: Yellowstone* (PBS, 2001), which describes how predator/prey/scavenger relationships balance the ecosystem in Yellowstone Park.
- Consider reading or assigning the following book to students to read and asking them to present a report: *Wolf Island*, Celia Godkin (Fitzhenry and Whiteside, 1989. Paperback ISBN: 1550410954). Reading Level: Ages 8–10. The book addresses the impact on the ecosystem after a wolf pack is removed from the food chain.
- Use some or all of the activities in the following Life Science *ActiveFolders*: Ecology and Food Chains/Food Webs/Energy Pyramids.

11.3 Interrelationships (page 244)

SUGGESTED TIMING	MATERIALS	BLACKLINE MASTERS
60–65 min (including research for the Science and Literacy Link) 40 min for research and making cards; 20 min for playing card game for Find Out	• coloured pencils or markers	BLM 11–3 Symbiotic Relationships BLM 11–4 Stoop and Scoop BLM 11–5 Symbiosis OHT C–11 Lynx and Hare Graph Assessment Master 2 Co-operative Group Work Rubric Assessment Master 16 Visual Presentation Rubric

Specific Expectations

BLT1.02 – identify challenges that arise from organisms living together in communities, including human populations
BLT1.03 – compare the strategies used by various communities of organisms to successfully coexist
BLT1.04 – use appropriate scientific terminology related to concepts of organisms living together
BLT3.02 – determine, through a case study, and explain how humans organize their communities to address challenges of living together
SIM2.02 – research science-related information from a variety of electronic and other sources

Key Terms Teaching Strategies

Have students complete some or all of the following activities to help them learn and remember the key terms:

- Write definitions for these terms in their Science Log. You may wish to have students keep a glossary at the back of their Science Log.
- Write a paragraph that contains the key terms in this section.
- Complete **BLM 11–3 Symbiotic Relationships** to practise using the key terms.

Help students remember the key terms by posting them on a science word wall.

Reading Icon Answer (page 245)

3. Students should highlight: mutualism, commensalism, and parasitism.

Activity Planning Notes

As a class, read and discuss the information on pages 244 and 245. Share or have students share examples of symbiotic relationships that they are familiar with, and then ask them to identify each type of relationship. Use prompts such as: Who is helped? Who is harmed? Who is not harmed or helped? For instance, the relationship between people and their dogs is an example of mutualism. The owner meets a dog's needs for food and shelter, and the dog provides

companionship. Or, ask students to make analogies using human relationships for each type of symbiotic relationship. For instance, the relationship between an employer and an employee is an example of mutualism. The employer generates products due to the efforts of employees, and employees earn money.

Provide students with **BLM 11–3 Symbiotic Relationships** to reinforce their understanding of symbiosis, if you have not already done so.

You might compare a predator and prey relationship to a parasitic relationship. How are they the same? How are they different? (Similarity: Both involve an organism that is helped and one that is harmed. Difference: In parasitism, a parasite continues to benefit as long as the host remains alive.)

Accommodations

- Pair ESL and LD Learners with students who have stronger language skills.
- Allow students some flexibility in choosing a format to present their information for the Science and Literacy Link (e.g., oral report).
- If students have access to a computer, they may wish to use clip art and graphics software to create their poster. The zoom feature on most photocopiers can be used to enlarge images to poster size.

Read the Science and Literacy Link on page 246 together as a class. Distribute copies of **BLM 11–4 Stoop and Scoop** to help students answer questions 2 and 3 on page 246. Students are to do research and then design a poster. Discuss how students should research the regulations in their community (e.g., text references, Internet, interview). In advance, gather text references and book the computer lab, or invite an official responsible for animal control and care by-laws to visit the class. Allow time for students to do research before assigning the poster. Display the completed posters in the classroom.

Consider using the following blackline masters and overhead transparency:
- **BLM 11–3 Symbiotic Relationships**
- **BLM 11–4 Stoop and Scoop**
- **OHT C–11 Lynx and Hare Graph**

Check Your Understanding Answers (page 244)

1. Accept any reasonable explanation. For example:
- As a prey population decreases, there is less food. As a result, fewer predators survive and the predator population decreases.

2. Accept any reasonable explanation. For example:
- As a predator population increases, there is more competition for food. As a result, the prey population slowly decreases.

Check Your Understanding Answer (page 246)

1. Look for the following reasons.
- Dog waste increases the risk for children to get parasites and infections.
- Dog waste spreads disease to other pets.

Making Connections Answers (page 246)

2. Answers will vary depending on community regulations. Sample answer:
- Pet owners are required to pick up dog waste.
- Pet owners may put dog waste wrapped in a sealed, leakproof bag, in regular garbage.

3. Posters should include an explanation of why stooping and scooping is important to protect public health.

Find Out Activity (page 246)

Symbiosis

Purpose

- Students conduct research and then play a game to reinforce their understanding of symbiotic relationships.

Science Background

Students research the following symbiotic relationships.

Aphid/Ant: (Mutualism) Aphids secrete a sweet liquid that ants eat. Ants allow aphids into their territory and provide protection. Aphids sometimes release chemical signals that warn other aphids of a predatorial attack and alert ants to attack the invader.

Barnacle/Whale: (Commensalism) Barnacles that attach to whales get shelter and transport. Whales are not harmed or helped.

Cattle Egret/Cow: (Commensalism) Cattle egrets feed on parasites found on the backs of cattle and other grazing animals. Cows are not harmed or helped.

Cleaner Fish/Grouper: (Mutualism) Cleaner fish enter the mouth and gills of grouper fish looking for parasites. Cleaner fish also help remove dead skin and tissue, and as a result, help maintain the health of grouper fish.

Cowbird/Other Birds: (Parasitism) Cowbirds lays their eggs in other birds' nests. The hatched cowbirds push the host eggs and chicks out, and eat the food that the host parents provide. The host bird population decreases.

Hermit Crab/Snail: (Commensalism) Hermit crabs live in shells that are abandoned by snails. Snails are not harmed or helped.

Isopod/Fish: (Parasitism) Isopods burrow into the flesh of fish, attaching to the gills or living inside the mouth, and scavenge on food particles that float by. The host fish are harmed.

Louse/Human: (Parasitism) Lice bite and suck blood from humans. Humans get no benefit, and an itchy spot.

Ostrich/Gazelle: (Mutualism) Ostriches and gazelles feed beside each other in grasslands. Both watch for predators and alert each other to danger. Each animal has different visual abilities, and as a result, are able to identify threats the other would not see.

Oxpecker/Rhinoceros: (Mutualism) Oxpeckers eat ticks and other parasites that live on the skin of the rhinoceros. Oxpeckers get food while the rhinoceros rids itself of harmful parasites. Additionally, oxpeckers fly upward and scream a warning when danger approaches.

Pilot Fish/Shark: (Commensalism) Pilot fish swim into a shark's mouth to feed on leftover food scraps stuck between its teeth. Sharks do not eat the pilot fish and are not harmed or helped.

Skunk/Groundhog: (Commensalism) Skunks sometimes live in burrows dug by groundhogs. Groundhogs are not harmed or helped.

Tick/Dog: (Parasitism) Ticks living on a dog get food and shelter. Dogs are harmed because they lose nutrients in their blood and suffer from itching.

Wild Grape/Ash Tree: (Commensalism) Wild grape vines grow up ash trees to get sunlight and space. Ash trees are not harmed or helped.

Yucca Moth/Yucca: (Mutualism) Yucca moths lay an egg in the ovary of the yucca flower, and then place pollen into the stigma of yucca flowers. This results in the fertilization of hundreds of seeds, some of which provide food for the moth larva. Yucca plants depend on yucca moths for pollination.

Advance Preparation

WHEN TO BEGIN	WHAT TO DO
1 week before	• Book library or computer lab.
1 day before	• Familiarize yourself with the game. • Photocopy **BLM 11–5 Symbiosis** and **Assessment Master 2 Co-operative Group Work Rubric** (optional).
Day of	• Set out cards and markers.

APPARATUS	MATERIALS
• blue, green, and yellow coloured pencils (optional) • markers	• index cards

Suggested Timing

40 min for research and making cards; 20 min for playing card game

Activity Planning Notes

Read the information as a class and make sure everyone understands what to do. Divide the class into groups of five, and suggest that each group member research the symbiotic relationships for one column in the chart on page 247.

Have students use **BLM 11–5 Symbiosis** to record their group's research. As students share the results of their research, have group members complete the chart for each symbiotic relationship presented. Afterward, consider having students use different coloured pencils to classify types of relationships on the chart.

- Colour examples of commensalism green.
- Colour examples of mutualism yellow.
- Colour examples of parasitism blue.

Accommodations

- Pair ESL and LD Learners with students who have stronger language skills.

Activity Wrap-up

- Have students use index cards to prepare the card game. Read the instructions for playing the game together. Consider playing a round as a class, before students play a few rounds.

Ongoing Assessment

- Use **Assessment Master 16 Visual Presentation Rubric** to assess students' posters.
- Use the reports presented during the Find Out activity to assess students' understanding of symbiotic relationships.
- Use **Assessment Master 2 Co-operative Group Work Rubric** to assess how well students worked together during the Find Out activity.

Technology Links

- For more information about why people should stoop and scoop, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Stoop and Scoop.
- For a sample Stoop and Scoop by-law, go to **www.mcgrawhill.ca/books/Se10** and follow the links to Stoop and Scoop.
- For some online games that students can play to reinforce their understanding of the concepts in Chapter 11, go to **www.mcgrawhill.ca/books/Se10** and follow the links to What's My Job? There are three levels. In level 1, go to Food Chain Solitaire. In level 2, go to Friend, Freeloader, or Foe? and What Happens Next? In level 3, go to The Unbroken Web.

Chapter 11 Review (page 248)

SUGGESTED TIMING

30–40 min to complete and take up the review, and then assign the Practice Test

BLACKLINE MASTERS

Master 5 Certificate
Master 6 List of Skills
BLM 11–3 Symbiotic Relationships
BLM 11–6 Chapter 11 Practice Test
BLM 11–7 Chapter 11 Test
BLM 11–8 BLM Answers

Using the Chapter Review

Depending on your class, students should be able to work through the review at their own pace. In order to have success with the Chapter Review, some students may need to do it in chunks, by completing several questions and then taking them up before continuing. This process will prevent students from completing many questions incorrectly.

To provide additional reinforcement of symbiotic relationships, and if not already done, have students complete **BLM 11–3 Symbiotic Relationships**. Once the review is completed and taken up, assign **BLM 11–6 Chapter 11 Practice Test** for students to answer individually. They may wish to use their completed review to help them.

Review Guide

Question	Section(s)	Refer to
1	11.3	Symbiosis (page 245)
2	11.1	Biodiversity (page 233)
3	11.2	Food Webs (page 242)
4	11.2	Food Chains (page 242)
5	11.2	Producers, Consumers, and Decomposers (page 240)
6	Chapter Opener	Interactions Among Communities (page 232)
7	11.2	Producers, Consumers, and Decomposers (page 240)
8	11.2	Producers, Consumers, and Decomposers (page 240)
9	11.3	Symbiosis (page 245)
10	11.1	Why Is Biodiversity Important to Humans? (page 238)
11	11.2	Producers, Consumers, and Decomposers (page 240)
12	11.2	Producers, Consumers, and Decomposers (page 240)
13	11.2	Food Chains (page 242)
14	11.3	Symbiosis (page 245)

Accommodations

- Allow students to make a chapter summary page of the key ideas/skills from the chapter. The back of the student resource provides space to do this. Alternatively, you might develop a chapter summary as an entire class.
- If students have difficulty with a particular review question, use the Review Guide to identify the section they need to review.
- **BLM 11–6 Chapter 11 Practice Test** can be customized to produce extra reinforcement questions.

Summative Assessment

- Have students complete **BLM 11–7 Chapter 11 Test** to assess individual skills.
- You may wish to develop **Master 5 Certificate** to show students what they have learned during this chapter. Cut and paste the related skills from **Master 6 List of Skills**.

Chapter 11 Review Answers (pages 248–249)

1. e) symbiosis

2. a) biodiversity

3. f) food web

4. b) food chain

5. g) carnivore

6. i) ecosystem

7. c) herbivore

8. d) omnivore

9. j) host

10. Look for the following three benefits and an example for each. Examples will vary.

a) foods; variety of animal and plant sources of food such as fruits and cheese

b) useful materials; clothing made from natural fibres such as cotton and wool

c) medicines from plants; willow bark contains an ingredient used in Aspirin®

11. Look for a check mark under each of the following headings.

a) Omnivore

b) Herbivore

c) Carnivore

12. Wording will vary. Fungi are decomposers that break down dead organic matter. Decomposers return nutrients to the soil for plants to use.

13. a) The snake population would decrease. (As the mouse population decreases, there is less food for snakes. As a result, fewer snakes survive.)

b) The owl population would decrease. (As the snake population decreases, there is less food for owls. As a result, fewer owls survive.)

c) Answers will vary. Accept any reasonable impact on the ecosystem such as:

- There would be fewer owls, snakes, and mice.
- Fewer mice would give grass a chance to regrow and multiply.

14. Wording may vary.

a) Parasitism; is helpful to one species and harms the other species

b) Mutualism; is helpful to both species

c) Commensalism; is helpful to one species and neither harmful nor helpful for the other species