



## Food Chains

### Grade 4 (Cycle 2)

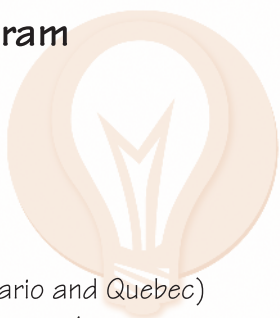


On the man-made habitat that is the Museum's demonstration farm, explore the interrelationship between domestic and wild communities. In the barns, students study photosynthesis, the different links in a food chain, and rebuild the food chains and food webs that they discover at the Museum. They come to realize that their lives depend on farm products and by-products, and identify some animals' diets by studying their dentition.

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### Language

And if They Disappear Forever...  
The Canada Goose

### Appendix

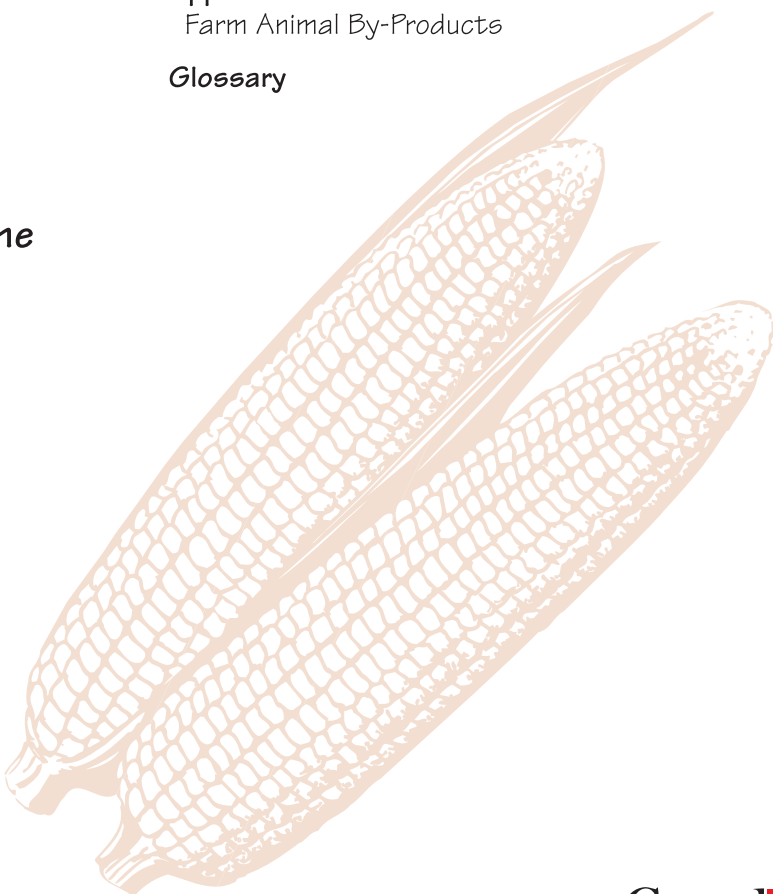
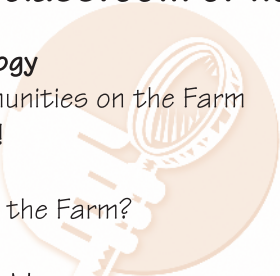
Farm Animal By-Products

### Glossary

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#### Science and Technology

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# AN ENRICHING PROGRAM



## Target grade level

This program targets Grade 4 in Ontario, and Cycle 2 in Quebec.

## Duration

90 minutes

## Program dates

This program is offered weekdays, from September to the end of June.

## Learning objectives

- explore what constitutes a habitat and community of plants and animals
- learn about photosynthesis
- understand a food chain and the role of farm animals and humans in it
- learn the appropriate terminology related to farm animals
- discover various facts about the life cycle of farm animals and the products and by-products of the animal agriculture industry
- learn about the communities of wild plants and animals that share the farm habitat, how they interact, and how they are dependent on their environment

## Learning methods

- visiting the Museum's Dairy and Small Animal Barns
- examining the products and by-products of various agricultural industries
- touching and/or watching various farm animals
- observing decomposers at work
- studying physical characteristics of predators and prey
- creating food chains and webs with various domestic and wild animals
- looking at the dentition of various consumers and classifying them based on their diet



## Curriculum Links

### ONTARIO

#### Grade 4

##### Science and Technology

Life Systems — Habitats and Communities

### QUEBEC

#### Cycle 2 (grades 3 and 4) Primary

##### Mathematics, Science and Technology

*Science and Technology*

- **Competency 2** To make the most of scientific and technological tools, objects, and procedures
- **Competency 3** To communicate in the languages used in science and technology

## Fees, payment and group size

For fees, please visit the **School Programs** section of our website at [agriculture.technomuses.ca](http://agriculture.technomuses.ca) or call us at **613-991-3053** or **1-866-442-4416**. Payment may be made in advance or on arrival, by cash, debit card, cheque (made payable to the *Canada Agriculture Museum*), or by credit card (VISA or MasterCard). Maximum group size for this program is 25 students. There are cancellation fees—please consult the **Important Information** section for more details.

If you have any questions, please do not hesitate to contact us at 613-991-3053. We look forward to seeing you at the Museum!



## Science and Technology

# HABITATS AND COMMUNITIES ON THE FARM



## Answers

- 1 How many habitats are on this farm? Describe each one.

There are two different habitats on this farm.

1) The fields: large tracts of clear land (no trees) where plants are cultivated

2) The woods: tree-covered areas

- 2 In a habitat, several plant and animal populations live together. These populations depend on one another. All the populations that interact with each other and live in a habitat form a community. In your opinion, what animals and plants form communities in the different habitats on this farm?

**In the fields:** cultivated plants, insects that eat them (grasshoppers, aphids, caterpillars, bees, etc.), insects that eat insects (wasps, ladybugs, etc.), weeds (dandelions, couch grass, daisies, etc.), animals that eat plants (mice, hares, raccoons, rats, groundhogs, Canada goose, crow, etc.), animals that eat insects or other animals (swallows, owls, falcons, foxes, skunks, raccoons, toads, snakes, etc.), organisms that eat plant and animal waste (earthworms, ants, mushrooms, centipedes, bacteria, flies, etc.).

**In the woods:** ground cover (ferns, grass, wild raspberry bushes, lichen, etc.) trees (maples, birch, oak, pine, fir, spruce, cedar, etc.), insects and animals that eat plants and trees (woodpeckers, raccoons, hares, caterpillars, spruce budworms, aphids, slugs, etc.), insects and animals that eat other insects and animals (toads, snakes, foxes, skunk, owls, raccoons, ladybugs, etc.), organisms that feed off plant and animal waste (earthworms, slugs, larger beetles, centipedes, etc.).



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## HABITATS AND COMMUNITIES ON THE FARM

A habitat is an environment in which plants and animals live. There are many habitats in the world. Ponds, deciduous forests, deserts and prairies are all habitats. A farm is an environment that humans have changed to meet their needs and produce food or fibres. There can be one or many habitats on a farm.

Look at the photo of a farm below and answer the questions on the following page.



1 How many habitats are on this farm? Describe each one.

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2 In a habitat, several plant and animal populations live together. These populations depend on one another. All the populations that interact with each other and live in a habitat form a community. In your opinion, what animals and plants form communities in the different habitats on this farm?




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## Science and Technology



### BEANS IN THE CLOSET!

During this experiment, students compare the growth and development of plants under various intensities of light. They formulate a hypothesis, measure the importance of photosynthesis on the survival of plants, and evaluate the results of their research.

## Materials

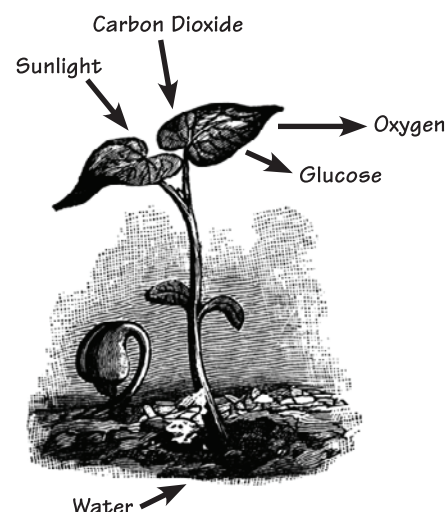
- 2 bean plants per team (planted in different pots a few weeks prior)
- measuring cups or other tools to measure water
- 1 set of activity sheets for each group (*Hypothesis, Observations, and Experiment Results*)
- ruler to measure plant growth

## Instructions

- 1 Divide your class into teams of four to five students.
- 2 Distribute two bean plants to each team. Have students write their team name and “Plant A” and “Plant B” on each pot.
- 3 Discuss with your students the role played by plants in the food chain. Explain that plants are producers. They belong to the first link of the food chain because they produce their own food. Ask the class to explain how plants make their own food. Review what occurs during photosynthesis:

**During photosynthesis, leaves capture the sun’s energy and carbon dioxide from the air. Plants use the solar energy to transform water (which they absorb through their roots) and carbon dioxide into glucose (a type of sugar) while releasing oxygen into the air.**

Explain to the students that this is how plants make their food, a sugar called glucose. Plants use this “food” to build their different parts, such as leaves, roots, flowers, tubers, etc. These parts are then used as food by other organisms. Without plants to transform solar energy into chemical energy (sugar), there would be no food for us and other consumer and decomposer organisms.



continued...



## Instructions (continued)

- 4 Discuss what plants need (light, water, soil and minerals, oxygen and carbon dioxide) and ask the students to describe a healthy plant and an unhealthy plant (colour, length and thickness of stem, height of leaves, vigour, etc.).
- 5 Explain that the purpose of the experiment is to observe and predict what happens when a plant is prevented from completing photosynthesis. For several weeks, the students will observe the growth and appearance of a plant exposed to high intensity light (control plant) and that of a plant kept in an area deprived of light (closet, cabinet, etc.). Distribute the **Hypothesis** activity sheets and ask the teams to formulate a hypothesis on the plants' need for light, and to predict the results of the experiment.
- 6 Distribute the **Observations** activity sheet and have the teams record their observations.
- 7 Every week, schedule an observation session and distribute the plants to the teams with a new **Observations** activity sheet.
- 8 Stop the sessions when the plants kept in the dark seem to be dead. Distribute the **Experiment Results** activity sheet, and ask students to explain why their plants could not survive without light.

## Other activities

Place the plants kept in the dark near a window and note the changes in the plants' appearance. Some will improve, others will not. Ask the students to explain why.





Team members: \_\_\_\_\_ Date: \_\_\_\_\_

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## BEANS IN THE CLOSET!

### Hypothesis

A hypothesis is an answer to a question. Since we do not know the real answer, we make a guess and predict the answer. We answer the question as best we can with the knowledge we have at the time. We then conduct research or an experiment to determine whether our hypothesis is correct.

As a team, predict the results of the experiment on the bean plants.

Answer the following question:

### Question:

If we prevent a plant from conducting photosynthesis by keeping it in the dark, what will happen?

### Hypothesis:

We think that

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because

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Team members: \_\_\_\_\_ Date: \_\_\_\_\_

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## BEANS IN THE CLOSET!

### Observations

	Plant A light	Plant B no light
height (cm)		
leaf colour		
stem thickness		
leaf size		
other observations		

Team members: \_\_\_\_\_ Date: \_\_\_\_\_

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## BEANS IN THE CLOSET!

### Experiment Results



1 Was your hypothesis correct?

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Why?

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2 Why was Plant B unable to live in the dark?

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## Science and Technology



# VERMICOMPOSTING

This activity, in addition to reducing the amount of waste produced by your class, allows students to study one of the most effective decomposers: the earthworm. Through worm composting, students observe how earthworms break down materials. Students also realize the importance of decomposers in the food chain.

## Did you know...

Did you know that earthworms are one of the most effective decomposers? They consume more organic material than all other decomposers combined! When worms consume organic material, they transform it into excrements that are highly concentrated with minerals that dissolve in water. These minerals are absorbed by plants when they soak up the soil's water through their roots.

Decomposers form the last link of the food chain. They break down organic material produced by all classes of organisms (both organism waste, and dead organisms) and return the minerals that plants need to survive to the soil.

Worm composting is the conversion or transformation of organic waste into compost or humus (a dark substance very rich in nutrients) through earthworms. Approximately 33% of waste sent to dump sites is compostable, and can be recycled into fertilizer for the garden. Worms do not give off an odour and do not need to be cleaned.

## Materials

- plastic bin with a cover (approximately ½ cubic metre)
- dark soil (enough to fill the plastic bin one-third full)
- water
- newspaper (black and white ink only—no colour)
- ½ kilogram of red wiggler worms (or earthworms from the garden)
- small scoop
- small stick
- organic waste (see “On the menu” below for suggestions)
- weight scale



continued...



## Instructions

- 1 Explain that a habitat is an area in which a plant or animal lives naturally. Explain that in order to raise earthworms in the classroom, the worms must be provided with an environment similar to their natural habitat. Ask the students to describe the earthworm's habitat.

Earthworm Habitat	Description and Explanation
<b>A cool, humid, and dark tunnel.</b>	<p>Worms like soil that is damp but not flooded with water. Their bodies must remain moist in order for them to breathe. If the soil is too dry, the earthworms will dry out. If it is too wet, they will drown.</p> <p>Worms like a temperature that varies between 13 and 25 degrees Celsius. At this temperature, worms eat and reproduce a lot. Below 13 degrees Celsius, worms eat little and have difficulty reproducing. Above 25 degrees Celsius, the worms could die. Worms are highly sensitive to light and will stay away from it. Even just a few minutes of light could harm them.</p>



continued...





## Instructions (continued)

- 2 Prepare the material necessary for worm composting with your class:

### a) air flow

Explain that, like humans, worms need air to survive; have students pierce the bin's cover several times to allow good air flow.

### b) litter

Fill the bin one-third full with soil. Ask each student to tear up a page of newspaper into very small pieces. Gradually add the pieces of paper to the soil until there is the same quantity of paper and soil in the container. Add water until the mixture is damp to the touch—but not too much water. The paper and soil mixture should have enough water to have the texture of a well-wrung sponge when pressed in a ball. You will know there is too much water if drops escape when a handful of the mixture is squeezed.

- 3 Once the bin and litter have been prepared, add the worms. Feed the worms once or twice a week. To do so, make a hollow in the surface of the litter, fill it with organic waste, and then cover with the litter. Mark the spot with a small stick. Do not dig deeper than 7 to 10 centimetres because worms are often found in the first few centimetres of soil. The organic waste should be cut into small pieces to make the worms' work easier. Place the organic waste in a different location at each feeding. This way, students can observe the speed with which the worms eat the waste and adjust the quantity as needed. If a lot of food is not eaten, the worms have too much. If there is hardly any left each time, they do not have enough.
- 4 Weigh the organic waste before each feeding, and record the weight each time. By measuring the quantity of waste that the worms eat over the course of this composting activity, students can estimate the amount of waste diverted from landfill.
- 5 Discuss the role of decomposers in the food chain. Stress the importance of recycling organic material, and producing minerals essential for plant survival.



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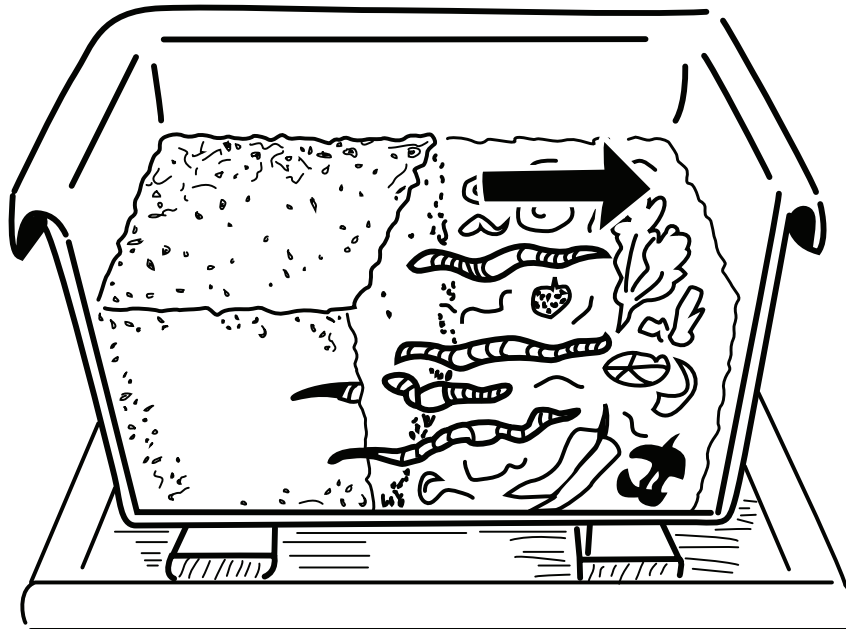




## On the menu...

In nature, worms dig tunnels to search for food. They eat plant and animal waste, as well as dead plants. In class, students can feed the worms with the following leftovers from snacks and lunches:

- all fruits (except citrus) and vegetables, and their peels
- baked beans
- cookies
- crackers
- grains
- pizza crusts
- bread
- noodles
- eggshells\*



\* It is important to add eggshells to worm food because the shells contain essential nutrients.

## Other activities

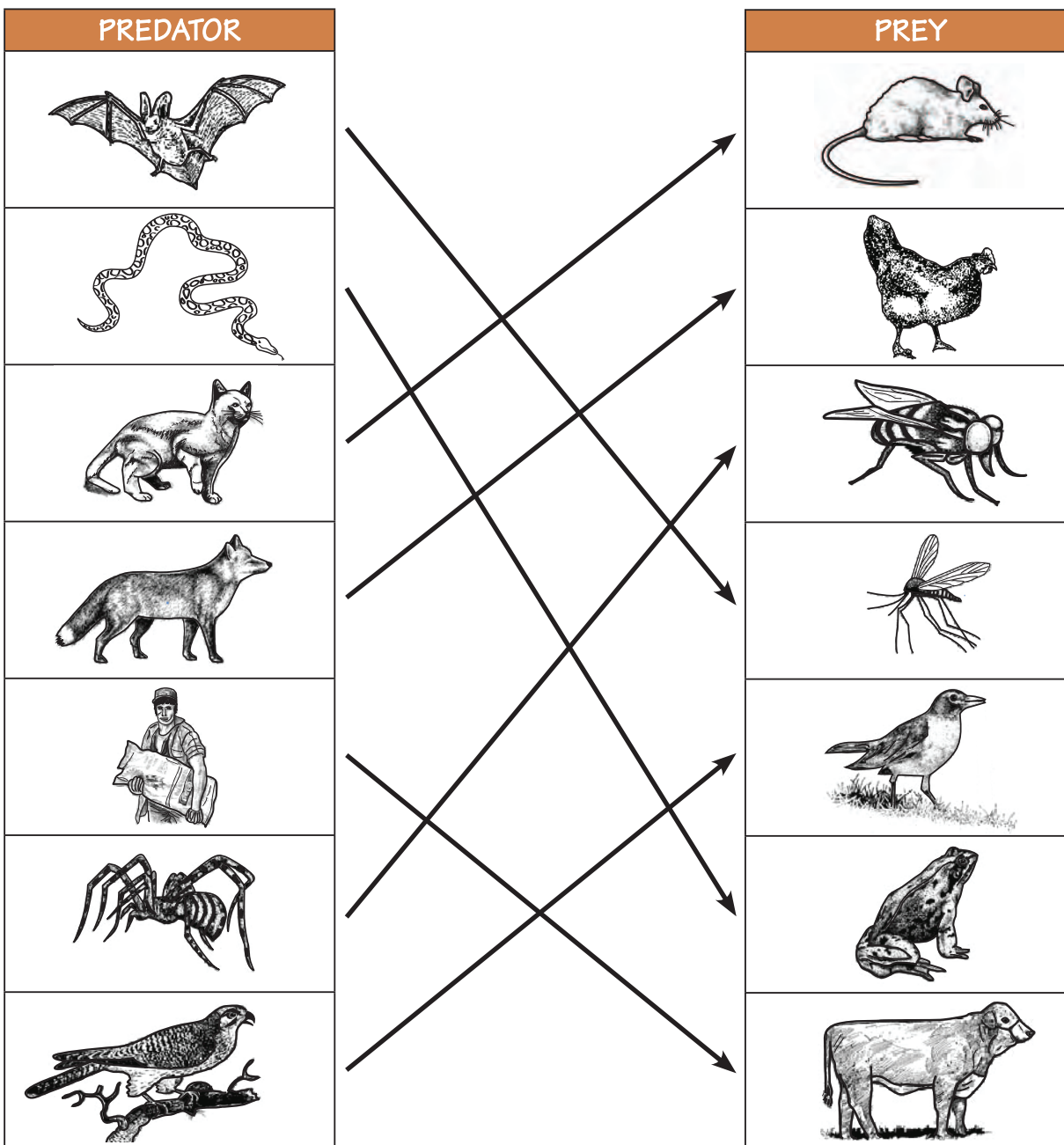
- 1 Distribute the activity sheet **A Food Chain at the Museum** to your students and ask them to complete it. Through this activity students study a food chain that includes the earthworm.
- 2 Use the humus produced by the earthworms to fertilize the plants at your school.



## WHAT'S FOR LUNCH ON THE FARM?

## Answers

Link each predator to its prey.


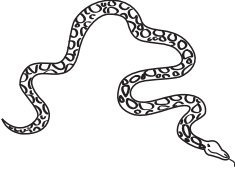

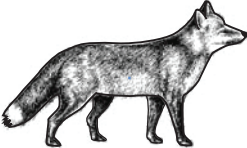











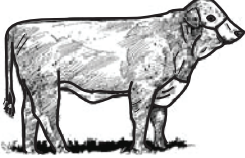
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## WHAT'S FOR LUNCH ON THE FARM?

Link each predator to its prey.

PREDATOR








PREY










# Science and Technology



## WHAT DOES IT EAT?

### Answers

Classify the following animals according to what they eat. Write down the animal's name under the column that best describes it.

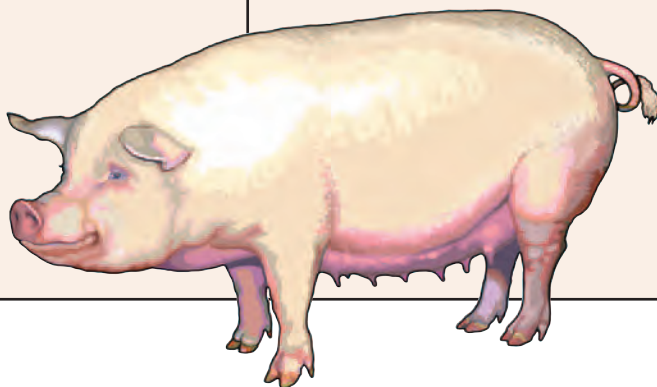
dog  
goat  
pig  
raccoon  
swallow

groundhog  
owl  
pigeon  
cat  
horse

cow  
fox  
mouse  
toad  
chicken

hare  
sheep  
snake  
donkey  
peregrine falcon

Herbivore Eats plants only	Omnivore Eats plants and animals	Carnivore Eats animals only
goat groundhog horse cow mouse pigeon hare sheep donkey	pig raccoon fox chicken	dog swallow owl toad cat peregrine falcon snake



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## WHAT DOES IT EAT?



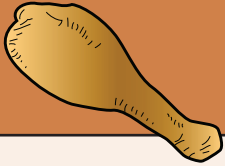
Classify the following animals according to what they eat. Write down the animal's name under the column that best describes it.

dog  
goat  
pig  
raccoon  
swallow

groundhog  
owl  
pigeon  
cat  
horse

cow  
fox  
mouse  
toad  
chicken

hare  
sheep  
snake  
donkey  
peregrine falcon

<b>Herbivore</b> Eats plants only 	<b>Omnivore</b> Eats plants and animals 	<b>Carnivore</b> Eats animals only 





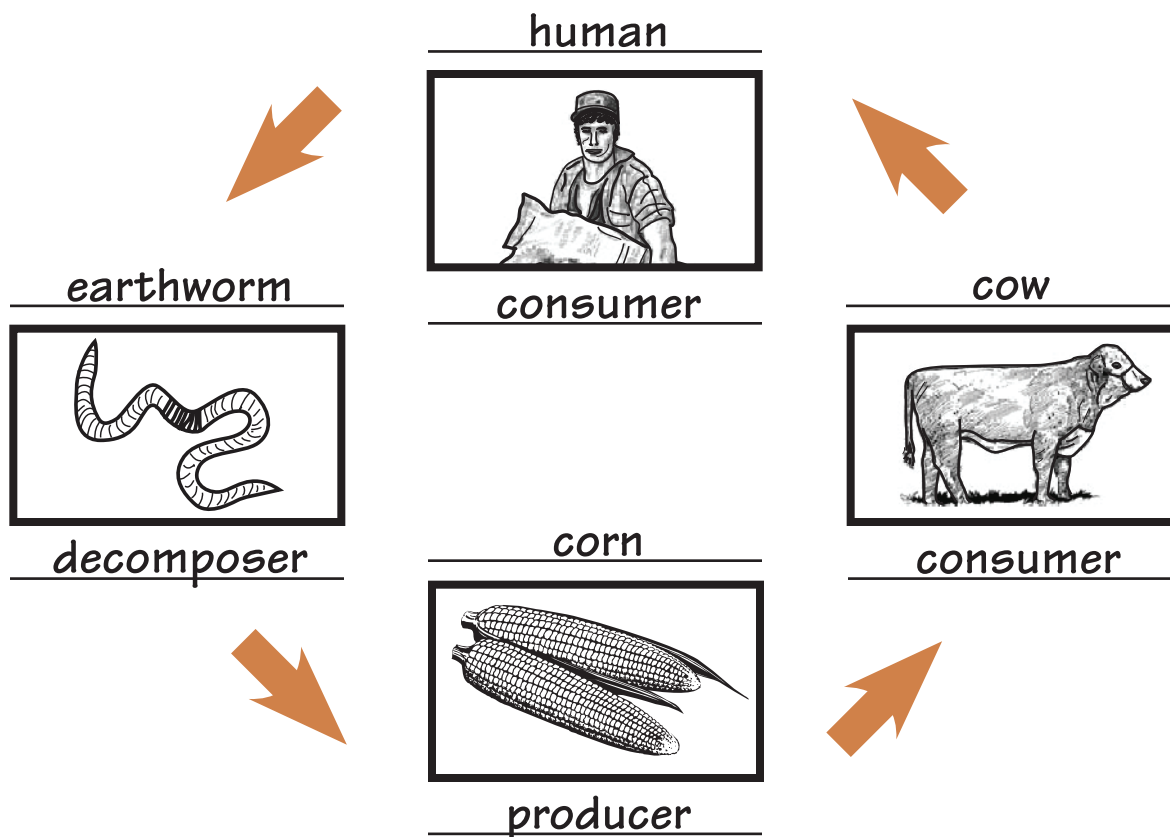
## Science and Technology



## A FOOD CHAIN AT THE MUSEUM

## Answers

Cut out the images of the organisms found at the Canada Agriculture Museum and glue them in the boxes below, in the correct order (following the direction of the arrows). Write the name of the organism above the image. Below each image, state whether the organism is a **producer**, a **consumer**, or a **decomposer** (see *Food Webs on the Farm* and the *Glossary* for more information).

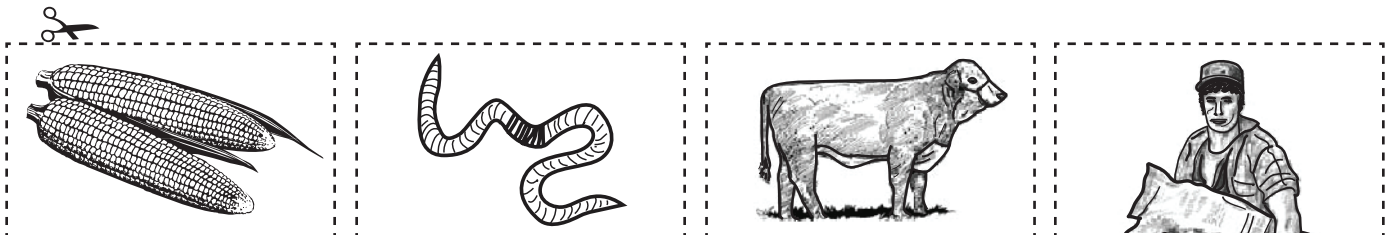


Name: \_\_\_\_\_

Date: \_\_\_\_\_

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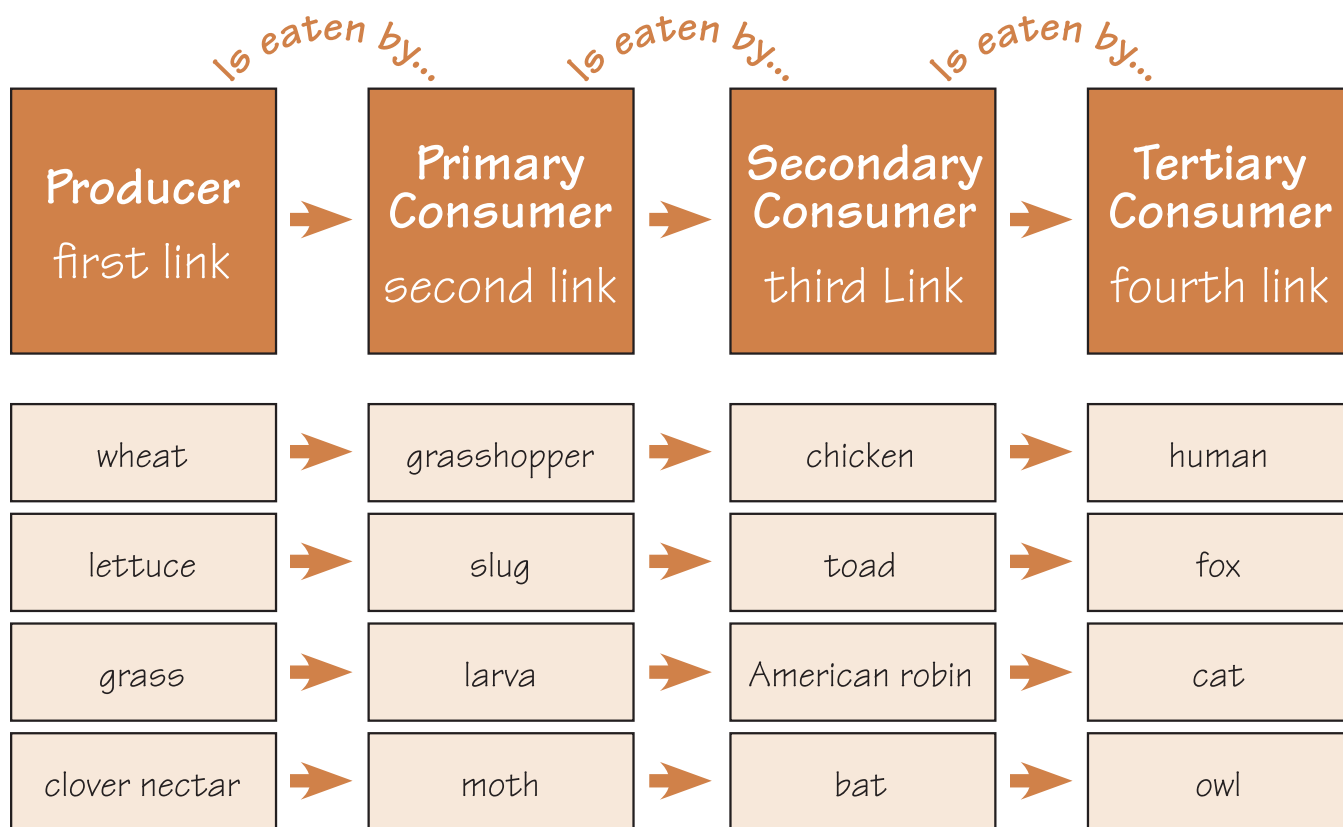
# Science and Technology

## LINKS OF A FOOD CHAIN



### Answers

Organisms are classified according to their role in the food chain. Fill in the empty boxes with the names of the organisms listed at the bottom of the page and reconstruct the four food chains.



### Organisms

larva  
wheat  
human

moth  
bat  
lettuce

cat  
chicken  
slug

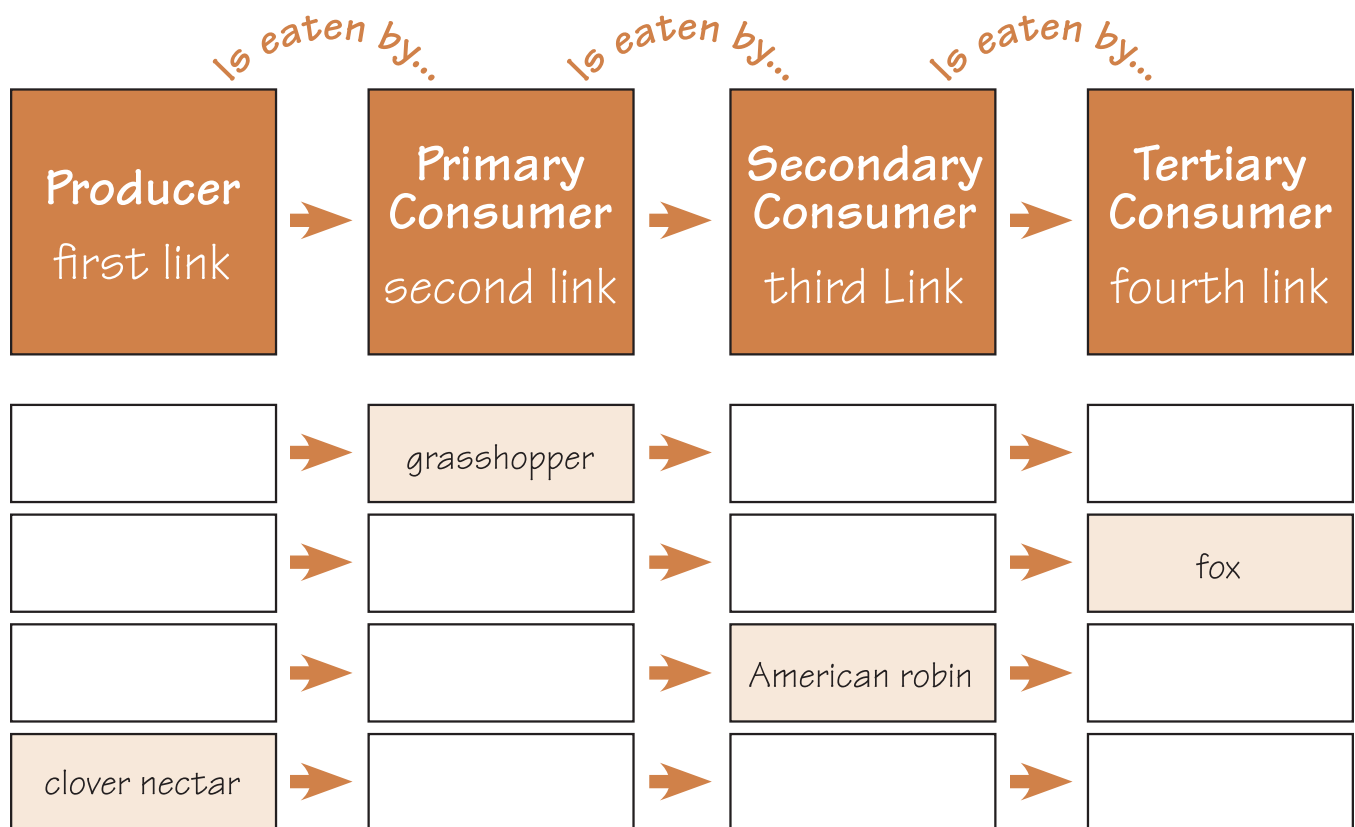
owl  
toad  
grass

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## LINKS OF A FOOD CHAIN

Organisms are classified according to their role in the food chain. Fill in the empty boxes with the names of the organisms listed at the bottom of the page and reconstruct the four food chains.



### Organisms

larva  
wheat  
human

moth  
bat  
lettuce

cat  
chicken  
slug

owl  
toad  
grass



## Science and Technology



### FOOD WEBS ON THE FARM

The Canada Agriculture Museum is a demonstration farm. It is an artificial habitat created by humans in response to their needs. It includes several communities of organisms that interact and form a network of **food chains**.

This activity familiarizes students with the concepts of **habitat** and **community** through research and a group game. Students also discover the interdependence and interactions between plants and animals living within a particular habitat — in this case, the Canada Agriculture Museum.

### Procedure

- 1 Assign each student to one of the organisms from the list below. Make sure that the first twenty organisms are handed out, since they are essential to making this activity work well. The more information sheets are used, the more fun and interesting the game will be.
- 2 Hand out the activity sheet **Food Chains on the Farm**. Each student will have to do some research to answer questions about their organism. These sheets will provide the basis for this **Food Webs on the Farm** activity. Remind students that they must fill out their organism chart according to the Canada Agriculture Museum habitat. They must think of species living on the Central Experimental Farm located in the middle of the City of Ottawa (where there are no wolves, coyotes, or bears).
- 3 Once the sheets have been filled in, the students are ready to play. Discuss the concepts of habitat and community with them. Explain that a habitat is an environment (such as a farm, a pond, or a forest) in which several populations of animal and plant species coexist. These different populations interact in various ways: some of them eat what others produce (e.g., bees eat flower nectar), and sometimes they compete for food (e.g., both the hare and the cow eat clover) and shelter (e.g., sparrows and swallows might fight over a birdhouse). Taken together, the plant and animal populations in a given environment create a community. Within this community, each of the populations plays an essential role in the survival of other populations, and is part of a network of food chains called a **food web**.

continued...



## Procedure (continued)

- 4 Attach your sun card to the blackboard. Explain to your students that the sun is an indispensable source of energy at the core of a food chain. All other organisms occupy roles as producers, consumers, or decomposers. Food chains are systems in which the energy of the sun is transferred to plants, then animals. The plant or animal then becomes food for another species, which in turn becomes food for another species, and so on. In a habitat, one doesn't find independent food chains, but many interdependent and complex chains that are called food webs. How many animals eat grass? Peregrine Falcons do not eat just pigeons, but many different kinds of birds. All the food chains that are linked in a habitat form what we call a **food web**.
- 5 Ask students with **producer** organisms to attach their sheets to the blackboard. What is the link between these organisms and the sun? **Producer** organisms are the green plants, and the energy of the sun is essential to their survival (**photosynthesis**). These are the only living things that can transform the energy of the sun into food; this makes them the first link in the food chain.
- 6 Ask students with **herbivore** consumer organisms to attach their sheets to the blackboard. What do these animals eat? **Herbivores** are primary, or first-level, consumers because they digest plant matter to feed themselves and build animal tissue. Ask students to draw an arrow linking plants to herbivores.
- 7 Do the same exercise with **carnivore** consumer organisms. **Carnivores** are called second-level, or **secondary**, consumers, because they eat first-level consumers. Herbivores often serve as food for carnivores. Others are **tertiary** consumers, or third level consumers, and so on, depending on who eats whom. Carnivores eat **prey** animals and digest the animals' tissues to feed themselves and build their own tissues. Invite students with sheets for **third-level consumers**, then **fourth-level consumers**, to attach their sheets to the blackboard. Don't forget to draw arrows linking each living being with others as appropriate.
- 8 Repeat the exercise introducing omnivores, and explain to students that **omnivores** eat a variety of foods — including plants and meats from both producers and consumers. Omnivores are less likely to become extinct, because they eat animals and plants, depending on their availability. They are thus less affected by droughts and other changes in their environment that affect food sources.
- 9 Repeat the exercise introducing **decomposers**. Decomposers are animals (e.g., millipedes, earthworms) and other organisms such as chlorophyll free plants (that cannot convert the energy of the sun into food), bacteria, moulds, or mushrooms, which help to break down dead organisms (vegetable and animal), as well as their wastes. Decomposers transform wastes into minerals and return them to the soil. Thanks to these minerals, green plants can produce food, and the cycle begins all over again.

continued...





## Procedure (continued)

This is a fun activity for students. It illustrates the many possible links between different organisms, reinforcing the concept of interdependence between different species, and the importance of each in the survival of others.

## List of Organisms

Teacher's card: sun

- |    |                |    |                  |
|----|----------------|----|------------------|
| 1  | earthworm      | 16 | peregrine falcon |
| 2  | housefly       | 17 | mosquito         |
| 3  | clover         | 18 | bat              |
| 4  | oat            | 19 | American robin   |
| 5  | corn           | 20 | pig              |
| 6  | grasshopper    | 21 | skunk            |
| 7  | cow            | 22 | toad             |
| 8  | chicken        | 23 | grass snake      |
| 9  | fox            | 24 | horse            |
| 10 | praying mantis | 25 | hare             |
| 11 | human          | 26 | larder beetle    |
| 12 | mouse          | 27 | sheep            |
| 13 | cat            | 28 | wheat            |
| 14 | spider         | 29 | mould            |
| 15 | pigeon         | 30 | springtail       |



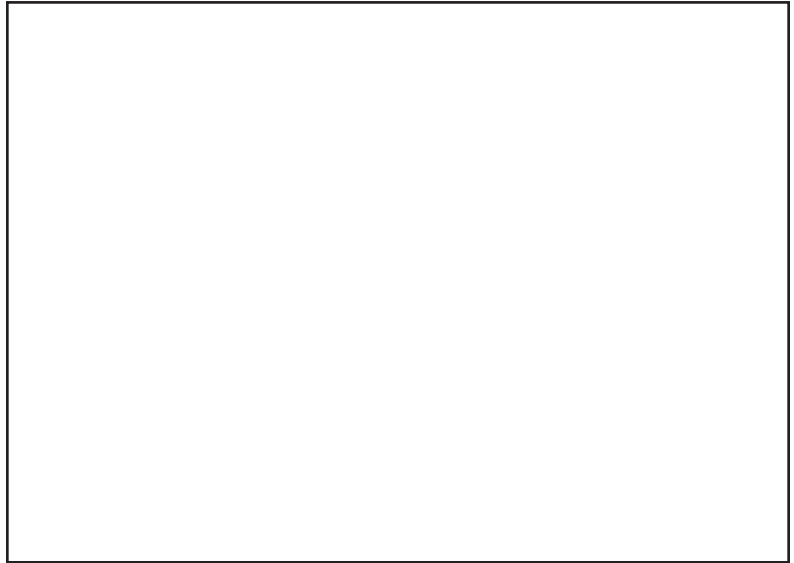
Name: \_\_\_\_\_

Date: \_\_\_\_\_

## FOOD CHAINS ON THE FARM

Name of organism:

Picture or drawing of organism:



For each question, circle the answer that applies to your organism:

**1** What role does your organism play in the food chain?

- a) It is a producer, and makes food.
- b) It is a consumer, and eats other organisms (plants or animals).
- c) It is a decomposer, and breaks down dead plants and animals, as well as their waste.

**2** If your organism is a consumer, what does it eat?

- a) It eats only plants, so it is a herbivore.
- b) It eats only animals, so it is a carnivore.
- c) It eats a variety of foods (plants and animals), so it is an omnivore.

continued...

3 If your organism is a consumer, make a list of the foods it eats.

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4 What eats your organism?

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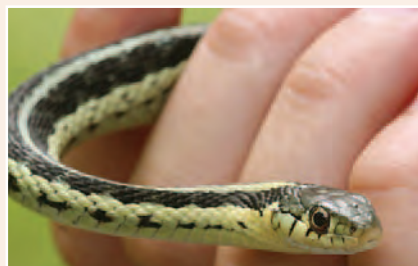
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## Science and Technology



# FOOD CHAINS ON THE FARM

## Answers



The following pages contain the answers for the **Food Chains on the Farm** activity sheets. Because of the range of potential answers, your students' responses may vary slightly from the options listed below.

To help you establish links between the different organisms featured in this game, and the examples provided, featured organisms are indicated in bold in the answers to questions 3 and 4.



### 1 earthworm



#### 1) What is its role in the food chain?

c) As a decomposer, it breaks down dead plants and animals, as well as their wastes.

#### 4) What eats your organism?

Several species of birds (**chicken**, **American robin**, etc.), **fox**, **toad**, mole, raccoon, **skunk**, **grass snake**, leech, slug, certain beetles, etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 2 housefly



#### 1) What is its role in the food chain?

c) As a decomposer, it breaks down plants and dead animals, as well as their wastes (in its larval stage).

#### 4) What eats your organism?

**Spider**, wasp, **praying mantis**, **toad**, frog, insect-eating birds (**American robin**), etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

continued...



## Answers (continued)

### 3 clover



#### 1) What is its role in the food chain?

a) As a producer, it creates food.

#### 4) What eats your organism?

Birds (goose, **chicken**, etc.), herbivorous insects (**grasshopper**, bee, **mosquito**, etc.), herbivorous mammals (**cow**, goat, **sheep**, hare, **horse**, etc.), and omnivores (**pig**, etc.).

Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 4 oats



#### 1) What is its role in the food chain?

a) As a producer, it creates food.

#### 4) What eats your organism?

Birds (**pigeon**, **chicken**, goose, sparrow, etc.), herbivorous mammals (**cow**, goat, **sheep**, hare, **horse**, etc.) and omnivores (**pig**, **mouse**, **human**, etc.). Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 5 corn



#### 1) What is its role in the food chain?

a) As a producer, it creates food.

#### 4) What eats your organism?

Birds (**pigeon**, **chicken**, goose, etc.), herbivorous insects (**grasshopper**, corn weevil, etc.), herbivorous mammals (**cow**, etc.), and omnivores (**pig**, raccoon, **mouse**, **human**, etc.).

Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 6 grasshopper



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Herbaceous plants (all non woody plants—any plant that is not a tree or bush—such as **clover**, grass, dandelion, **corn**, barley, **oats**, **wheat**, soybean, etc.), and the fruits and leaves of certain shrubs and trees.

#### 4) What eats your organism?

Insects (**praying mantis**, **spider**, etc.), birds (**American robin**, **chicken**, etc.) and carnivorous or omnivorous animals (**fox**, **skunk**, etc.). Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

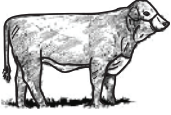
continued...





## Answers (continued)

### 7 cow



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Fodder plants (grass, **clover**, alfalfa, etc.) and cereal plants, either whole or as grain (**corn**, barley, **oats**, etc.).

#### 4) What eats your organism?

**Human** and **mosquito**. Decomposers eat the wastes of this organism and eat the organism itself after it dies.

### 8 chicken



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

c) It eats a variety of foods (plant and animal), so it is an omnivore.

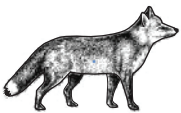
#### 3) If your organism is a consumer, make a list of what it eats.

Grain of all kinds (**wheat**, **barley**, **oats**, **corn**, flax, etc.), fodder plants (grass, **clover**) and insects (**grasshopper**, **earthworm**, **larder beetle**, **spider**, **praying mantis**, etc.).

#### 4) What eats your organism?

**Human**, **fox**, and **mosquito**. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 9 fox



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

c) It eats a variety of things (plant and animal), so it is an omnivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Small mammals (**mouse**, **squirrel**, **hare**, rabbit, beaver, etc.), insects (**grasshopper**, etc.), **earthworm**, crayfish, plants (berries and other fruits), birds (**chicken**, etc.), eggs, amphibians (frog, **toad**), reptiles, fish, garbage, etc.

#### 4) What eats your organism?

**Dog** and **mosquito**. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

continued...



## Answers (continued)

### 10 praying mantis



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

3) If your organism is a consumer, make a list of what it eats.

It eats any insect that moves, and which is either smaller or the same size as itself (grasshopper, bug, fly, springtail, locust, bee, mosquito, caterpillar, spider, other praying mantis, etc.), hummingbird, and mouse.

4) What eats your organism?

Birds (American robin, chicken, etc.), bat, larger praying mantis, spider, toad, frog, and lizard. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 11 human



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

c) It eats a variety of foods (plants and animals), so it is an omnivore.

3) If your organism is a consumer, make a list of what it eats.

Oats, corn, wheat, chicken, cow, sheep, pig, hare, horse, etc.

4) What eats your organism?

Mosquitoes and decomposers (which eat human wastes and humans themselves after they die).

### 12 mouse



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

3) If your organism is a consumer, make a list of what it eats.

Grains (wheat, barley, oats, corn, soybean), fruits and vegetables.

4) What eats your organism?

Particularly the cat, the owl and the grass snake, but also the dog, sparrow hawk, weasel, raccoon, fox, marmot, skunk, praying mantis, mosquito, etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

continued...



## Answers (continued)

### 13 cat



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

3) If your organism is a consumer, make a list of what it eats.

Mouse, bat, birds (American robin, pigeon), grass snake, toad, frog, etc.

4) What eats your organism?

Mosquitoes and decomposers (which eat the wastes of this organism, and eat the organism itself after it dies).

### 14 spider



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

3) If your organism is a consumer, make a list of what it eats.

Insects (other spiders, grasshopper, housefly, mosquito, praying mantis, larder beetle, springtail, etc.).

4) What eats your organism?

Birds (chicken, American robin), insects (wasp, spider, praying mantis), reptiles, and amphibians (frog, toad). Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 15 pigeon



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

3) If your organism is a consumer, make a list of what it eats.

All sorts of grains (barley, oats, corn, wheat, soybean, etc.).

4) What eats your organism?

Particularly the cat, birds of prey (peregrine falcon), owl, and mosquito.

continued...



## Answers (continued)

### 16 peregrine falcon



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

3) If your organism is a consumer, make a list of what it eats.

Birds (American robin, pigeon, etc.)

4) What eats your organism?

Mosquitoes and decomposers (which eat the waste of the falcon and eat the falcon itself after it dies).

### 17 mosquito



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

c) It eats a variety of things (plants and animals), so it is an omnivore.

3) If your organism is a consumer, make a list of what it eats.

The larvae consume algae, bacteria, and organic debris; the adults eat sap or nectar (clover) and the female needs to eat blood (from all-warm or cold-blooded animals: human, fox, chicken, cow, sheep, pig, skunk, peregrine falcon, mouse, cat, pigeon, toad, bat, grass snake, horse, American robin, hare) to make its eggs.

4) What eats your organism?

Water and land insects (spider, praying mantis), fish, amphibians (frog, toad), birds (American robin), bat, etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 18 bat



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

3) If your organism is a consumer, make a list of what it eats.

A variety of nocturnal insects (night butterflies, moths, mosquito, etc.).

4) What eats your organism?

Cat, skunk, raccoon, grass snake, mosquito, certain owls and birds of prey. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

continued...



## Answers (continued)

### 19 American robin



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

c) It eats a variety of things (plants and animals), so it is an omnivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Worms (**earthworm**), insects (**grasshopper**, **praying mantis**, **larder beetle**, **spider**, etc.) and fruits.

#### 4) What eats your organism?

**Cat**, owl, raccoon, squirrel, crow, birds of prey (**peregrine falcon**), **grass snake**, **mosquito**, etc. Decomposers eat the waste of this organism, and eat the organism itself after it dies.

### 20 pig



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

c) It eats a variety of things (plants and animals), so it is an omnivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Fodder plants (**clover**), and agricultural crops (barley, **wheat**, **oats**, **corn**, soybean, etc.), roots and tubers, animal byproducts (bloodmeal, fishmeal, and bonemeal), table scraps, etc.

#### 4) What eats your organism?

Human, **mosquito**, and decomposers (which eat pig wastes, and the pig itself after it dies).

### 21 skunk



#### 1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

#### 2) If your organism is a consumer, what does it eat?

c) It eats a variety of things (plants and animals), so it is an omnivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Insects — all worms (**earthworm**), **grasshopper**, grub, bee, wasp, etc. — **mouse**, squirrel, **bat**, eggs, fruits, several varieties of plants, garbage, etc.

#### 4) What eats your organism?

Lynx, large birds of prey, and **mosquito**. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

continued...





## Answers (continued)

### 22 toad



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

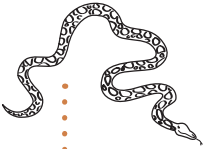
3) If your organism is a consumer, make a list of what it eats.

Worms (**earthworm**), slug, insects (**grasshopper**, **mosquito**, **housefly**, **praying mantis**), etc.

4) What eats your organism?

Heron, mammals (**cat**, **fox**, etc.), **grass snake**, and **mosquito**. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 23 grass snake



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

b) It eats only animals, so it is a carnivore.

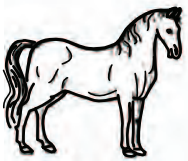
3) If your organism is a consumer, make a list of what it eats.

**Mouse**, amphibians (frog, **toad**, salamander, etc.), **earthworm**, birds (**American robin**), **bat**, fish, other **grass snakes**, etc.

4) What eats your organism?

Raccoon, **fox**, mink, **skunk**, large frogs, birds of prey (buzzard), **cat**, **mosquito**, other **grass snakes**, etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 24 horse



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

3) If your organism is a consumer, make a list of what it eats.

Fodder plants (grass, **clover**, bird's foot trefoil, alfalfa, etc.) and cereal grains (barley, **oats**, etc.), vegetables (carrot, etc.) and fruits (apple, etc.).

4) What eats your organism?

**Mosquito**, **human**, and decomposers (which eat horse waste, and eat the horse itself after it dies).

continued...



## Answers (continued)

### 25 Hare



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

3) If your organism is a consumer, make a list of what it eats.

Herbaceous plants (non woody plants such as grass, **clover**, dandelion, lupin, etc.), vegetables (carrot, cabbage, etc.), leaves of shrubs, buds, bark, etc.

4) What eats your organism?

**Fox**, owl, and other birds of prey, mink, **human**, **mosquito**, etc. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 26 larder beetle



1) What is its role in the food chain?

c) As a decomposer, it breaks down dead plants and animals, as well as their wastes.

4) What eats your organism?

Insects (other **larder beetles**, **spiders**, etc.) and birds (**American robin**, **chicken**, etc.).

Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 27 sheep



1) What is its role in the food chain?

b) As a consumer, it eats other organisms (plants or animals).

2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

3) If your organism is a consumer, make a list of what it eats.

Fodder plants (grass, **clover**, bird's foot trefoil, alfalfa, etc.) and cereal plants (barley and **oats**).

4) What eats your organism?

**Human** and **mosquito**. Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 28 wheat



1) What is its role in the food chain?

a) As a producer, it creates food.

4) What eats your organism?

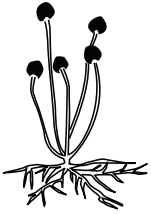
Grain eating birds (**pigeon**, **chicken**, etc.), herbivorous animals (**mouse**, etc.) or omnivores (**human**, **pig**) and herbivorous insects (**grasshopper**, etc.). **Decomposers** eat the wastes of this organism, and eat the organism itself after it dies.

continued...



## Answers (continued)

### 29 mould



#### 1) What is its role in the food chain?

c) As a decomposer, it breaks down dead plants and animals, as well as their wastes.

#### 4) What eats your organism?

Very small insects (**springtail**: it is a decomposer, but also eats moulds and mushrooms).  
Decomposers eat the wastes of this organism, and eat the organism itself after it dies.

### 30 springtail



#### 1) What is its role in the food chain?

c) As a decomposer, it breaks down dead plants and animals, as well as their wastes.

#### 2) If your organism is a consumer, what does it eat?

a) It eats only plants, so it is a herbivore.

#### 3) If your organism is a consumer, make a list of what it eats.

Moulds and the mycelium of funguses.

#### 4) What eats your organism?

Carnivorous insects (young **praying mantis**, **spider**, dust mite, beetle, ant, etc.).

Decomposers eat the wastes of this organism, and eat the organism itself after it dies.





## Science and Technology

# THE ANIMAL BY-PRODUCTS TREASURE HUNT



Even though they are raised by humans to produce food, farm animals also supply us with a wide range of products that we use every day. In this activity, students learn that their dependence on farm animals goes beyond food and that, all day long and without knowing it, they consume by-products derived from animal husbandry.

**By-product: a secondary product resulting from the production of a primary product.**

Ask your students why humans raise farm animals. Explain that we use more than the meat, milk, and eggs produced on the farm. Each part of an animal is recycled and used to make another product. The **by-products** of animal husbandry are all the products other than those for which the animal was raised. For example, on a farm where poultry is raised for eggs, the eggs are the product, while the poultry meat is a by-product.

Ask several questions about animal by-products and allow your students to reflect on the place these products occupy in their everyday lives. You can use the Appendix **Farm Animal By-Products**, as a guide. Inform the students about the important role that animals play in medical research, the development of vaccines, cosmetics, accessories, and hygiene products. More than 350 pharmaceutical products are based on animal by-products.

## Treasure Hunt

- 1 Hide a few animal by-product objects in the classroom (e.g., toothpaste, leather gloves, etc.; see Appendix for more examples).
- 2 Have students work in pairs to find objects made from farm animals in the classroom and on their classmates.
- 3 Set a time limit. When the time is up, compare answers.
- 4 As a reward, the class could watch a film about farm animals or have a snack that contains a by-product, such as gummy bears, marshmallows, or vegetables and dip (the gelatin found in candy and dips is an animal by-product).

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## AND IF THEY DISAPPEAR FOREVER...

Each link of the food chain plays an important role in the survival of the other links. If all producer organisms disappeared from the planet, what would happen to the consumers and decomposers?

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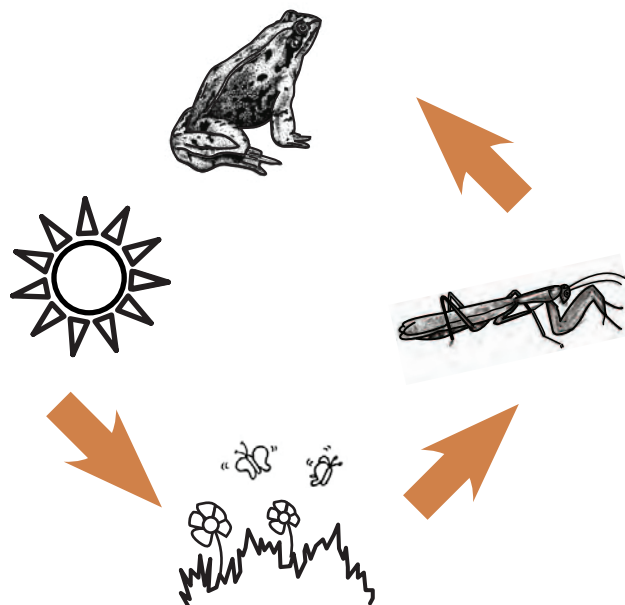
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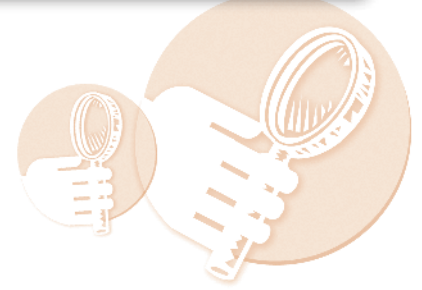
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## Language

THE CANADA GOOSE  
READING EXERCISE

## Answers

This reading exercise informs students about a type of wild animal whose population is greatly affected by modern agriculture. Students learn about the Canada goose habitat, the impact of human activity on this species, and cohabitation between geese and humans. A vocabulary list helps students understand the text and answer questions about it.

For more information on Canada geese, please visit the **Hinterland Who's Who** website at [www.hww.ca](http://www.hww.ca).

1 Where does the Canada goose nest?

In the same location as its parents.

2 What practices helped to re-establish Giant Canada goose populations?

a) Giant Canada geese raised in captivity were released.

b) Canada goose sanctuaries were created.

c) Restrictions were placed on hunting.

3 What type of habitat do Canada geese prefer?

Vast expanses of wet grassy fields near ponds and lakes.

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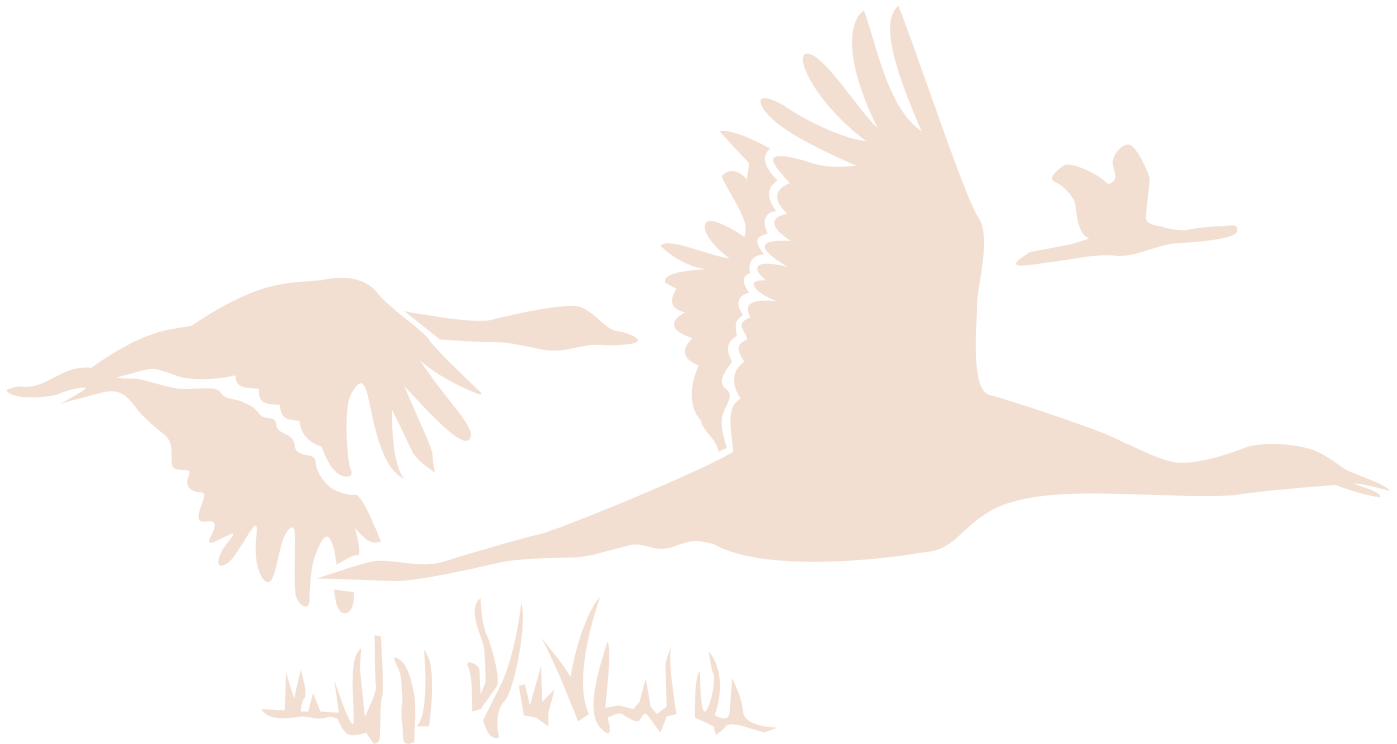
## Answers (continued)

4 How does modern agriculture benefit the Canada goose?

The large fields prevent Canada goose predators from approaching without being seen and provide corn and grain leftover from the harvest. Agricultural land provides Canada geese with rich diets during their migration.

5 What types of problems can Canada geese cause in cities?

Droppings (excrement) on lawns and beaches can contaminate drinking water and Canada geese can be aggressive toward humans.



Name: \_\_\_\_\_

Date: \_\_\_\_\_

## THE CANADA GOOSE

Every spring, **Canada geese** fly north in large V formations. They return to **nest** where their parents nested, sometimes using the same nest every year. In the fall, dozens of goose families gather for the long voyage back. More than eight million birds **migrate** south.



In a world in which too many species are threatened by human activity, Canada geese are an exception, even though their numbers have not always been as great. Toward the end of the 1800s, one species of goose, the giant Canada goose, almost disappeared. It is believed that pioneers collected the eggs and hunted during the **moulting** season, when the geese lost their feathers and could not fly. To allow the **population** to rebuild, Canada geese raised in captivity were released. Through this **reintroduction** program, as well as the creation of **sanctuaries** and hunting restrictions, Canada geese have made their way back into Ontario, southern Alberta, and even to areas where they have never been before.

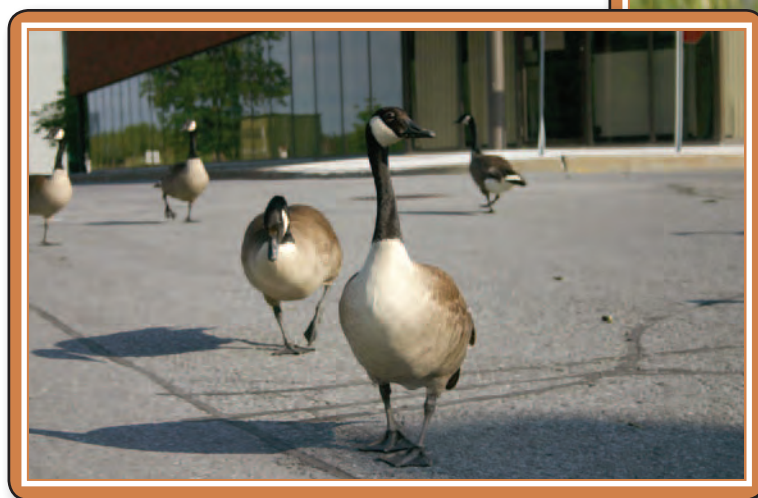
Canada geese can live in many **habitats**, but prefer vast wet grassy fields near ponds and lakes where they can hide from **predators** (foxes, wolves, coyotes, bears, etc.). This explains why the Canada goose has benefited from modern agriculture. The large fields prevent Canada goose predators from approaching without being seen and provide corn and grain leftover from the harvest. Agricultural lands provide Canada geese with rich diets during their migrations.

continued...

## The Canada Goose (continued)

Canada geese also live in parks, on lawns, and golf courses because they can find safety and food there. Since hunting is prohibited in these areas and there are very few predators, Canada goose populations continue to increase in **urban areas**. This causes problems. **Droppings** (excrement) on lawns, fields, and beaches can **contaminate** drinking water and Canada geese can be aggressive toward humans.

Despite these problems, the Canada goose is one of the greatest success stories of **cohabitation** between a wild species and human beings. It is an excellent example of the conservation of a wild species.





## VOCABULARY

### The Canada Goose

**Canada goose** wild North American goose

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**cohabitation** living together in the same territory

---

**conservation** maintaining the same state

---

**contaminate** introducing unwanted micro-organisms (microbes) into an environment

---

**droppings** animal or bird excrement

---

**habitat** environment in which several animal or plant populations live together

---

**migrate** seasonal movement of certain animal populations from one geographic location to another

---

**moult** shedding of feathers, skin, or fur

---

**nest** make a nest

---

**population** animals or plants of the same species living in a given habitat or area

---

**predator** eats animal prey captured live

---

**sanctuary** area created to protect animal species

---

**reintroduction** introduction of a species to an area where it has disappeared

---

**urban area** area of land occupied by a city

---

Name: \_\_\_\_\_

Date: \_\_\_\_\_

# THE CANADA GOOSE

## Questions

1 Where does the Canada goose nest?

\_\_\_\_\_

2 What practices helped to re-establish Giant Canada goose populations?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3 What type of habitat do Canada geese prefer?

\_\_\_\_\_

4 How does modern agriculture benefit the Canada goose?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

5 What types of problems can Canada geese cause in cities?

\_\_\_\_\_

\_\_\_\_\_





## Appendix

### FARM ANIMAL BY-PRODUCTS



**fatty acid** chain made of carbons, hydrogen, and oxygen that makes fat

**gelatin** jelly produced when the skin and bones of animals are boiled; collagen is the main component of gelatin; gelatin is clear, colourless, and has a structure similar to glue

**glycerin** clear, colourless liquid that is a by-product of the manufacture of soap and certain fatty acids

**lanolin** greasy yellowish substance secreted by sheep's skin, which lubricates the wool

**rennet** coagulating enzyme that comes from the stomach (abomasum) of young ruminants

**Fun Fact** 45% of an animal raised for food is actually used to produce other things!

### USES OF FARM ANIMAL BY-PRODUCTS

Please note that these are only some of the many products derived from animals.

**bones and hoofs** buttons, piano keys, porcelain

**collagen** (beef and pork) construction of artificial skin for burn victims

**down** clothes, bedding, pillows, fishing tackle, arrows

**egg whites** ceramics and varnish

**fatty acids** plastics, rubber, lubricants, fluids, brake fluid, antifreeze, tires, lubricant and softener for fibres and fabrics, lubricant and plasticiser used in paper manufacturing



continued...



## Appendix (continued)

**gelatin** canned meat, Jell-O, candies (gummy bears), stabilizer, thickener or texturizing agent for foods (e.g., ice cream, mayonnaise, yogourt, cream cheese, jam, light foods and frozen foods), clarifying agent for liquids (e.g., fruit juice, vinegar, wine, and beer), medication capsules, crayons, glue, photographic film and paper, matches, sand paper, and high-gloss paper

**glycerin (glycerol)** lipstick and other cosmetics, soap, toothpaste, mouthwash, moisturizers, skin products, cough syrups, food (as a sweetener, for moisture retention, and as a solvent), video tape, photographic and x-ray film, car polishing products, plastics, cellophane, and antifreeze fluids

**hair** paint brushes

**heart valve** heart transplants

**intestines** strings for musical instruments, medical sutures

**lanolin** soap, shaving cream, makeup, skin cream and lotion

**leathers** furniture, clothing, purses, footballs, baseball gloves and balls

**manure, blood, bones, and feathers** fertilizer

**purified bone powder** sugar refiner

**rawhide (skin)** glue

**rennet** cheese

**suet** latex gloves, bird food, soap, candles, biodiesel fuel, lubricant in steel manufacturing

**wool\*** clothes, blankets, and felt



\*Wool is considered a by-product in Canada because sheep are usually raised for meat.



## GLOSSARY

**by-product** something produced in addition to the primary product

**carnivore** eats only animals

**cohabitation** living together in the same territory

**community** populations of plants and animals that occupy a habitat and interact among themselves

**consumer** organism that eats other living beings; can be a herbivore, carnivore, or omnivore

**degradation** replacement of a plant formation with another generally less diverse plant formation

**environment** area (ecosystem) where a living being or species lives

**food chain** a series of living organisms each dependent on the next for food

**food web** complex and interdependent food chains linked to each other

**habitat** an environment in which several animal or plant populations live together

**herbivore** eats only plants

**interaction** activity or sharing between organisms

**link** connection or part of a chain

**omnivore** eats both plants and animals

**organism** living being (animal or plant)



continued...



**photosynthesis** biochemical process that converts light energy into energy:  
 $\text{carbon dioxide} + \text{water} + \text{light} = \text{glucose} + \text{oxygen}$

**population** animals or plants of the same species living in a given environment or area

**predator** eats animal prey captured live

**prey** living being captured and eaten by another animal

**producer** organism capable of making its own food (organisms like mushrooms) at the bottom of the food chain

**product** the results of an activity

