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Wetlands
and the
World

Milieux humides
sans
frontiers

A Lesson Plan for English Language Learners (ELL)



Ducks Unlimited Canada
Canards Illimités Canada

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Wetland ecosystems are an important part of Canada's natural capital and provide goods and services that are essential to the sustained health of our environment and economy. More than 25% of the world's wetlands and 20% of the fresh water are found in Canada. However, in the most developed parts of southern Canada more than 70% of the wetlands have been lost to other land uses and many of those that remain have been impacted. This destruction of wetlands means the loss of productive wildlife habitat, biodiversity and vital sources of clean and reliable water for people.

Ducks Unlimited Canada is a non-profit organization and since 1938 it has worked to protect, conserve, restore and enhance wetland habitats for the benefit of North America's waterfowl, wildlife and people. As part of these efforts we recognize the urgent need to educate and engage more people in their protection, helping them to understand the essential role that these rich and diverse ecosystems play in our own health and Canada's future.



Project Webfoot is an international, interdisciplinary environmental education program. It links to the school curriculum across the country and offers teachers and students the chance to explore and learn about the importance of wetlands. It includes free teaching resources and in many parts of the country free field trips or in class presentations.

For current information about Project Webfoot in your region please visit our website at education.ducks.ca.

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About Wetlands and the World

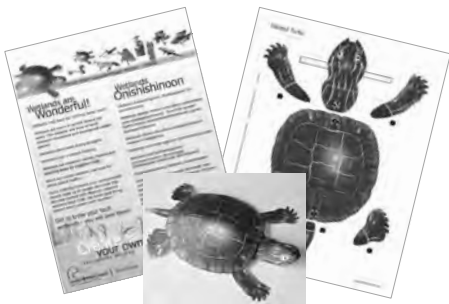
There is significant cultural diversity in Canada and every year hundreds of thousands of new Canadians arrive from countries around the world. Ducks Unlimited Canada recognizes that conservation efforts must cross cultural boundaries to remain a core Canadian value.

Wetlands and the World provides ways for exploring wetlands across cultures and for recognizing the value of wetlands in maintaining a healthy world for all of us. Like all of the resources, programs and activities offered by Ducks Unlimited Canada, it is linked to the elementary school curriculum across Canada. In Ontario this includes the Gr.1 – 8, Science and Technology Curriculum (2007) *Grade 4: Habitats and Communities* and *Grade 6: Biodiversity* units, although many other curriculum links exist. The project is designed to increase your students' understanding and appreciation of wetlands but it also includes lessons and resources to assist in English Language Literacy (ELL) development. It also recognizes that many classes contain students who are at different stages in their literacy development and provides opportunities to accommodate this.

This project consists of three parts:

Kids and Wetlands Go Together includes a world map highlighting wetlands and the important role they play around the world.

AVAILABLE: In English and French with quotes in 19 different languages. Available on CD or as a free downloadable .pdf file from our website at education.ducks.ca. Also available on request from Ducks Unlimited Canada.



Wetlands are Wonderful! Bilingual pieces in English (or French) as well as a secondary language (including Arabic, Chinese, Cree, French, Korean, Ojibwe, Punjabi, Somali, Spanish and Vietnamese). Each language piece includes one of ten different wetland creatures which can be used to create 3-D paper models, along with natural history notes.

AVAILABLE: On CD or as a .pdf from our website at education.ducks.ca in full colour or as black and white line drawings for children who want to colour their own animal model before putting it together.

Wetlands and the World: Resources for Literacy. (English only)
Designed to help in English literacy development while addressing the elementary science curriculum this includes:

- information for teachers, student activities which may be reproduced for classroom use
- Picture Dictionary to assist in vocabulary development.
- Powerpoint presentation *Wetlands Around the World* (.pdf format)
- Ideas for involving families and to undertake environmental action projects

AVAILABLE: On CD. The "Wetlands Around the World" Powerpoint can be downloaded from education.ducks.ca



Please see the **Educators' Notes**, **Wetlands and the World** for more information about the individual parts of this resource, including the plant and animal images, the Animal Model - Nature Notes and map captions.



Ducks Unlimited Canada funds wetland field trips and other programs for students in communities across Canada through the generous support of many sponsors. The Ontario Trillium Foundation is one of these sponsors and has generously sponsored the creation of these resources.

Curriculum Connections

As educators know, curriculum guidelines are regularly reviewed and renewed. In recent years, the curriculum in many parts of Canada has been re-written to incorporate important issues relating to the environment, sustainability, and Canada’s changing demographics. In addition, there has been renewed support for outdoor education and allowing students to experience nature first hand in order to combat “nature deficit disorder” a term coined by Richard Louv in his book *Last Child in the Woods: Saving Our Children from Nature -Deficit Disorder* (2006). Ducks Unlimited Canada’s school-based program, Project Webfoot, and Wetlands and the World are linked to the science curriculum but are also designed with curriculum reform in mind.

Wetlands and the World, was developed in Ontario and its lessons are linked to the **Gr.1 – 8, Science and Technology Curriculum (2007)**, aligning closely to the *Grade 4: Habitats and Communities* (pg. 84 – 86) strand.

The lessons in *Wetlands and the World* address the Fundamental Concepts for Grade 4 outlined below:

FUNDAMENTAL CONCEPTS	BIG IDEAS <i>(These are the broad, important understandings that students should retain long after they have forgotten many of the details of something that they have studied.)</i>
Systems and Interactions Sustainability and Stewardship	Plants and animals are interdependent and are adapted to meet their needs from the resources available in their particular habitats. Changes to habitats (whether caused by natural or human means) can affect plants and animals and the relationships between them. Society relies on plants and animals.

and help meet the Overall Learning Expectations for Grade 4, that students will:

- analyse the effects of human activities on habitats and communities;
- investigate the interdependence of plants and animals within specific habitats and communities;
- demonstrate an understanding of habitats and communities and the relationships among the plants and animals that live in them.

Some of the specific expectations that are addressed by this unit include the expectation that by the end of Grade 4 students will be able to:

- 1.1 analyse the positive and negative impacts of human interactions with natural habitats and communities, taking different perspectives into account, and evaluate ways of minimizing the negative impacts
- 2.2 build food chains consisting of different plants and animals, including humans
- 2.3 use scientific inquiry/research skills to investigate ways in which plants and animals in a community depend on features of their habitat to meet important needs
- 2.4 use scientific inquiry/research skills to create a living habitat containing a community
- 2.5 use appropriate science and technology vocabulary, including *habitat, population, community, adaptation*, and *food chain*, in oral and written communication
- 2.6 use a variety of forms (*e.g., oral, written, graphic, multimedia*) to communicate with different audiences and for a variety of purposes

- 3.1 demonstrate an understanding of habitats as areas that provide plants and animals with the necessities of life (*e.g., food, water, air, space, and light*)
- 3.2 demonstrate an understanding of food chains as systems in which energy from the sun is transferred to producers (plants) and then to consumers (animals)
- 3.3 identify factors (*e.g., availability of water or food, amount of light, type of weather*) that affect the ability of plants and animals to survive in a specific habitat
- 3.4 demonstrate an understanding of a community as a group of interacting species sharing a common habitat (*e.g., the life in a wetland*)
- 3.5 classify organisms, including humans, according to their role in a food chain (*e.g., producer, consumer, decomposer*)
- 3.6 identify animals that are carnivores, herbivores, or omnivores
- 3.7 describe structural adaptations that allow plants and animals to survive in specific habitats (*e.g., a duck's webbed feet allow it to move quickly and efficiently in water*)
- 3.10 describe ways in which humans are dependent on natural habitats and communities (*e.g., for water, medicine, flood control in wetlands, leisure activities*)

A few additional curriculum links:

Wetlands and the World not only addresses these science expectations and others (e.g. Gr. 1 – Needs & Characteristics of Living Things, Gr. 2 – Growth and Changes in Animals, Gr. 6 – Biodiversity) but many of the activities can be used to address expectations in geography, social studies, art, music, drama, physical education and so on. For example:

Geography – use the Wetlands and the World map and powerpoint to explore the features and values provided by wetlands across the planet

Social Studies – explore the beliefs and stories of different cultures about wildlife (for example people in North America, China, Africa and India all have ancient beliefs that the Earth is carried on a turtle's back)

Art – Create paper animal models, a wetland diorama, and food chain mobiles

Music – Interpret the sounds of a wetland through art; explore songs from around the world about water, wetlands and wildlife

Drama, Dance, Physical Education – Explore the crane dance and animal-related martial arts moves.

The Literacy - Environmental Education Link

. . . Our children are highly responsive to all of the programs that are brought into their world and especially those that they can actually interact with physically, visually and emotionally.

- Toronto teacher

Environmental Education (EE) focuses on students interacting with their environment. It is a process-oriented, student-centred, hands-on learning approach that aligns well with the needs of students who are in the process of developing skills in a new language. Such experiences as a simple nature hike or pond study offer the opportunity to stimulate a child's natural curiosity, facilitating communication and promoting conversational language. And, in this outdoor, informal setting children are able to relax and communicate more easily around their shared experiences.

Sharing Our Cultures

“It is hard to argue that we are teaching the whole child when school policy dictates that students leave their language and culture at the schoolhouse door . . . “

(Cummins et al, 2005 in Many Roots, Many Voices)

Helping students to share their life experiences and to connect with each other has important benefits to everyone. It affirms a student's sense of belonging, making them feel valued and an integral part of their school and their community. Research studies and surveys of students themselves show that they are more motivated to learn when they can see themselves reflected in the curriculum. For society, the ability to live and work in a multicultural, multilingual, multi-faith society is beneficial as individuals learn to work with each other and learn to share and respect different viewpoints, values and experiences.

Some of the basics that need to be addressed in creating a more inclusive curriculum include:

- connecting the curriculum to the experiences of the students
- continuing to incorporate diverse teaching and assessment practices to meet the needs of different students
- including the experiences and perspectives of Canadians from a variety of different backgrounds; and
- promoting educational practices focused on identifying and challenging stereotyping, bias and discrimination in the curriculum.

Wetlands and the World has worked to do this by including multi-lingual pieces which allow children to share what they are learning with other members of their family and opportunities within the lessons to link students' own experiences, perhaps in a different part of the world or with a different cultural perspective about some of the aspects of study.

Thanks to the generosity of the **Indigenous Cooperative on the Environment (I.C.E.)** we have also included materials in two of the languages of Canada's aboriginal peoples – Ojibwe and Cree. We are continuing to work with I.C.E. to expand some of these resources into several other aboriginal languages from other parts of Canada. Within these units are ideas to explore the different beliefs and stories of Canada's first peoples and other cultures from Canada and around the world.

For more information see:



Antiracism and Ethnocultural Equity (AREE) Teacher Manual. Ottawa: Ottawa-Carleton District School Board, 2001 http://www.ocdsb.edu.on.ca/Secondary_Websites/Teacher_Res/AREE/areetm.htm

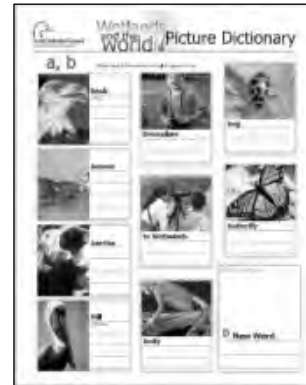
Helpful Hints for English Literacy Teaching¹

“It is never easy to come into a new school where everyone already seems to have friends, know the teachers, and understand the routine. But when that new school is in a new country, then the problems can be even more formidable.”

(Porter, 1991 in Many Roots, Many Voices)

- elicit your students’ prior knowledge before introducing environmental or grammar concepts
- preview the lesson’s key vocabulary; do not include too many new difficult vocabulary words in a single lesson. For example, you may need to modify these exercises to reduce the number of animal names or science terms introduced to your students.
- create a word wall displaying lists of specific words.
- illustrate word meanings and phrases with demonstrations and pictures
- modify some or all of the subject expectations
- adapt instructional activities to include:
 - visual cues, graphic organizers and peer tutoring
 - use of the students’ first languages at strategic times
 - modified assessment strategies (e.g. provide extra time, use conferencing, have students complete graphic organizers and Cloze activities)
 - a variety of texts at different levels of difficulty on the same topic or on the same unit of study
- encourage English Language Learners (ELL) to participate in classroom instruction and practice at all times, for example:
 - encourage students to “think, pair, share”
 - arrange structured group work with a focus on oral language
 - create flexible groupings – assign beginner ELLs to work together when they need to but also make sure they have opportunities to work with English speakers.
 - keep your lessons learner-centred – ELL students should do more talking than the ELL teacher.
- recognize the students’ need to use their first language as a tool for thinking and learning. This helps them to develop a strong foundation of knowledge and skills upon which English proficiency can be built. This is recommended for all ELLS, especially those in their early stage of English language acquisition. You can help further by:
 - providing bilingual dictionaries
 - encouraging students to use their first language as they develop word lists, in prewriting activities for lessons and in oral discussion

Each lesson plan contained in *Wetlands and the World* includes a list of the key vocabulary words. A Picture Dictionary is also included (see box on this page for details.)



HELP FOR YOUR STUDENTS

Wetlands and the World includes a *Picture Dictionary* with photos illustrating key vocabulary words. Each photo includes space for students to write the words in their first language or to create their own pronunciation reminders or notes. Available from the CD or the DUC website at education.ducks.ca.

¹ with special thanks to Tara Shakaripe, Ottawa-Carleton District School board and the staff at Ecokids Canada.

Teaching Heritage Languages

“Language carries within it the spirit, culture, history, and philosophy of a people; it reveals how they think and how they view the world. In short, language both defines and reflects the particular attitudes and values of a people. Language, moreover, is the principal means by which culture is preserved and transmitted from one generation to another.”

The Ontario Curriculum
Grades 1-8, Native Languages Ministry of Education, 2 0 01

Teachers of aboriginal languages and of students learning their own heritage language (e.g. an English-speaking child who is learning or improving their skill in the language spoken in their family home) have suggested that these resources can provide useful tools to help their students.

For example, students can:

- use the Picture Dictionary to enter words from the language being studied to help them to build vocabulary in this language
- learn new vocabulary using the animal stories that appear in both English and other languages
- some of the ELL activities can be used to explore a heritage language – for example, creating a bilingual poster in English and the language being studied (*see Project and Action Ideas for English Language Learners*)



For more about teaching ELL see:

The Ontario Curriculum, Grades 1–8: English As a Second Language and English Literacy Development – A Resource Guide, 2001. Toronto: Government of Ontario, 2001

<http://www.edu.gov.on.ca/eng/document/curricul/esl18.pdf>

Many Roots, Many Voices: Supporting English language learners in every classroom. A Practical Guide for Ontario Educators. Toronto: Government of Ontario, 2005

<http://www.edu.gov.on.ca/eng/document/manyroots/manyroots.pdf>

English Language Learners ESL And ELD Programs And Services: Policies and Procedures for Ontario Elementary and Secondary Schools, Kindergarten to Grade 12. Toronto: Government of Ontario, 2007

<http://www.edu.gov.on.ca/eng/document/esleldprograms/esleldprograms.pdf>

The TESL Canada Federation (Teaching English as a Second Language) website provides links for those interested in training to become an ESL teacher and to TESL programs in your province and elsewhere

<http://www.tesl.ca/>

Create a Wetland World with Paper Animals



- Before you begin: Make sure you have everything you need - scissors, a glue stick, a print-off of the paper model, the instructions, and a place to work. And, of course, your parent's or teacher's permission to go ahead!
- If you have received a print copy of the animal model that you want to save, you can do this. Simply download any of the animal models from our website at education.ducks.ca along with the instructions.
- Do you like to colour? There are black and white versions of these models that you can print off from our website at education.ducks.ca.
- Read the instructions before you begin and look at the pictures closely. It will help you understand how the pieces work, where you need to fold and where you need to glue.
- Cut the pieces out carefully. If you make a mistake, try taping the piece back on. But, if you really need to, you can easily print off another copy of the model.



Project and Study Ideas for the whole class!

Don't just do what's written down - let your imagination be your guide.



- Exploring another country? Include a map so people know where it is.
- Creating a wetland animal model or food chain? Research the animal and write your own nature notes.
- Have a great project idea yourself? Send it to us. If you have a picture or photo we would love to see it! You can email it to project_webfoot@ducks.ca.

1. Make a number of models and use them to create a "wetland mobile".
2. Use the models to create a food chain for a Canadian wetland. But then explore a wetland in another part of the world and research the animals that live there. Create a food chain poster or mobile using your own drawings or pictures from old magazines.



3. Feeling extra creative? Use these models as a starting point to design your own paper models for animals from another habitat, like a forest, or from a wetland in another part of the world. For example, look at the body and legs of the Yellow-spotted Salamander model and compare them to a picture of an alligator or crocodile. Could you design your own alligator model using the design ideas for the salamander? You could do the same with some of the other animal models.
4. Many cultures have sayings about animals and the weather. For example, in the wintry parts of the northern United States and Canada, people wait to hear the predictions about winter from a furry mammal, called a groundhog or woodchuck. It is said that if the groundhog sees his shadow when he comes out of his underground burrow on the morning of February 2nd, Groundhog Day, there will be six more weeks of winter. Otherwise it will be an early spring. Look at the story that accompanies the dragonfly model from "Wetlands and the World" for another way of forecasting weather. (P.S. February 2nd is also "World Wetlands Day". Visit www.ramsar.org to find out more.

Do you know other wildlife weather beliefs? Ask your families and friends if they know a story you can share with your classmates. You could:

- write the story in your own words and read it out loud to others
 - create a picture storybook to share with younger students
 - choose a saying or belief and explore it further to find out whether it is closer to fact or fiction.
5. Dances, martial arts and yoga all have movements based on animals. For example, for thousands of years people all over the world have performed "crane dances" and many kinds of martial arts and yoga have similar stances (standing positions) based on animals. For example, the "cat stance" is one in which a person stands like a cat ready to pounce.
 - Explore birds like the crane, grebes, loons and others who dance (usually a way of attracting a mate). You may even find samples on the Internet. Do a project on dances from around the world based on animals. You may want to explore costumes as well.
 - Find out if anyone in your class studies dance or martial arts. Have they learned any movements that are based on animals? Do you have ideas why these different animals were chosen?
 - Do you and your friends like to dance? Could you create your own dance to tell the story of a wetland?
 6. People from different cultures see animals in different ways. For example, owls are found around the world and may be seen as wise, foolish, or as an evil omen or a symbol of death. Why do you think people would see animals in different ways? Explore the "natural history" of an animal (the natural history means where they live, what they eat and so on) or look for stories or legends about them for some ideas.
 7. A Big Idea - Work with your friends and classmates to create a giant wetland art and science project to share with other classes in your school.



8. Take Action! The last exercise in the "Wetlands and the World - Resources for Teaching English Literacy" contains action ideas for students studying English but many of these are fun for everyone. You can also check our website at education.ducks.ca for more project and action ideas.



Lesson 1: Exploring Wetlands

 **Time: 50 minutes**

Summary:

Students will:

- listen to the sounds of a wetland (a marsh) and interpret it through drawing or writing
- discuss their drawings or word pictures in small groups
- discuss wetlands and use a graphic organizer to identify the different parts of a healthy wetland
- view a Powerpoint presentation **Wetlands Around the World** and discuss their own experiences and understanding of wetlands
- receive a take home **Wetlands and the World** map to share with their families
- Optional Activity: **Wetland Word Search**

Materials and Preparation

- computer with speakers and projector
- blank paper and colouring utensils for students
- **Wetlands and the World** maps hardcopy versions or pdf from *education.ducks.ca*
- **Wetlands Around the World** download Powerpoint presentation (as .pdf) from website *education.ducks.ca* or from the **Wetlands and the World** CD.
- graphic organizer - Healthy Wetlands (one for each student)
- Optional: **Wetland Word Search** (one for each student)
- Preparation: Preview **Wetlands Around the World** and its teaching suggestions.



Vocabulary Words

habitat, wetland, marsh, swamp, plants, insects, birds, fish, soil, wet, dry, water, land



Detailed Lesson Plan



15 min.

Students will need blank paper, colouring utensils or pen/pencil. Tell students that you are going to play a clip from a natural habitat (available on the **Wetlands and the World** CD, or on the Internet from <http://www.ducks.ca/resource/general/naturenotes/index.html> **Sounds of the Marsh** in the bottom right hand corner of the screen or http://uk.encarta.msn.com/media_461520510_121503347_-1_1/Wetland_sounds.html)

Ask them to:

- draw what they think that habitat looks like OR
- write down words in their first language about the sounds they are hearing. Afterward, ask them to look up the comparable English words in their dictionary.

You might want to give them clues to get them started. What creatures might make the sounds they are hearing? Is the sound loud, soft, scary, soothing? How does the sound make them feel? What colours might they see in this place?

After you play the clip, give the students time (10 minutes) to complete their drawing or their writing task. Ask them not to discuss their ideas with their neighbours. You may choose to play the clip once more while the students work on their drawings.



10 min.

Ask students to share their drawings or descriptive words about what this habitat might look like with the class. What elements were represented in their drawings (soil, water, sunlight)? Did they include any vegetation or animals? Were there similarities in the classes' drawings? If so, what were they? Were there differences?





Inform the class that the natural habitat they were listening to is called a "wetland". Write the word "**wetland**" on the board and point out to students the two smaller words that wetland is made up of **wet** and **land**. Ask students to guess what they will find in all wetlands using the name "wetland" as a clue. (water and land) Have them write the word "wetland" on their drawing or on their written work.



Show the **Wetlands Around the World** Powerpoint (downloadable in pdf format from Ducks Unlimited Canada education website at education.ducks.ca or available on the **Wetlands and the World** CD.) The Powerpoint shows pictures of different types of wetlands throughout the world and includes notes for using it with your students and drawing on their own personal experiences and understanding about wetlands.

Reinforce the following concepts:

- that wetland habitats are comprised of **land** and **water** and

they have:

- plants that can live in the water
- animals that are adapted for living in the water (even if they are only microscopic or seen during wet seasons only),
- and they all need sunlight, soil and air (for the plants and animals to breathe, etc.). Also point out how humans use wetlands (recreation, fishing, growing rice, etc.).

Two common types of Canadian wetlands, a marsh and a swamp, are presented in the show. The first is a marsh. Point out the cattails that are growing in the water. The second is a swamp. Point out the shrubs and trees that are growing in or along the edge of the water. The type of vegetation growing in these two types of wetlands is the easiest way to tell them apart.



Complete the attached graphic organizer **Healthy Wetlands** depicting all of the components of a healthy wetland. Ask students to write the word "wetland" in the middle. As a class, brainstorm/review the different components of a healthy wetland and have students write them into the graphic organizer. (water, land/soil, sunlight, air, animals, plants). See example in Answers section.



Pass out the take-home **Wetlands and the World** map which the students can share with their family. Look at it as a class. Point out to students that wetlands are found all over the world, from the Arctic to the equator, from Canada to Africa to Asia (although not areas that are frozen year-round, the extreme north and Antarctica). Depending on your students and the time available you may want to read and discuss some of the wetland values that appear on the map out loud.

The map has a quote in many different languages. It is an ancient Chinese saying that states "Whenever you drink water, remember its source." This is a reminder that water comes to us from nature and that we need to cherish it and the natural world that provides it.

FOR STUDENTS WHOSE LANGUAGE DOES NOT APPEAR ON THE MAP: They may want to create their own translation of this quote to share with other students and add to their map. OR they may want to share another saying about water or nature that they know.

Wetland

- a collective noun used to describe natural areas where land is covered by water for at least part of the year.

Some cultures may not have a similar collective noun. They may only refer to specific kinds of wetlands or where such habitats are rare or nearly non-existent, for example in a desert country, this concept may not exist.

Some names for types of North American wetlands:

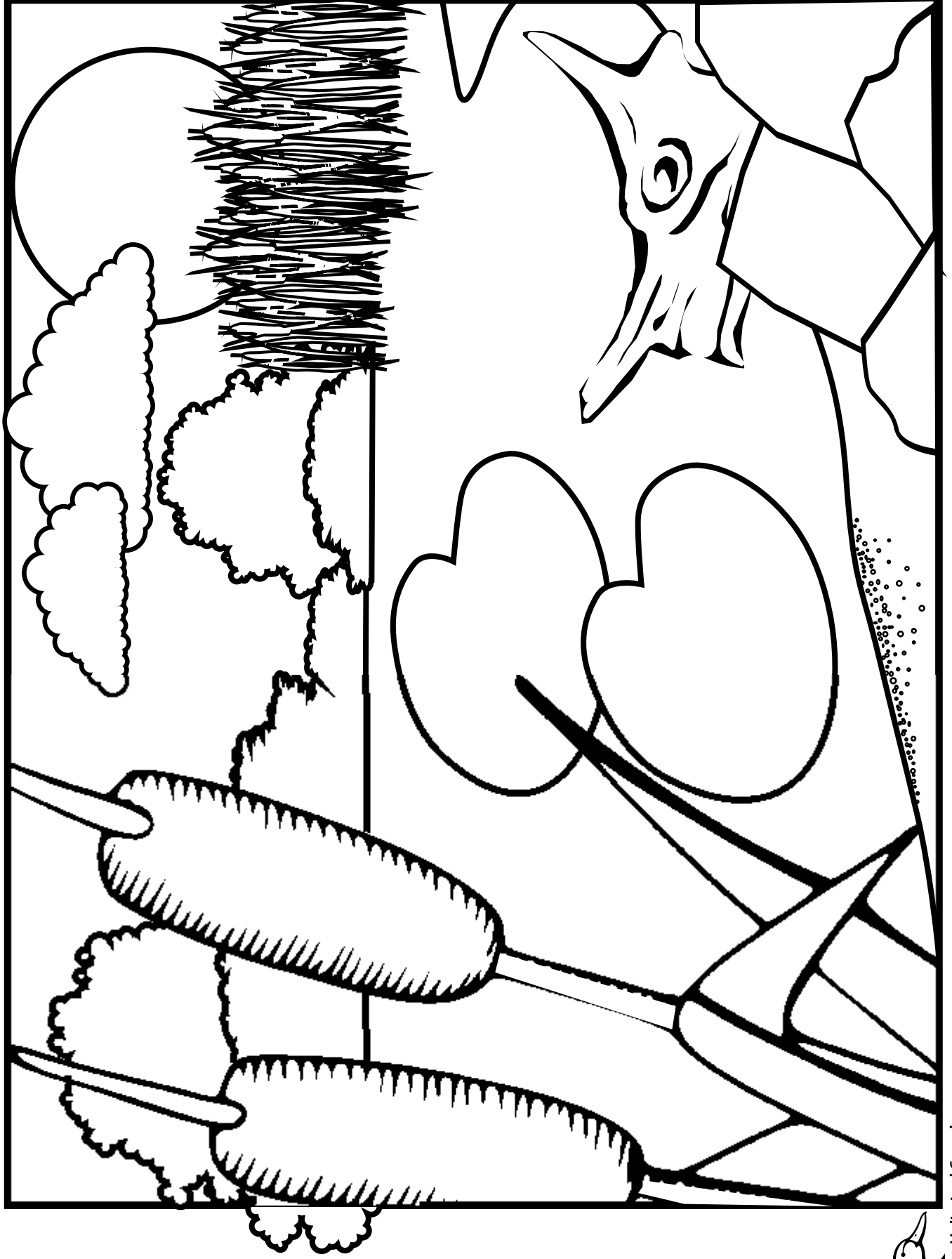
marsh	swamp
bog	fen
bayou	delta
mangrove (forest, swamp)	
saltwater marsh	
floodplain	playa
vernal pool	bottomland
slough	wet meadow



Ask students to share some of the names used for wetlands (marsh, swamp, etc.) from their first language.



Healthy Wetlands - Graphic Organizer



Wetland Word Search

Find and circle the hidden words below. The words may be written across or up and down.

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

WETLAND/wetland

MARSH/marsh

WET/wet

DRY/dry

ANIMALS/animals

SUN/sun

SWAMP/swamp

HABITAT/habitat

PLANTS/plants

INSECTS/insects

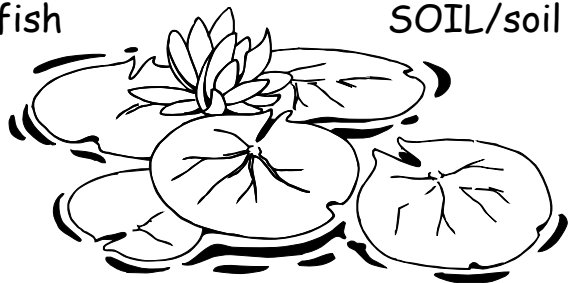
WATER/water

LAND/land

BIRDS/birds

FISH/fish

SOIL/soil



Lesson 2: Wetland Wildlife

 **Time: 50 minutes**

Summary:

Students will:

- as a class and using pictures identify different plants and animals
- discuss the different adaptations for living in a wetland habitat
- individual students will come to the front of the room and will have a wetland plant or animal taped to their back where they cannot see it. They will deduce "what they are" through questions and answers with their classmates.


Materials and Preparation


- common wetland plants and animals. Print 2 sets of black & white line drawings from the "Wetland Illustrations" file on the **Wetlands and the World** CD OR use the Wetland Wildlife models, from the CD or website education.ducks.ca OR cut out photos from a wildlife calendar or magazine. You may want to save these to use in Lesson 4.
- tape
- **Wetland Plants and Animals** (1 copy for each student)

Vocabulary Words

adaptation, beaver, cattail, dragonfly, duckweed, fish, fox, frog, hawk, heron, raccoon, turtle, water lily, webbed, waterproof

Detailed Lesson Plan

 **5 min.** Review from last class. Ask students if they can remember the name of the habitat they learned last day (wetland). Ask students if they can remember the different things a healthy wetland needs/has. (water, land, clean air, sunlight, plants, animals)

 **20 min.** Place pictures of common wetland plants and animals on the board. Inform students that today you are going to be talking about the different plants and animals living in the wetland. Point to the duck and ask students if any of them know what it is called. Write the word "duck" under the picture. Looking at the picture of the duck, ask students if they can see anything about the duck that might make it a good animal for living in the wetland. (webbed feet for swimming; wide, flat beak for scooping small insects and plants out of the water to eat, waterproof feathers that keep the duck nice and dry) Write the words "webbed feet", "beak" and "feathers" under the duck, with arrows pointing to each of the features. Complete the same exercise pointing out the adaptations for the following wetland plants and animals (see chart, next page).

Not all adaptations will be easily identifiable by your students. You may choose to be selective and limit the number of plants and animals you select for this lesson. However, this is a chance to draw upon the students' own knowledge and experience with similar wetlands species in other parts of the world. As part of this activity you may want to ask the children to share some of the animal names in their own language.



Plant or Animal	Adaptation
Beaver	webbed feet, waterproof fur, sharp teeth (allow it to cut down trees), ability to build dams and create wetlands
Cattail	can live in water, strong stem, strong roots create "mats" that can float on water
Dragonfly	adults have big eyes & strong eyesight (for hunting insects), jaws for chewing, eggs laid in the water; nymphs live in water
Duckweed	floats on water, tiny hair-like roots can glean nutrients from water
Fish	tail, fins, streamlined body for moving through water
Fox	good hearing, good sense of smell (for hunting), sharp teeth for eating meat, hunts at dusk and dawn when other animals visit wetlands
Frog	webbed feet, long, sticky tongue (for catching insects), needs water for part of lifecycle (eggs laid in water and tadpoles live in water and evolve to frogs)
Hawk	good eyes (for hunting), strong beak (for eating)
Heron	long, sharp beak (for fishing), long legs (for wading through water)
Raccoon	sharp claws (for fishing), eats a variety of foods
Turtle	webbed feet for swimming, shell for protection
Water lily	broad leaves float on water

Leave information on board for next class.



For more information about these animals and their adaptations:

- Ducks Unlimited Canada's *Wetland Ecosystems 1: Habitats, communities and the Diversity of Life*, Teachers Guide and Student Journals Lesson 4, available as free downloads from education.ducks.ca.
- Find out more about wetlands and wetland plants and animals in Marsh World. This guide is sent to sponsored classes in their Project Webfoot kit or may be purchased from the Marsh Shop at www.marshshop.ca



Ask for a student to volunteer to come to the front. Tape a picture of one of the plants or animals you have discussed on their back (from second set of pictures). Ask them to turn around to show the class what they are. The student at the front of the class tries to guess what they are by asking their classmates questions. For example, "Do I have webbed feet?", "Am I a plant?" "Am I brown?" Students are not allowed to ask, "Am I a duck (for example)?" until they have asked three other questions. Once the student has successfully guessed what they are, another student can come to the front and a different wetland plant or animal can be taped to their back.



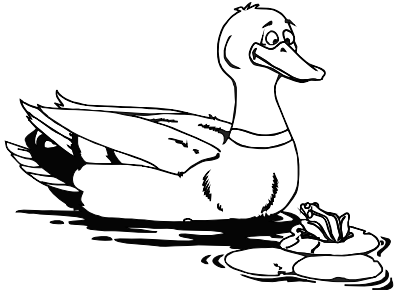
Hand out the **Wetland Plants and Animals** for students to complete. (You will take up the answers as a review at the start of Lesson 3.)





Wetland Plants and Animals

Many different kinds of plants and animals live in wetlands! Answer the questions below using the clues.



1. I have feathers and webbed feet.



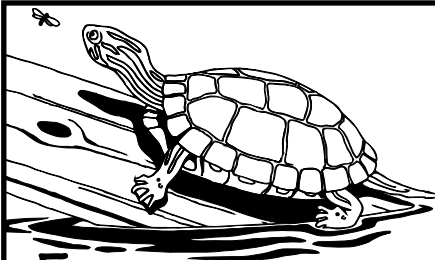
2. I have a tail and fins to swim under water



3. I am green and I have a long, sticky tongue.



4. I have brown fur and I make a dam from branches and sticks.



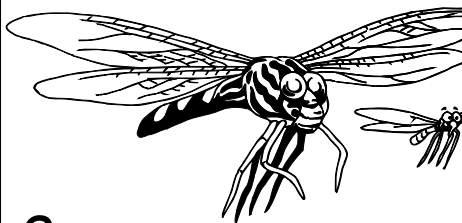
5. I have a hard shell and webbed toes.



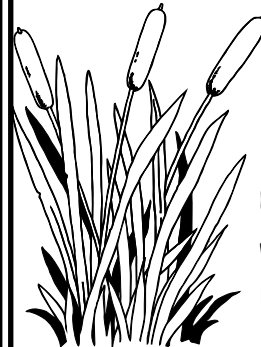
6. I have sharp claws and I look like I am wearing a mask!



7. I have feathers, a beak, and long legs to walk in the water.



8. I am an insect. I have four wings and eat mosquitoes.



9. I am a tall marsh plant with a soft brown seed head.

fish raccoon duck turtle dragonfly cattail beaver frog heron



Lesson 3: Wetland Web of Life

 **Time: 50 minutes**

Summary:

Students will:

- as a class, discuss the different actions and relationships in a wetland, using the two illustrations provided **A Day in the Marsh** and **Wetlands Never Sleep** and led by questions such as “Who is eating whom”
- write a three sentence story about one or both of the scenes, working to use complete sentences
- Optional: Will draw their own wetlands and discuss the different components amongst members of their small working group. OR Will complete the **Wetland Who, What, When, Where and Why** activity sheet based on the wetlands scenes provided.

Materials and Preparation

- copies of the wetland scenes page **A Day in the Marsh** and **Wetlands Never Sleep** (one per student or work group)
- Optional: drawing materials or copies of **Wetland - Who, What, Where and Why**

Vocabulary Words

vocabulary from previous lesson;
who, what, when, where, why; bat, butterfly, mink,
mosquitoes, muskrat, owl, redwing blackbird, skunk, swallows

Detailed Lesson Plan



As a class, review Lesson 2, using the clues that you left on the board and taking up the answers on the **Wetland Plants and Animals** worksheet.



Hand out the worksheets **A Day in the Marsh** and **Wetlands Never Sleep**. Note: The Answer section includes these scenes labeled with the animal names.

As a class, discuss the different interactions in the wetland. You may wish to write these questions on the board beforehand and jot down some of the student's answers to help them with their assignment.

- What animals do they see?
- Where are the different animals?
- What are the different animals doing?
- Who is eating whom?
- What kind of plants are there?



Ask students to write three sentences on each worksheet, describing what they see happening in the wetland. Remind them to use complete sentences and to be creative.

Optional: Provide each student with a sheet of paper and drawing implements and ask each of them to draw their own wetland. Remind students to include all of the components of a healthy wetland in their drawing (water, land/soil, sunlight, plants, animals). Students can describe their drawing to members of their work group, explaining the different components and how they are interacting in their own drawing.

OR Complete the **Wetland Who, What, When, Where or Why** handout using the **A Day in the Marsh/ Wetlands Never Sleep** scenes.



A Day in the Marsh



Wetlands Never Sleep





Wetland "Who, What, When, Where and Why"

Using *A Day in the Marsh* and *Wetlands Never Sleep*, select the correct word to complete each question. Then, write a sentence to answer it.

Example: What/Who is taking a photograph?

The boy is taking a photograph.



1. What/Which is the muskrat doing?

2. Who/Which animals are eating?

3. When/What is the girl pointing at?

4. Why/Where does the duck look surprised or scared?

5. What/Which animal is standing on a log?

6. Who/Which animal is hunting?

7. What/Where is the bat doing?

8. Where/Who is the frog sitting?

9. When/What do you think the hawk will have its dinner?

10. Which/When animals are in the water?



Lesson 4: Who Eats Whom?

 **Time: 50 minutes**

Summary:

Students will:

- as a class, explore the different foods that animals eat
- categorize animals as herbivores, omnivores or carnivores
- create several food chains and, depending on language skills, be introduced to the concepts of producers, consumers and decomposers
- Optional: Will reinforce this knowledge by using the activity sheet **Food Chains – Singles and Plurals**, exploring singular and plural forms of “eat”.



Vocabulary Words

herbivore, carnivore, omnivore, producer, consumer, decomposer (depending on language skills)



Materials and Preparation

- common wetland plants and animals (use black & white line drawings printed off in Lesson 2 or reprint them from the CD). Mark them using a large coloured dot.
- Green – Producers (all plants - cattail, water lily, duckweed, berries, tree)
- Red – consumers - herbivores (beaver, muskrat, mallard), omnivores (raccoon, turtle) and carnivores (fox, heron, hawk, owl) Note: Although the humans are omnivores they are a top level consumer in the wetland food chain since they are not eaten by other consumers.
- You may wish to include decomposers. If so, mark them Blue – (mushrooms, worms, some insects, etc.). Snails and some turtles, especially the snapping turtle, will eat decomposing animals and plants and can fulfill this role.
- tape
- Optional: **Food Chains – Singles and Plurals** (one for each student)



Detailed Lesson Plan



20 min.

In earlier lessons, especially Lesson 3: Wetland Web of Life, students discussed animals eating or being eaten. For example, when they explored the activities taking place in the scenes **A Day in the Marsh/Wetlands Never Sleep**, as well as on the activity page **Wetland Who, What, When, Where and Why**, they may have observed:

- The muskrat eating a cattail. A moose eating a lily pad. Deer grazing on plants. The duck “tipped” up feeding on microscopic plants.
- Swallows, dragonflies and bats hunting insects as they fly.
- The heron eating a frog. A frog about to eat an insect. The duck is worried that hawk may be looking at it as its next dinner!
- The mink, hawk, owl, heron, bats, and dragonflies are hunting.

Drawing upon observations made in earlier lessons and your students' own experience and knowledge, work as a class to create a list of a few examples of wetland animals and what they eat. Ask students to decide if there were animals on their list that only eat plants. Write the name of the animal on the board. Ask students if they can think of any others. On the board above the list write the word herbivore. Tell students that herbivores are animals that only eat plants. Next ask students if they know of any animals that eat both plants and animals. List them under the word omnivore. Do the same for carnivores, animals that eat only meat.

Using the following scenarios, ask students to guess which animals are herbivores, omnivores or carnivores.

Raccoons eat plants, insects and fish.	Omnivore
Turtles eat duckweed, insects and water lilies.	Omnivore
Beavers eat water lilies, tree bark and leaves.	Herbivore
Dragonflies eat other insects.	Carnivore
Humans eat plants and animals.	Omnivore
Frogs eat insects.	Carnivore





Tape a wetland plant or animal image to the front of each student (you may have to use more than one set of name tags depending on the number of students in your class).

Ask for a volunteer to come to the front of the class. Depending on where they sit in the food chain, ask them to pick someone else from the class that either eats them, or that they eat. Have the person they choose come to the front and do the same thing. This carries on until the food chain is completed. There should be a top level consumer at one end and a producer (plant) at the other. Ask the food chain group to move to one side of the class, lined up one behind the other in order, with the producer at the front of the row. Choose another volunteer and construct a second food chain. Continue until you have constructed four or five food chains and they are all lined up one beside each other.

Ask the class to take a look at the food chains that have been constructed. What do they notice about the first person in each food chain? (they should all be plants - marked by green dots) Why do they think this is? (because plants make their own food using the sun's energy) What do they notice about the last person in each food chain? (they should all be carnivores - top level consumers) Why do they think this is? (because there aren't really any other animals in the habitat that eat them) How do these top level consumers usually die, if they aren't eaten by another animal? (natural causes, disease) What happens to the living matter of all wetland plants and animals when they die? (decomposers break down their nutrients which can be recycled by being taken up by plants to produce energy.)

Some food chain examples:

Cattails → muskrats → fox

Water lilies → insects → frogs → heron

Water lilies → insects → turtles → raccoon

Trees → beaver → fox

Duckweed → ducks → fish (pike eat ducklings) → hawks (osprey)

Allow the students to keep their nametags and ask them to remember their food chain since we will explore that next class.

OPTIONAL: Food Chains – Singles and Plurals



Food Chains - Singles and Plurals

Read each sentence below.
For each sentence,
circle whether the word
should be "eat" or "eats".

1. A duck **eat/eats** plants.

2. Foxes **eat/eats** small animals.

3. Plants don't need to **eat/eats** because they make their own food.

4. Some fish **eat/eats** small plants.

5. A deer **eat/eats** grass and berries.

6. Beavers like to **eat/eats** plants and tree bark.

7. A muskrat **eat/eats** plants, fish and frogs.

8. I like to **eat/eats** _____!

Write in your favourite food!



Lesson 5: Wetlands Energy Flow

 **Time: 50 minutes**

Summary:

Students will:

- look at the food chains that they created during their last lesson and as a class discuss what happens when changes happen within a food chain to the populations of producers and consumers
- use a graphic organizer to discuss food pyramids, populations and the transfer of energy
- Optional: Students create their own Food Chains

Materials and Preparation

- **Transfer of Energy** – graphic organizer (one per student or one per group)
- **Optional** – Create a Food Chain – for each student: images of plants and animals (or drawing materials), glue sticks,




Vocabulary Words

herbivore, carnivore, omnivore, producer, consumer, decomposer (a required vocabulary learning outcome but their use may depend on literacy skills of your students)



Detailed Lesson Plan

-  **20 min.** Choose a group of students who created one of the food chains to come to the front of the room and ask them to line up forming a chain from producer to top level consumer. If you are using decomposers include these too. Review the roles of each class of organism according to their place in the food chain (e.g. producer, primary consumer, secondary consumer, top level consumer.) Remove the producer from the food chain (explain it – for example, it was a very hot, dry summer and there wasn't enough water in the wetland for very many water lilies to grow). Ask the students what they think would happen to the habitat as a result. (using the following food chain as an example:

water lily → insect → frog → fish → heron

If the water lilies disappeared, the insects would start to die because they have no food, then the frogs would start to die because they didn't have enough food, and so on down the chain)

Next, remove the top level consumer from the food chain (i.e. a subdivision was built next to the wetland, so the herons moved to a quieter wetland) and ask students what they think would happen to the habitat as a result. (If the herons disappeared, the fish population would increase because the fish no longer had a predator). What would eventually happen to the frogs? (the remaining population of frogs would decrease because there are so many fish eating them). What would eventually happen to the fish population (it would decline because there are no more frogs to eat).

IMPORTANT: Explain to the students that this is a simplified example. Animals eat many different kinds of food and their relationships are more complex. However, what you have demonstrated is known to happen with animal populations when different species are removed or introduced.





10 min.

Hand out a **Transfer of Energy** graphic organizer to each student.

Working in groups, ask the students to write the names of some wetland producers in the bottom tier (cattail, water lily, duckweed, berries, rice, tree), the primary consumers (eat producers) in the second tier (fish, muskrat, beaver, duck, turtle, bug, snail) and the secondary consumers (eat other consumers) in the top tier (frog, dragonfly, raccoon, hawk, heron, human, fox).



10 min.

As a class, ask the different groups to identify the different plants and animals they placed in each tier. Discuss where the energy comes from (the sun) and have them draw an arrow from the sun to the producers, showing that they make their own food from the energy of the sun. Students can write the word “sun” in the sun, “plants” on the line beside the producer level, “animals that eat plants” on the line beside the primary consumers and “animals that eat other animals” on the line beside the secondary consumers.

You may want to point out that the bottom tier is the biggest because many plants are needed to feed the animals above. The tiers depicting the number of animals decrease as we move higher up the food chain. Ask them to remember back to the food chain scenario where the population of hawks increased. The top level consumers need to have smaller populations so that there is enough food lower down on the food chain to support them. For example, if a hawk needs three mice per day to survive, what would happen if the number of hawks and mice were the same?



10 min.

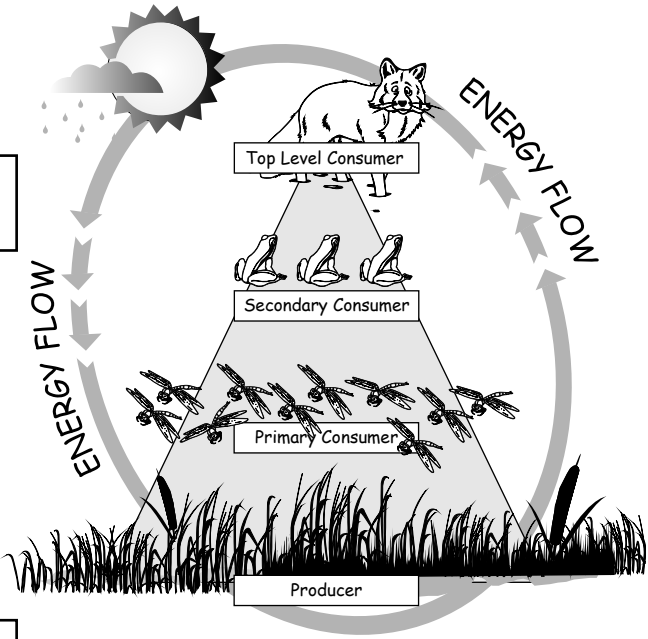
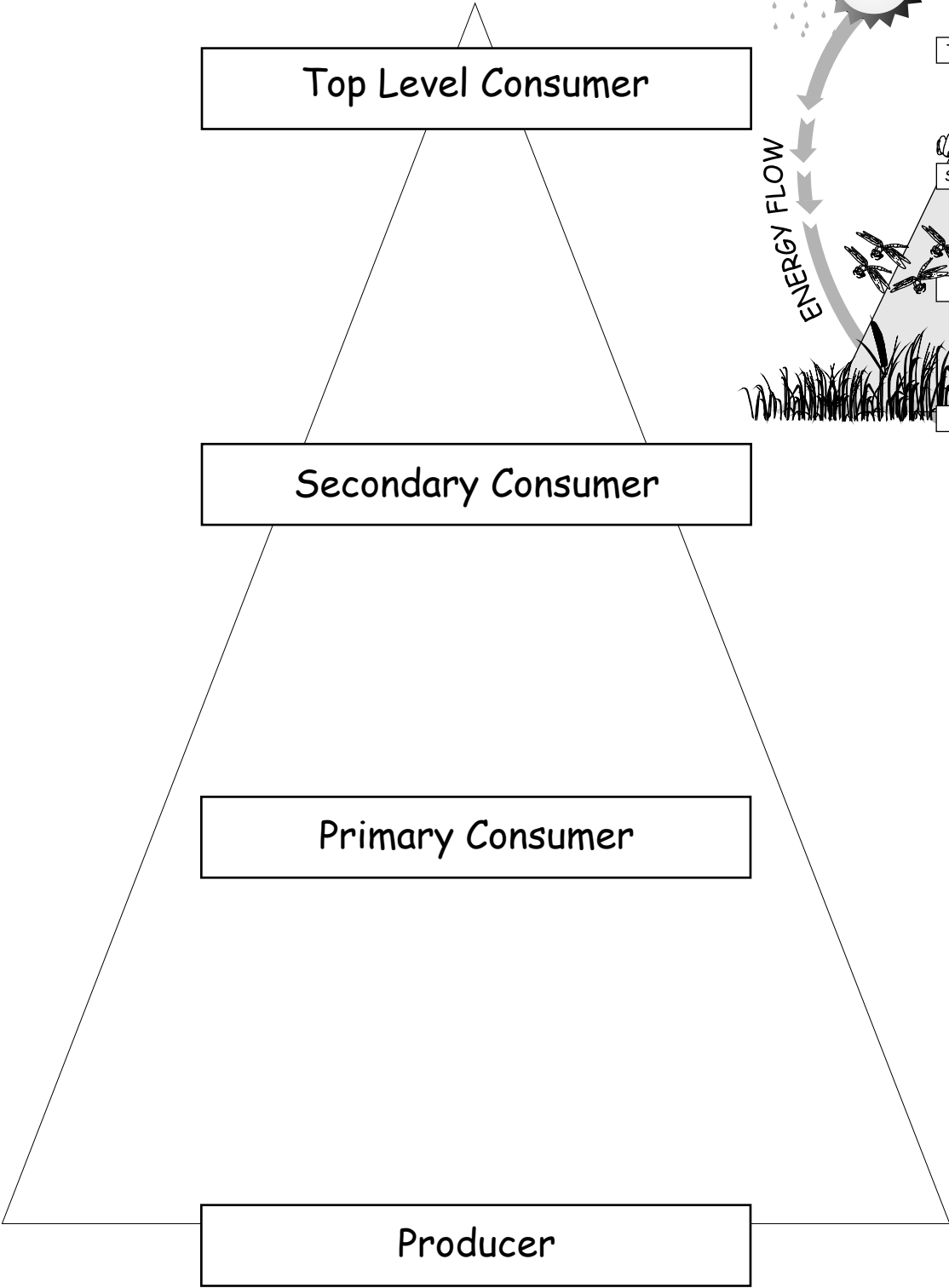
Optional: Students can create their own Food Chain or Food Pyramid using the black & white drawings used in previous lessons or their own drawings. They may do this as individuals or as a group.

- Students should select at least three different plant and animal images that create a food chain.
- On a separate, large sheet of paper students should glue the pictures in the proper order to create their food chain. If they choose to do a pyramid, they should show a multiple number of animals at each level – representing the diminishing number of each as they go up the pyramid.
- They should draw arrows to show the links in the food chain and then label each picture.

Alternately you may wish to undertake the creation of the paper models of wetland animals using the materials provided on the **Wetlands and the World** CD or downloadable from the Ducks Unlimited Canada website at education.ducks.ca. If so, this activity will require another class period to complete.



Transfer of Energy - graphic organizer



Lesson 6: Wetlands Really Clean Up!

 **Time: 50 minutes**

Summary:

Students will:

- observe two demonstrations showing how wetlands clean and store water
- work as a class to complete the **Wetlands Really Clean Up!** graphic organizer
- begin a class list of the reasons that wetlands are important
- Optional: In small work groups complete the **Wetland Values – True or False** question sheet
- Optional: Create a wetland poster in their first language



Materials and Preparation

- something to protect the demonstration area from water (newspaper, old towel or plastic sheet)
- paint tray or other large pan
- 2 sponges (clean and dry, at least ½ inch thick)
- scissors
- measuring cup
- water
- ½ tsp. sand or pepper
- **Wetlands Really Clean Up!** graphic organizer (one for each student)
- **Wetland Values - True or False** (one for each student)

Detailed Lesson Plan



5 min.

Review Unit 1. What is a wetland? What does a healthy wetland need? What sorts of animals live in a wetland? What are some adaptations that plants and animals have that help them to live in a wetland habitat?



15 min.

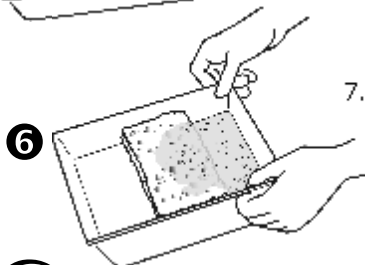
Demonstration to show the students how wetlands filter and clean water, and reduce flooding.



2



4



6

1. Cover your work area with newspaper, an old towel or plastic sheet to protect it. Place the pan on the newspaper.
2. Cut the sponge so it's just a bit wider than the pan. Press the sponge flat into the centre of the pan, making sure it's pressed down all the way and that there is space on either side of the sponge.
3. For the demonstrations – gather the students around so they can all watch. Ask them to imagine that the sponge is a wetland filled with lots of plants.
4. **Demonstration #1 – Cleaning water:** Measure ½ cup of water. Stir the sand or pepper into the water. The sand or pepper represents pollution.
5. Slowly pour the water into the space on one side of the sponge. Stop pouring if the water reaches the top of the "wetland".
6. Slowly tilt the end of the pan that holds water. The water will flow through the "wetland" to the other side. Observe the cleanliness of the water after passing through the "wetland".
7. **Demonstration #2 – Storing water:** Set up the experiment again, using a clean, dry sponge and clear water. Follow the steps above without adding the sand or pepper. Once you have poured water into the "wetland", measure how much water flows out compared to how much was poured in.





15 min.

As a class, complete the **Wetlands Really Clean Up!** graphic organizer summarizing what happened in the demonstrations.

Demonstration #1:

Water carrying dirt or pollution (the pepper/sand) flows through a wetland. It is trapped by the wetland. If it is pollution, it is cleaned out of the water. But flowing water (rivers, streams, etc.) also carry soil and nutrients. If the pepper/sand represents soil what might trapping them in the wetland mean? (Hint: Wetlands are considered to be one of the most productive ecosystems in the world. One of the reasons they are drained for farming is the richness of the soils that are found there. But remember, if we drain a wetland for farming, we may lose other important things.)

Demonstration #2:

Wetlands are often referred to as "giant sponges". They have the ability to absorb large amounts of water and then to slowly release it. During a storm large amounts of water can be absorbed by wetlands, reducing flooding and during dry periods or droughts wetlands become an important source of stored water for wildlife and people.

Start a list of wetland values on the board which you can continue to add to throughout these units.

- ex: Wetlands clean water.
 Wetlands filter pollution.
 Wetlands are home to wildlife.
 Wetlands are resting places for migrating animals.

Remind students of the **Wetlands Around the World** Powerpoint presentation that you looked at in Lesson 1 and of the map they received. Looking at these will help you generate more ideas. You may want to replay parts of the Powerpoint as part of your discussions. The text from the map, listing different values of wetlands from around the world can be found in Educator's Notes, page v.



10 min.

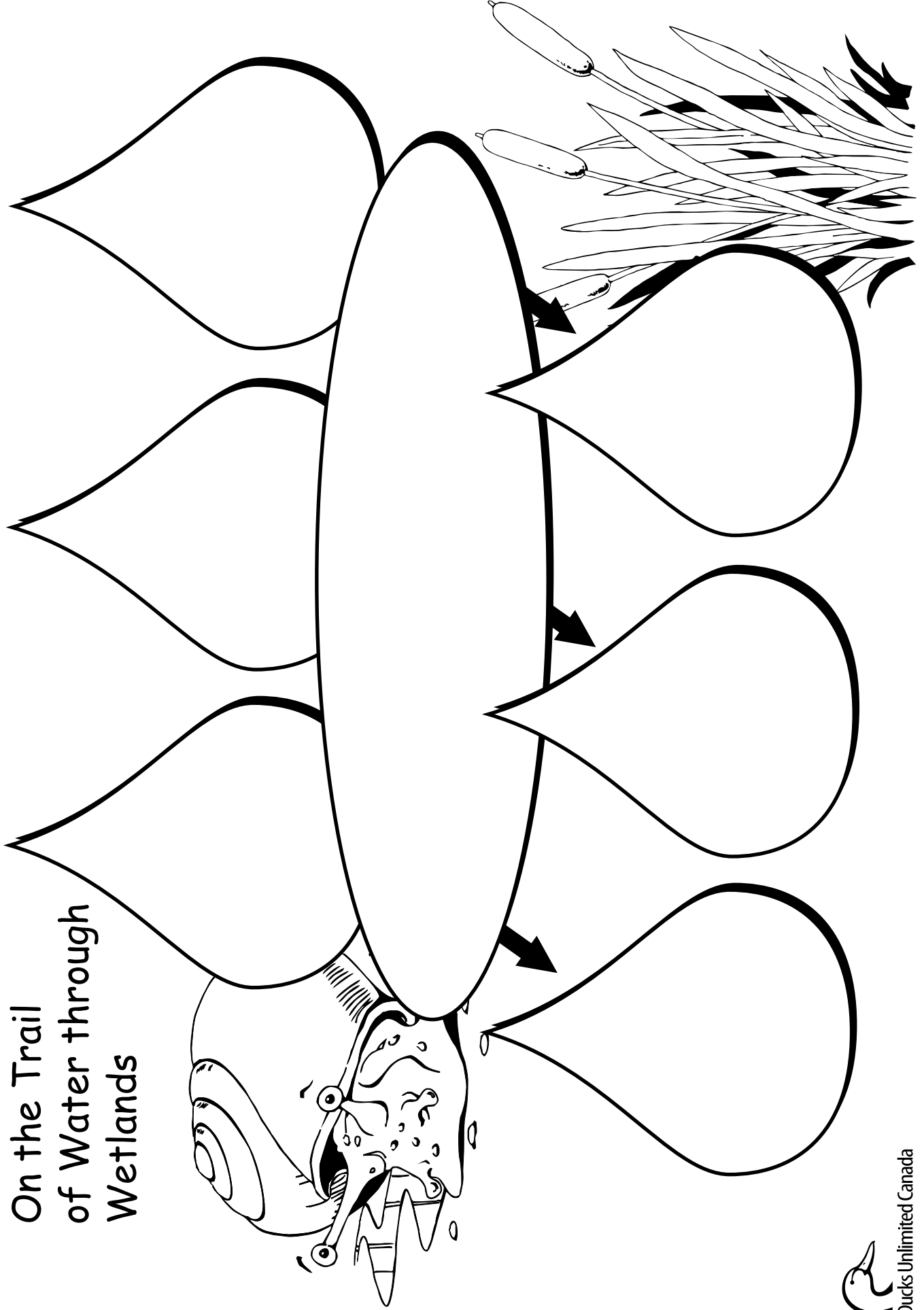
In small work groups complete the **Wetland Values - True or False** worksheet. Take up your answers as a class.

Optional: Ask students to create a poster about the importance, or one of the values (e.g. prevent flooding, home for wildlife, etc.) of wetlands using words or short sentences in their first language. They should translate the words into English to allow them to explain their poster to their classmates or to allow them to create an English version or a bilingual poster.



Wetlands Really Clean Up! - Graphic Organizer

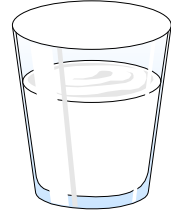
On the Trail
of Water through
Wetlands



Wetland Values - True or False?

Read each statement below and write a "T" if the statement is true or an "F" if it is false.

1. Wetlands help to clean our water. _____



2. Not very many species of plants and animals live in wetlands. _____



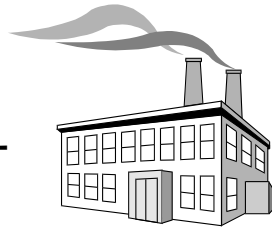
3. Wetlands help reduce flooding. _____

4. Scientists use wetlands as a place to study nature. _____

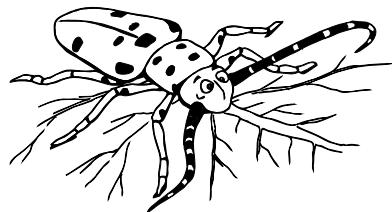
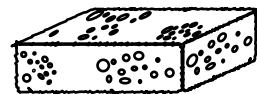
4. Many people use wetlands to hike and watch birds. _____



5. Wetlands pollute the air. _____



6. Wetlands act like giant sponges. _____



Lesson 7: Point of View

 **Time: 50 minutes**

Summary:

Students will:

- as a class, look at a map of Happy Town and discuss its features
- work in small groups to read through the profile of one of the following (farmers, builders, scientists and townspeople) and explore their point of view around the growth of Happy Town
- based on their group's exploration of a specific viewpoint, they will provide input into a class discussion of the pros and cons of adding 50 new homes to their community

Materials and Preparation

- profiles of farmers, builders, scientists and townspeople (one per group)
- a map of Happy Town (one map per group)
- **Growing Happy Town - Pros/Cons** chart

Vocabulary Words

Review profiles to determine if there are any new vocabulary words for the students in your class. If so, introduce these at the beginning of the class.

Detailed Lesson Plan



Review some of the reasons that wetlands are important, from Lesson 4: **Wetlands Really Clean Up!** and the Powerpoint **Wetlands Around the World.**



Split the class into 4 groups (or 8 if the class size is large). Give each group a copy of the Happy Town map. As a class, review the features of the map, including the town boundaries, the legend, the symbols and what they mean, and the features that are currently found in the town. Explain to the students that one group is going to pretend they are farmers growing food in Happy Town, one group will be builders, one group will be scientists and the other group will be the people living in the town, including those who own businesses. Hand out the corresponding information sheet to each group. Ask the students to read through their information sheet together. Then, have them look at the map and discuss as a group what changes they would like to see in Happy Town to have it work best for their viewpoint.



Hand each group a **Pro/Con** chart and, working from the same viewpoint, have them fill it out together.

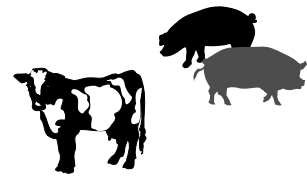


As a class, take up the **Pro/Con** chart, getting feedback from all groups. Have each group explain to the rest of the class who they represent and justify the answers they gave in the chart. Record the collective **Pro/Con** chart on the board and leave it there for next class



Farmers

The farmers grow all the food for the people who live in Happy Town. They grow apples and corn and raise cows and pigs. When more people move to Happy Town, they need more food to eat. Most of the land left for the farmers to use is the wetland.



If the farmers take the water out of a wetland, they can use the land to grow more food. But, if it rains a lot, all the water will go to the lowest area where the wetland was and it may be too wet for food to grow.

What should the farmers do?



Builders

Builders build houses for the new people that move to Happy Town. There are a lot of people that would like to live in Happy Town. The builders would like to build 50 new houses. Where should the builders build the new houses?

They can fill in the wetland and build them there. But the wetland is very important. For example, if it rained hard and the wetlands were no longer there to store water, what might happen to the houses? They could build on the farm land. But then where would people get their food?

Where should the builder build
the houses?



Scientists



Scientists want to keep the wetlands in Happy Town. They know that wetlands clean water, are homes to plants and animals, they act like sponges to stop flooding and drought and they are nice places to visit.

The farmers want to fill in the wetland and use it to grow food. The builders want to fill in the wetland and build houses.

What should the scientists do?



People Living in the Town

People love living in Happy Town.

They always have fresh food from the farmers to eat.



They have beautiful wetlands on the edges of the town that keep their water clean. Many plants and animals live in the wetland. The people of the town like to visit the wetland and go hiking there.

There are stores,  and parks.



Happy Town is a very nice place to live.



Look at the map of Happy Town. If you lived there, what would you do to make it better?



Happy Town

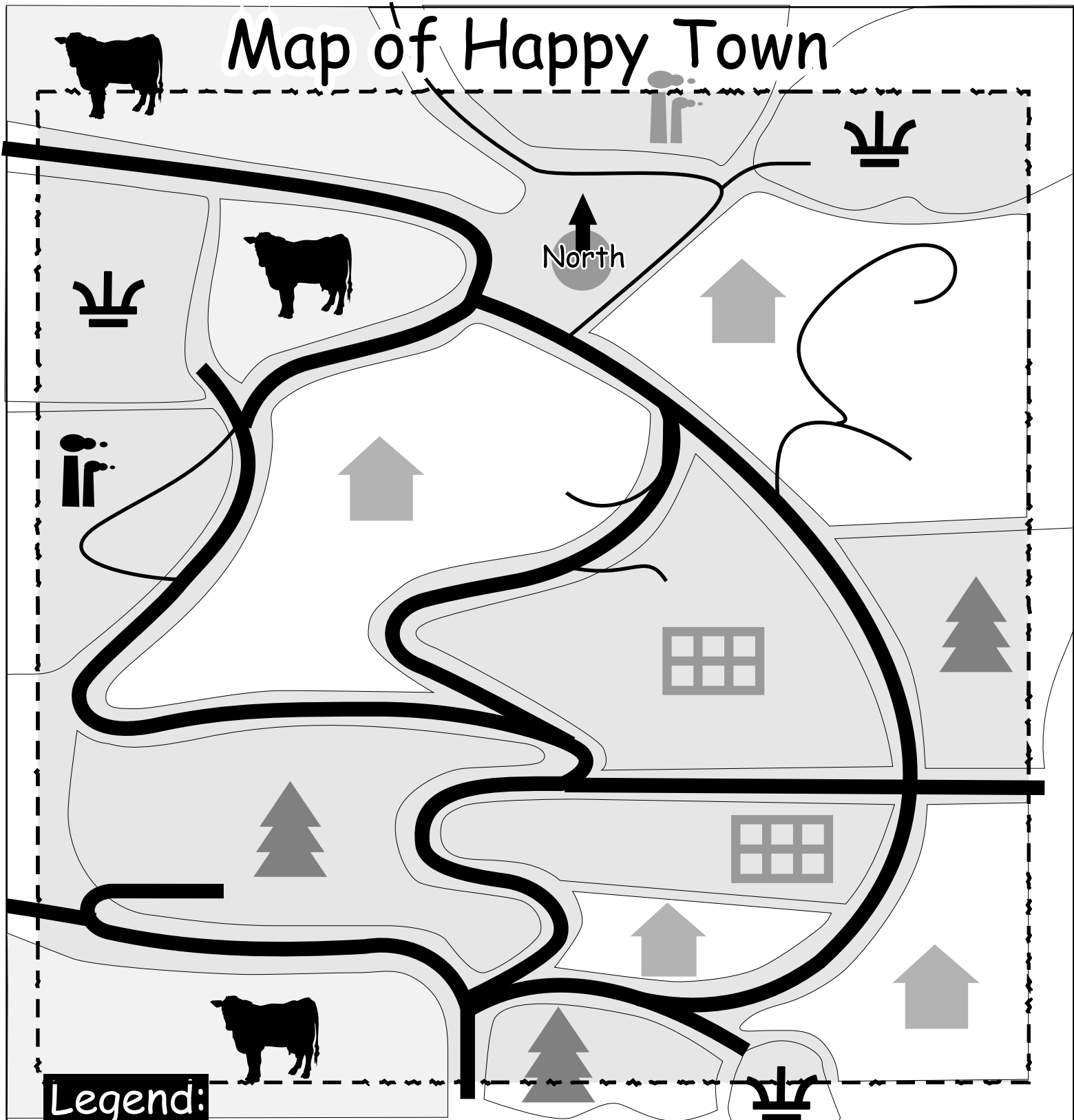


This is picture of Happy Town. It shows the places that people need - places to work, to play, to go to school and live. It shows parks and natural areas, and the farms that grow their food. It also shows the wetlands that are home to plants and animals and that help to clean the water for the town, and stop flooding and drought.

But when people want to plan a city or design a park, they create a map. Maps use symbols - simple pictures - to represent real things. The next page includes a map of Happy Town that you will use in Lessons 7 & 8.



Map of Happy Town




Legend:

Roads 

Town Boundary 

 Wetland

 Homes

 Factories

 Stores & Offices

 Park, Natural area

 Closed Factory

 Farmland



Growing Happy Town - Pros and Cons

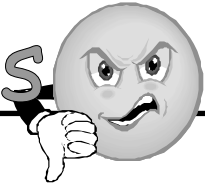


Activity

Pros



Cons



50 new families moving into Happy Town		
building houses on the farmers' land		
building houses in the wetlands		
building apartment buildings		
building new roads		
building new stores		



Lesson 8: The New Happy Town

 **Time: 50 minutes**

Summary:

Students will:

- work in groups that include at least one farmer, one builder, one scientist and one townspeople (from the previous lesson)
- review the **Pro/Con** chart
- work to create a map showing the plan for the New Happy Town considering the needs of the different groups

Materials and Preparation

- large sheet of newsprint (one per group)
- colouring utensils



Vocabulary Words

Review profiles to determine if there are any new vocabulary words for the students in your class. If so, introduce these at the beginning of the class.



Detailed Lesson Plan



5 min.

Split the class into 4 (or 8) groups again. This time, make sure there is one farmer, one builder, one scientist and one townspeople in each group. As a class, review the **Pro/Con** chart from last day.



45 min.

Inform the students that Happy Town is about to undergo a change. There are going to be 50 new families moving into Happy Town. As a group, the students need to decide where these families are going to live. They need to think about where all the people will get their food. They need to try to save as much of the wetland as possible so that the water stays clean, the town is safe from floods and drought, there will be an area for recreation for the townspeople, and there is a home for the plants and animals that live in Happy Town. Each student should give their viewpoint according to the group they were in last day, and students need to work together to find a solution that works best for everyone.

Give each group a large sheet of newsprint and colouring utensils. Ask them to redraw the map of Happy Town, including the changes that will have to be made for 50 new families to move in. Students need to keep in mind that they may need to include new roads and stores. Services like water mains, sewers and power lines will also be needed, but the students do not have to include these on their maps.

The finished maps should have a title, border, town boundaries, and a legend.



Lesson 9: Taking Action

 **Time: 50 minutes**

Summary:

Students will:

- in groups, complete their map and present their plan for Happy Town to the class
- through the individual activity page **Students Taking Action**, they will explore actions they might be able to take in their community to improve wetlands
- the class can explore further opportunities through the Extension suggestions below and through the Project and Action Ideas included at the end of this unit.



Vocabulary Words

Review profiles to determine if there are any new vocabulary words for the students in your class. If so, introduce these at the beginning of the class.



Detailed Lesson Plan



15 min.

Split students into their groups from last day. Give them some time to finish their map and prepare their presentation.



20 min.

Ask each group to present their plan for Happy Town and to tell the class why they made the decisions that they did.



15 min.

Hand out a **Students Taking Action** worksheet to each student in the class. Discuss with the class that there are many students in other classes who are working together to learn more about wetlands and working to protect them. Ask them to complete the worksheet, matching the picture of the action that students are taking with the correct description. Take up.



Materials and Preparation

- **Students Taking Action** (one per student)

Extension

Plan action projects. Work as a class or in small groups to share what you know about wetlands and to help to protect them. Over 70% of the wetlands that were once in southern Canada have been filled in, mostly for cities, farms and other kinds of development. Although many things are being done to help by Ducks Unlimited and other groups, students can become involved too.

See the individual **Project and Action Ideas** at the end of this unit or visit our website at education.ducks.ca to download the **Take Action** handout. Your students may also have some good ideas of their own.

OR

Plan a field trip to a wetland. Despite their continuing loss, wetland habitats are still some of the most easily accessible habitats to visit. To find one, check with your local naturalist club, national or provincial park, your local conservation authority or watershed management organization or your government department responsible for natural areas. In Ontario, you can visit www.downatthepond.ca for a wetland site near you. And, remember, Ducks Unlimited Canada's website provides many excellent free resources to help you to explore wetlands together with your students.





Students Taking Action

Match the pictures of students working to protect wetlands with the correct sentence



1.



2.



3.



4.

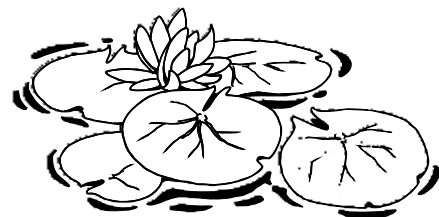


5.



6.

- A. Students can grow plants for wetlands. Picture # _____
- B. Planting plants or shrubs can help improve the health of a wetland. Picture # _____
- C. Students share what they know about wetlands with others. Picture # _____
- D. It is fun to build nest boxes for birds. Picture # _____
- E. Building wooden boardwalks allows people to visit wetlands and prevents damage to the soil and plants. Picture # _____
- F. Marking storm drains reminds people to prevent pollutants, like paint or oil, from going into our water. Picture # _____



ANIMAL MODELS – Nature Notes

NOTE: These notes are available in French as well as other languages (currently Arabic, Chinese, Cree, Korean, Ojibwe, Punjabi, Spanish, and Vietnamese)



LARGEMOUTH BASS*

Fish are important in the stories and symbols of many cultures and religions. The astrological sign Pisces is a fish and there are even stories of some gods appearing to humans in the form of the fish. The largemouth bass is the largest member of the sunfish family. It is found in many parts of eastern Canada, in areas with clear water and vegetation. It is a predator that eats crayfish, frogs and fish, including sometimes smaller largemouth bass.

The largemouth bass lays its eggs in round nests which the male scoops out from the lake or pond bottom. The males guard the eggs and newly hatched young for up to a month. After that the young are free to move off on their own – and to watch out for bigger, hungrier bass!



BEAVER*

“Busy as a beaver” is an old saying with a lot of truth. Beavers dam up streams to create wetlands and build large homes of logs and mud, call lodges. They appear to be at work all the time.

Perhaps that is why some of Canada's First Nations believe the beaver helped to build the earth. We all recognize the beaver by its wide flat tail which helps it balance on land when it is cutting down trees or dragging them over land to build or repair its dam or lodge or simply to have as a snack. That's right - the beaver's main food is the bark and twigs of trees! The beaver's tail also helps it to steer itself when swimming. This is important since the lodge has underwater entrances. These make it difficult for a predator to sneak up on the beaver or its family.



DRAGONFLY*

Dragonflies are found around the world near wetlands, lakes, and streams because they lay their eggs and develop in water. In many European countries dragonflies have an evil image while they are revered in many Asian and aboriginal cultures. Vietnamese people have a traditional way to forecast rain by seeing dragonflies: "Chuồn chuồn bay thấp thì mưa, bay cao thì nắng, bay vừa thì râm" (Dragonflies fly at low level, it is rainy; dragonflies fly at high level, it is sunny; dragonflies fly at medium level, it is shadowy).

Dragonflies move quickly through the air to hunt mosquitoes, flies and other small insects. This makes them an important predator to control harmful insects. Dragonflies start out as eggs laid in water (sometimes on plants or buried in the muddy bottom), then pass through several stages, eventually climbing out onto a plant stem where they emerge as adults.



MALLARD DUCK*

The mallard is probably the world's best known duck. It is found in many parts of the world and the male's glossy green head and the hen's familiar “quack” call are easy to recognize.

Mallards are dabbling ducks that feed by skimming their beaks along the surface of the water to gather up small floating plants and other tiny creatures. Mallards may nest near a lake, pond, river or even a backyard pool. Each spring the mallard hen lays 8 – 12 greenish-coloured eggs in a nest on the ground. These hatch 28 days later and the young are soon led down to the open water by their mother where they will learn all they need to know about being a duck!



RED FOX*

Foxes appear in stories from around the world. They are usually seen as clever troublemakers but perhaps that is simply because they are hunters that need to be able to sneak up on their prey.

The red fox is found across Canada. They dig deep dens with several entrances in which they have their young. The family stays together hunting until the fall when the pups grow up and move out on their own. Foxes eat mice, squirrels and rabbits but also other foods such as insects, crayfish and some plants. Just like other animals, foxes have to watch out for a hungry predator, such as a coyote or bobcat, which might look upon them as dinner!





LEOPARD FROG*

Frogs appear in fairy tales from many countries - usually telling a tale of a handsome hero changed into a frog and only able to be changed back by magic. Perhaps this is because the frog's life is one of magical changes. The frog starts out its life as part of a gooey mass of eggs attached to a plant stem underwater. The egg hatches into a tadpole which lives in water but then starts to grow legs, eventually becoming a completely different creature – a frog which can hop and move over land. There are many kinds of frogs in the world and they all depend on water for part of their life. The leopard frog is one of the most common frogs in Canada. It feeds on insects, crustaceans and sometimes other frogs. But, of course, frogs and tadpoles are food for fish, birds, raccoons and other animals.



GREAT BLUE HERON*

The heron, and other long-legged wading birds including cranes, depend on the world's wetlands. These birds are important to people in many cultures and, in fact, are often used as a symbol for conservation organizations in countries such as Japan. The great blue heron is often seen in the shallow water along the edges of marshes, rivers and lakes where it feeds on frogs, fish, insects, shellfish and other small animals. This 1.2 metre tall bird is a hunter and stands motionless when stalking its prey. Herons nest in colonies in bulky stick nests high up in trees. Here they usually lay 4 eggs. The herons feed their young until they are ready to fly to the nearest wetland and learn to hunt for themselves.



GREAT HORNED OWL*

Owls are found everywhere on earth except Antarctica, and in every habitat from desert to arctic tundra. Owls appear in stories around the world, often seen as wise, but sometimes as foolish, and in many cultures as an evil omen. The great horned owl is found throughout most of North America and is one of the larger birds of prey. Like all owls, its huge, round eyes help it to see in low light and its specially built feathers help it to glide silently through the air as it hunts. The owl has a very long, flexible neck which allows it to sit comfortably with its body facing one way and its head facing another. The great horned owl nests in the hollows of trees, often when there is still snow on the ground. It is a strong bird and may feed on everything from small animals to skunks and even geese.



YELLOW-SPOTTED SALAMANDER*

The word salamander comes from ancient Persian meaning "to dwell in fire". This belief is widespread and may have come about because adult salamanders often dwell inside rotting logs. When a log was placed on a fire, the salamander raced out, looking like it was created by the flames. Of the more than 400 kinds of salamanders found in the world, almost all live near water or wetlands. They are amphibians and their eggs are laid and hatch in water. Spotted salamanders are rarely seen except in the early spring when they gather at ponds and ditches to breed. Salamanders feed on worms, beetle larvae and small insects. They are hunted by fish, snakes, crows, muskrats and other animals. Salamanders have one amazing characteristic. If they lose a leg or tail, they can grow it back. This comes in handy when escaping a predator.



PAINTED TURTLE*

Did you know people in North America, China, Africa and India all have ancient beliefs that the Earth is carried on a turtle's back? And, that you can find turtles in most parts of the world, as long as they have a few warm summer months? The Painted Turtle is found in many of the small lakes and wetlands of southern Canada. They eat many different things – plants, worms, leeches, tadpoles, insects and even, small fish or frogs. A hard shell surrounds their body and protects them from predators, such as a hungry fox or raccoon. The bottom shell has a beautiful design that looks like it is painted and its face has bright coloured markings. I bet you can guess how this turtle got its name!

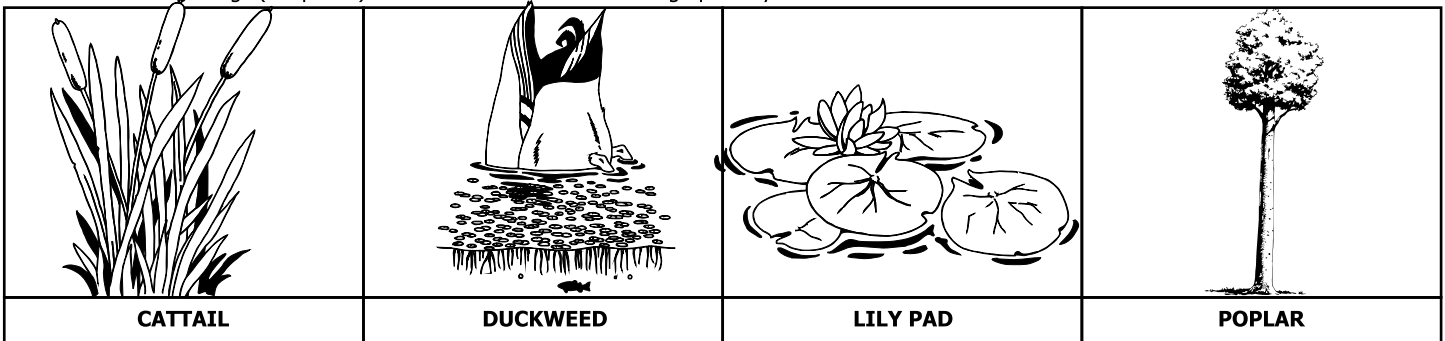


Plants and Animal Images

- black and white line drawings (size 8 1/2 x 11) to use with these lesson plans – available on CD
- where indicated (*) paper models are available and include nature notes in English and French, as well as other languages (currently Arabic, Chinese, Cree, Korean, Ojibwe, Punjabi, Spanish, and Vietnamese)
- additional information about these species may be found in DUC's publication *Marsh World* and in other Project Webfoot resources or on-line at education.ducks.ca. Another good source of information is the Canadian Wildlife Service's Hinterland Who's Who at www.hww.ca or the Canadian Museum of Nature at http://nature.ca/discover/discover_e.cfm

Plants - primary producers

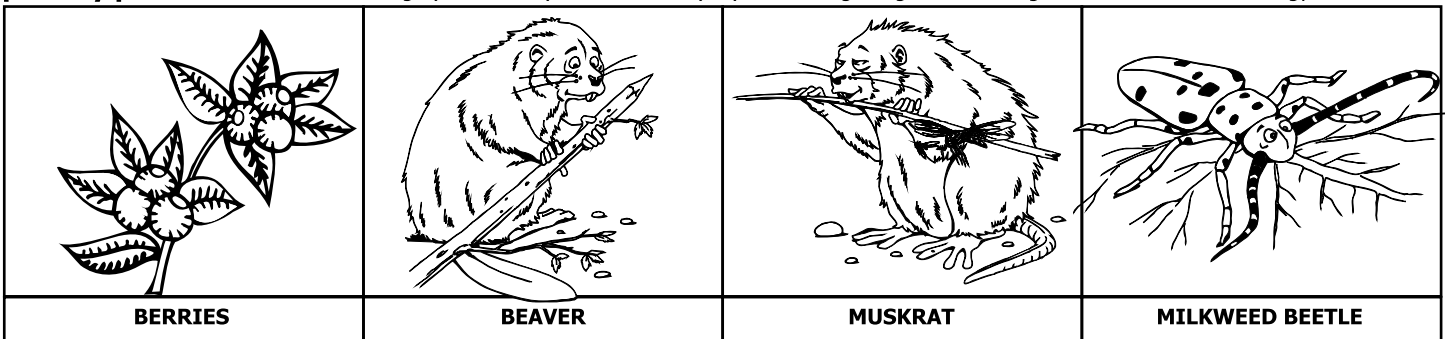
Producers are living things (i.e. plants) that make their own food through photosynthesis



Plants (con't.) - primary producers

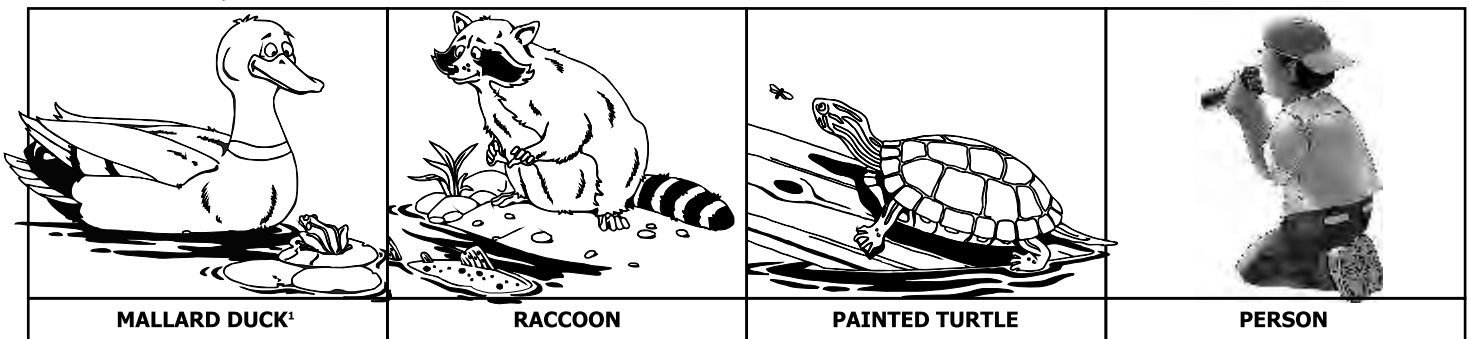
Herbivores - primary consumers

Herbivores eat plants. Consumers are living things (i.e. animals) that consume (eat) other living things in order to get their nutrients and energy.



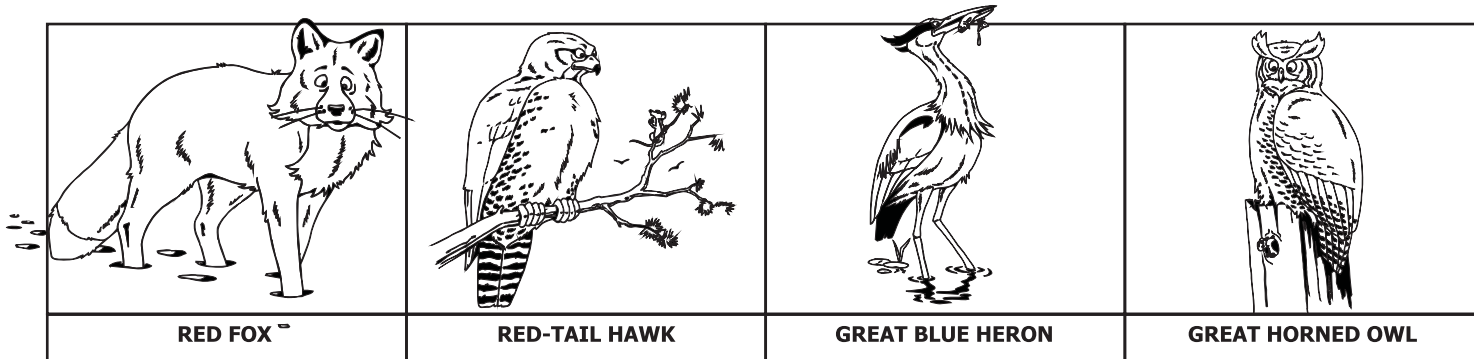
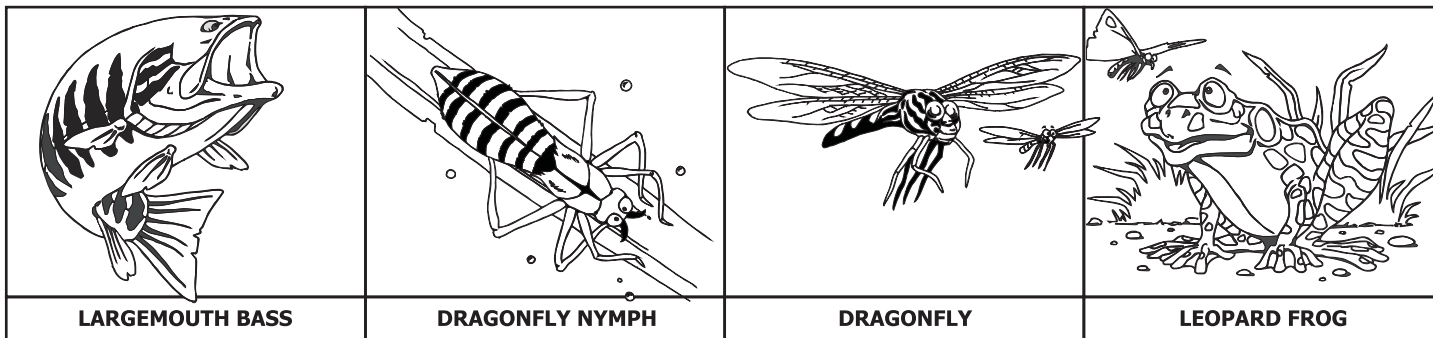
Omnivores - consumers

Omnivores eat both plants and other animals and are consumers.



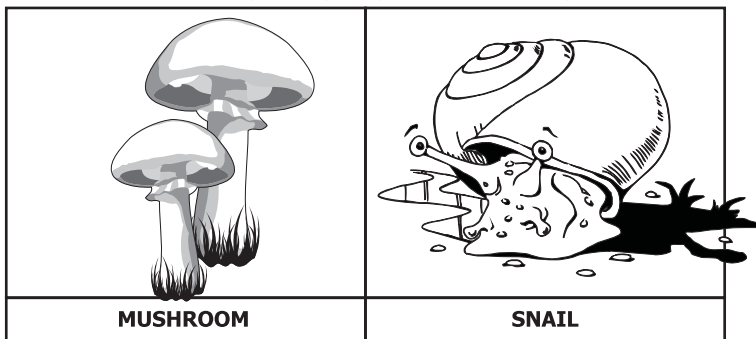
¹Different kinds of ducks are adapted to eat different food. The mallard eats mostly plants, although it may eat insects, mollusks and other tiny animals.

Carnivores - consumers Carnivores eat other animals, which may include anything from small insects and microorganisms to birds, mammals and other larger creatures. They are consumers.



Decomposers - consumers

Eat or break down no-longer living things, thereby returning their nutrients to the soil (e.g. mushrooms, snails, worms, etc.).



NORTH AMERICA

1. Canada's boreal forest and its wetlands store vast amounts of carbon which would be released with drainage. This carbon storage protects against climate change and is valued at \$849.2 billion.
2. Ducks Unlimited is a major partner in the North American Waterfowl Management Plan (NAWMP), among Canada, the US and Mexico. NAWMP partners have conserved millions of hectares of habitat.
3. Oak Hammock Marsh is a 3500 hectare restored wetland that is home to Ducks Unlimited's Canadian headquarters and an award winning public learning centre.
4. Walpole Island includes 6,900 hectares of the richest wetlands in the Great Lakes. Aboriginal peoples have lived here for thousands of years. To this day, many support their families through hunting, fishing, trapping, and guiding.
5. Polar Bear Provincial Park in the Hudson Bay/James Bay lowlands, is home to polar bears, caribou and hundreds of thousands of waterfowl.
6. More than 10 million ducks and geese depend on Louisiana's coastal marshes for their winter homes. These wetlands also provide vital flood and wind protection during violent storms.
7. Each year over 1 million tourists visit the Florida Everglades, to view the many species of wildlife.
8. Mexico's coastal lagoons can yield over 30 kilograms of oysters per hectare - that's 10 times the amount of food that could be produced by farming beef cattle on drained wetlands.

SOUTH AMERICA

9. The vast Pantanal wetland zone in Brazil has wet and dry cycles. The shallow wetlands remaining in the dry season provide a rich feeding ground for wildlife, including over 700 species of birds.
10. One billion people eat fish as their primary source of protein. Two-thirds of marine fish species rely on coastal wetlands such as the mangrove swamps of the Caribbean, at some stage in their lifecycle.
11. Over 1,800 different species of fish are found only in the Amazon River and its wetlands.
12. The Parana River sustains water levels for much of South America. From Argentina, its tributaries and wetland floodplains extend into Bolivia, Paraguay and Brazil.
13. 80% of the world's population depends on traditional medicines, many derived from wetland plants and animals.

EUROPE, MIDDLE EAST

14. The sand and mudflat salt wetlands of western Britain and France are nurseries for herring, sole and mussels.
15. Like all wetlands, the Azraq Oasis in Jordan's East Desert, is a water reservoir that supports most of the life in the region.
16. The global treaty to protect wetlands was signed at an international meeting in Ramsar, Iran, in 1971. Visit www.ramsar.org for details.

AFRICA

17. The Etosha Pan is Namibia's most important wetland. During the dry season, it is an essential watering and feeding place for vast herds of African wildlife.
18. Africa's greatest floodplains are found in the very dry Sahel region. People living there depend on these seasonal wetlands to support agriculture and for sources of water and fish.

ASIA

19. Over 40 million waterbirds use Northern Asian wetlands for nesting.
20. Some of the world's mightiest rivers: Ganges, Brahmaputra, Indus, Mekong and Yangtze, originate in the Himalayan Mountains. These watersheds support all life in the south Asia and Indian subcontinents.
21. India is the world's second most populous country - most of the people are farmers supported by wetlands.
22. Bangladesh's vast floodplains, provide fish and crops for its people. This richness results from natural cycles of flooding which also are a challenge for humans.
23. Ninety-five percent of China's huge population is concentrated along its vast river floodplains.
24. Worldwide, cranes rely on wetland health to survive. The Sarus crane, an endangered species, is a Japanese symbol of conservation.
25. Rice, a wetland plant, is the staple diet of three billion people worldwide. It was first domesticated in southeast Asia.

AUSTRALIA, NEW ZEALAND, SOUTH PACIFIC

26. Much of Australia is flat and dry. When it rains, floods spread quickly over big areas creating temporary wetlands. Much of the land drains into Lake Eyre, and waterfowl species here respond quickly to wet conditions by nesting.
27. Wetlands are of cultural and spiritual significance to the Maori people of New Zealand.
28. The "Green Coast Project", is repairing coastal habitats and the livelihoods of the people of Indonesia, Sri Lanka, India, Thailand and Malaysia who were affected by the Tsunami disaster.



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Guide to Wetlands: An Illustrated Guide to the Ecology and Conservation of the World's Wetlands. Dr. Patrick Dugan, General Editor, Firefly Books Ltd., 2005

The Ramsar Convention on Wetlands Secretariat, www.ramsar.org

Ducks Unlimited Canada, www.ducks.ca.

Other resources:

Visit education.ducks.ca to download these and other free resources from Ducks Unlimited Canada's website.

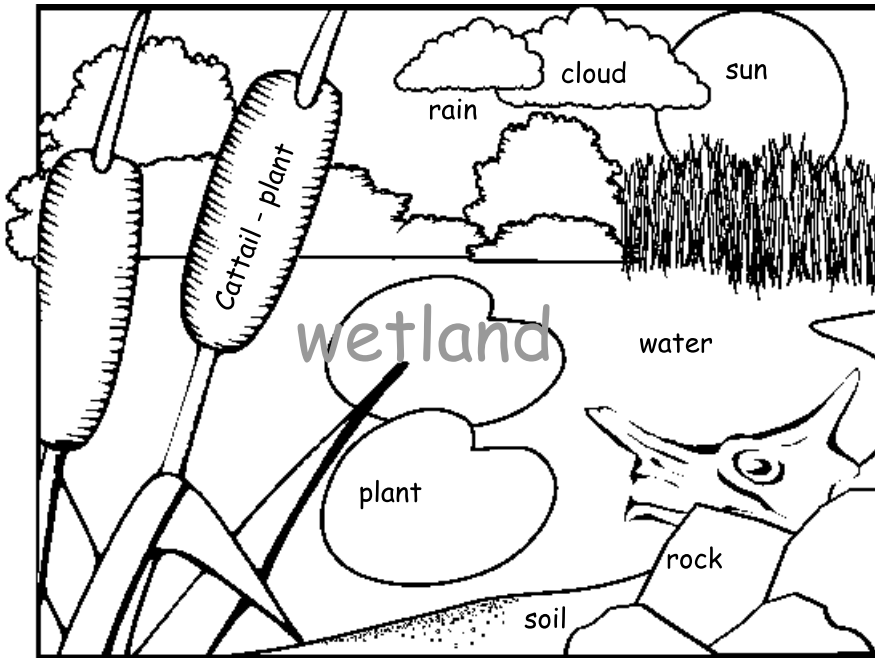
www.downatthepond.ca, sponsored by DUC, Conservation Ontario and the Ministry of Natural Resources, provides information about publicly-accessible wetlands across Ontario

Ecokids, a program of Earth Day Canada, provides additional ELL resources dealing with a variety of environmental issues. Download these free resources from ecokids.ca

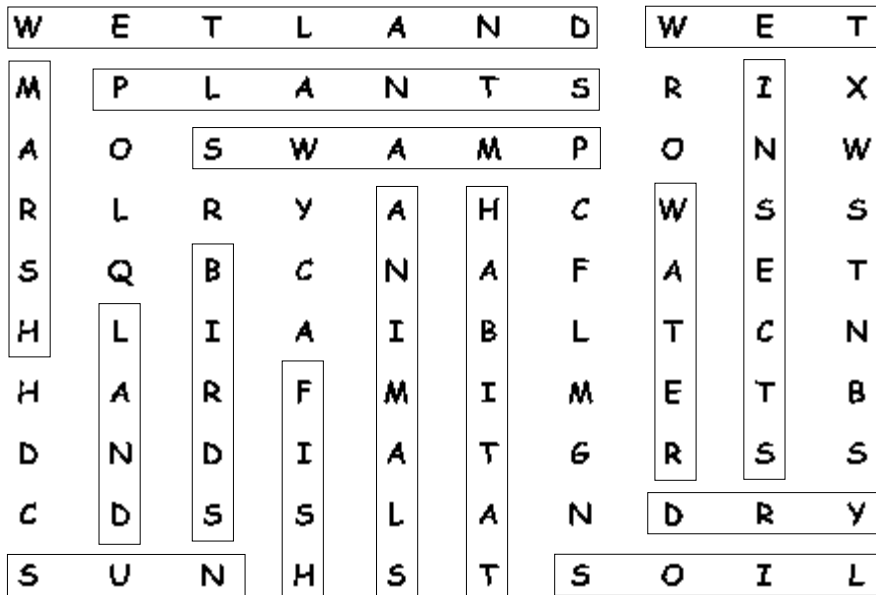


Lesson 1: Exploring Wetlands

Healthy Wetlands • Example: Graphic Organizer



Wetland Word Search



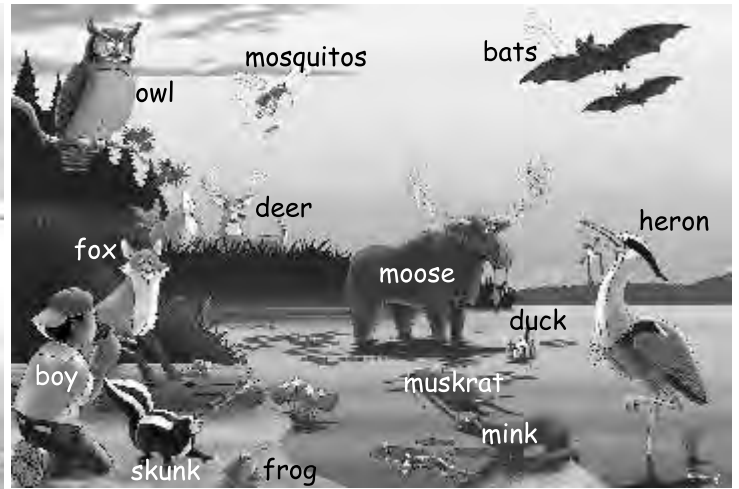
Lesson 2: Wetland Wildlife

Wetland Plants and Animals

1. duck
2. fish
3. frog
4. beaver
5. turtle
6. raccoon
7. heron
8. dragonfly
9. cattail



Lesson 3: Wetland Web of Life



Wetland Who, What, When, Where and Why

1. **What/Which** is the muskrat doing?
The muskrat is eating a cattail.
2. **Who/Which** animals are eating?
The heron (duck, moose, frog, muskrat) is eating.
3. **When/What** is the girl pointing at?
The girl is pointing at a bird.
4. **Why/Where** does the duck look surprised or scared?
The duck is worried that the hawk may want it for dinner.
5. **What/Which** animal is standing on a log?
The fox (turtle) is standing on a log.
6. **Who/Which** animal is hunting?
The mink (hawk, heron, bat, dragonfly) is hunting.
7. **What/Where** is the bat doing?
The bat is flying.
8. **Where/Who** is the frog sitting?
The frog is sitting on a lily pad (on the ground).
9. **When/What** do you think the hawk will have its dinner?
The hawk will have its dinner when it catches its prey.
10. **Which/When** animals are in the water?
The duck (beaver, moose, frog) is in the water.



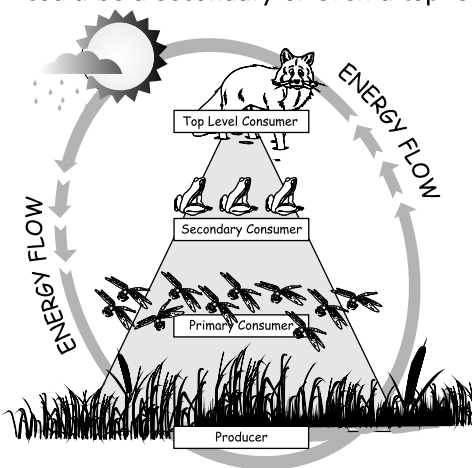
Lesson 4: Who Eats Whom?

Food Chains – Singles and Plurals

1. A duck **eat/eats** plants.
2. Foxes **eat/eats** small animals.
3. Plants don't need to **eat/eats** because they make their own food.
4. Some fish **eat/eats** small plants.
5. A deer **eat/eats** grass and berries.
6. Beavers like to **eat/eats** plants and tree bark.
7. A muskrat **eat/eats** plants, fish and frogs.
8. I like to **eat/eats** (student enters own food preference)!

Lesson 5: Wetland Energy Flow

Note: Green plants are **producers** (green plants still produce energy even though some, like carnivorous plants (sundews, pitcher plants, Venus fly-trap) digest animal protein to supplement the nutrients lacking in some habitats and parasitic plants, like orchids, extract nutrients from other plants.) However, animals may occupy different levels in different food chains. For example, a raccoon will be a primary consumer in a food chain where it is eating berries but it could be a secondary or even a top level consumer in a chain where it is eating a clam or a fish that ate the clam.

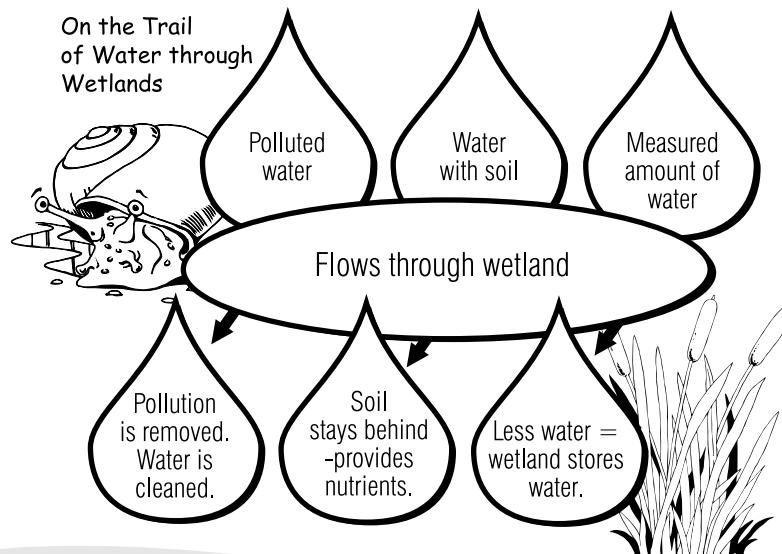


Producers: cattail, water lily, duckweed, berries, rice, tree
 Primary Consumers may include: fish, muskrat, beaver, duck, turtle, bug, snail, raccoon which all may eat plants.
 Secondary Consumers: frog, dragonfly, raccoon, hawk, owl, heron, fox
 Top Level Consumers: hawk, owl, fox, human
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Lesson 6: Wetlands Really Clean up!

Wetlands Really Clean Up!
(Graphic organizer)



Lesson 6: Wetlands Really Clean up! (continued)

Wetland Values - True/False

1. True. Students have seen this demonstrated in Lesson 6.
2. False. Wetlands are some of the most biologically diverse ecosystems in the world containing hundreds of different species of plants and animals.
3. True. Demonstrated in Lesson 6.
4. True. Demonstrated in Lesson 6.
5. True. Demonstrated in Lesson 6.
6. False. Like all natural areas with plenty of plant growth, wetlands help to clean the air. If your students have experienced a "smelly" wetland, this is because some produce methane gas as wetland plants die and decay but this is not considered pollution.
7. True. Demonstrated in Lesson 6.

Lesson 7: Point of View

Growing Happy Town – Pros/Cons

These are only a few examples. Students may come up with many of their own ideas.

Activity	Pros	Cons
50 new families moving into Happy Town	<ul style="list-style-type: none"> • will give new homes to people • will bring more money into the community – more people will shop in the local stores • may create new jobs – to build the houses and maybe afterwards (for stores, services, etc). • more people may mean new services – enough people to justify building a community centre, new school, more stores, movie theatre, etc. • new neighbours – more kids to play with 	<ul style="list-style-type: none"> • need space to build housing • may effect the natural areas or farmland • will need more roads, stores, water mains, sewers • more traffic, more congestion, maybe more pollution
Building houses on farmers' land	<ul style="list-style-type: none"> • land has already been cleared of trees and does not need special preparation (for example, building in a wetland might mean they need to remove water) • building homes will be easier and cheaper than other places 	<ul style="list-style-type: none"> • will lose important farmland • will have to bring more food or maybe even all the food they need from other places (more trucks on the road, more use of gas, more pollution, more cost to their food) • farmers will lose their livelihoods and have to find work elsewhere



Lesson 7: Point of View (continued)

Activity	Pros	Cons
Building houses in the wetland	<ul style="list-style-type: none"> the land is not currently being "used" for houses, city buildings, etc. would leave the farmland for growing food 	<ul style="list-style-type: none"> loss of natural habitat that provides many benefits including helping to purify the water for the town, preventing floods, providing homes for wildlife and so on the land is very wet which will likely increase the cost of building there water will still flow to the lowest spot and so houses built there may eventually experience flooded basements
Building apartment buildings	<ul style="list-style-type: none"> creates high density housing so you need less land for more people 	<ul style="list-style-type: none"> town will start to lose its small town feel
Building new roads, installing power lines and so on	<ul style="list-style-type: none"> will create jobs to build and maintain their new services roads will make it easier for people to move around town and for others to visit 	<ul style="list-style-type: none"> will have to use more land to build these leaving less land for farms and nature
Building new stores	<ul style="list-style-type: none"> will create jobs people will have more choices about where they shop or they may not have to go as far to shop 	<ul style="list-style-type: none"> new stores will compete with existing stores and there may not be enough business to keep all stores operating need to use more land to build these stores

Lesson 9: Taking Action

Students Taking Action A – 2, B – 6, C – 5, D – 3, E – 1, F – 4

