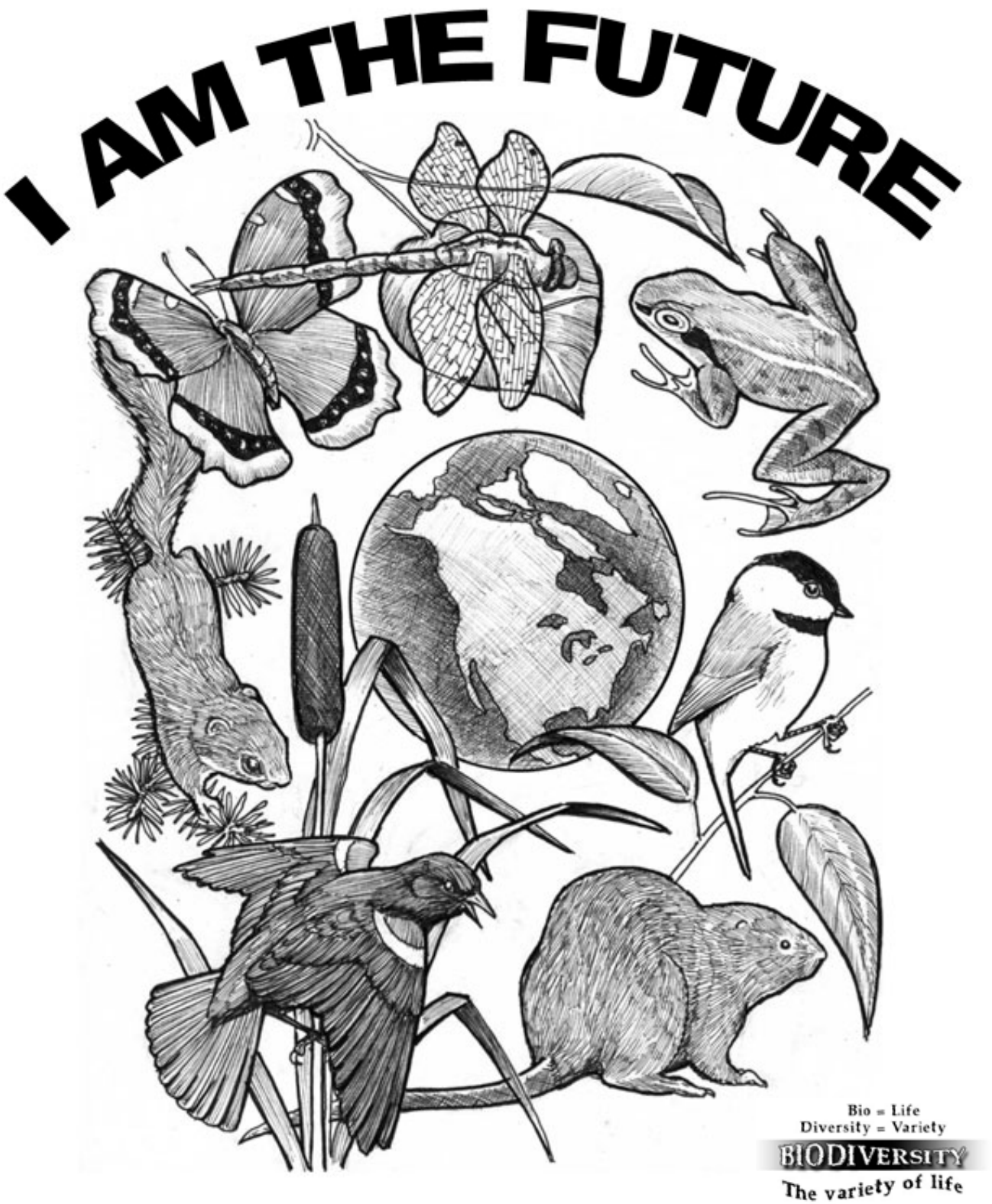

Song & Educators' Handbook

Ecological Literacy for Grades 4 – 6

Biodiversity of Wetlands & Urban Forests

Alberta Edition

Ver. 01/18/12

SONG & EDUCATORS' HANDBOOK

ECOLOGICAL LITERACY FOR GRADES 4 – 6

BIODIVERSITY OF WETLANDS & URBAN FORESTS

ALBERTA EDITION

Presented to Alberta Educators by

University of Alberta
City of Edmonton
ABCRC

This music-based learning resource supports sustainability education and ecological literacy. Inside you'll find: blackline illustrations; articles about Alberta wetlands and urban forest ecosystems and their organisms; science activities for grades 4-6 and much more.

The song, *I Am the Future* is written from the point of view of a young person and carries the message that they can take action and make a difference now to protect their local ecosystems and the Earth.

"Each fall since 2008, we have been producing a *Voices of Nature* concert at the Myer Horowitz Theatre in celebration of Sustainability Awareness Week at the University of Alberta (U of A). Choirs of hundreds of students from local schools learn songs about nature, and join us and the Dream Band in spectacular performances that celebrate students' learning and leadership. Students learn songs for many weeks leading up to the concert, and the music is used in classrooms to enliven studies in science, social studies and many other subjects. *I Am The Future* is our closing finale anthem.

To enhance the educational component of the annual *Voices of Nature* Concert, the U of A, City of Edmonton and the Alberta Beverage Container Recycling Corporation (ABCRC), through their on-going partnership, want to offer Alberta teachers a learning resource to support sustainability education that takes advantage of the fact that kids love to sing this song!

The *I Am The Future* Song & Educators' Handbook provides music and biology information to support existing, excellent resources provided by Learn Alberta and the Cities of Edmonton and Calgary, and others. The beautiful illustrations and entertaining articles, together with the song, connect students to the natural world and reasons for caring about and understanding the environmental consequences of our actions and why we need to take responsibility for making the world a better place."

HOLLY ARNTZEN & KEVIN WRIGHT
ARTIST RESPONSE TEAM (ART)

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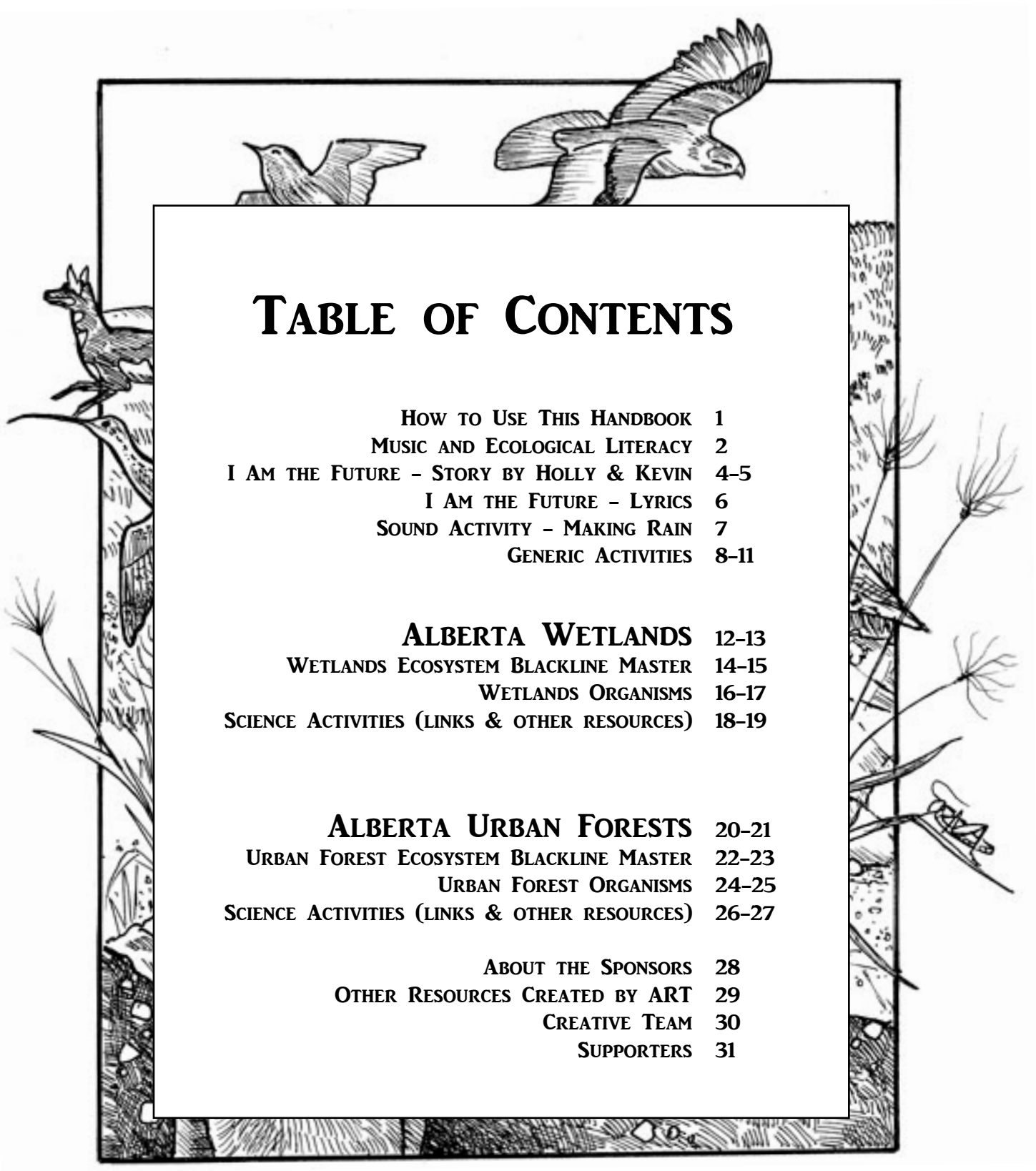

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MONTANE ECOZONE

Rocky Mountains, Alberta foothills, Interior valleys of BC

Steller's Jay, Golden Eagle, Grizzly Bear, Elk, Stonefly, American Dipper, Long-toed Salamander, Bull Trout, Spruce Grouse

How To Use This Handbook

Music is a fabulous tool for project-based, cross-curricular environmental education. Singing together includes all learners. This handbook helps ANY teacher to use music in the classroom. It makes connections to ecosystems that are hopefully within reach of most classsrooms, and can provide children with the opportunity to get to know their home places and neighbourhood organisms.

Make double-sided sheets and give students the **Story, Lyrics, Illustrations and Articles.** Have students insert the sheets in a keepsake "*I Am The Future* Journal".

Download the MP3 for *I Am The Future,* so you can play it in your classroom. You can find it here: **www.ArtistResponseTeam.com/handbooks**

Read the Story aloud and use it to elicit students' questions about what they wonder, what they want to learn, and what they can do to help address issues raised in the song.

Play the song while students listen. Refer to the song **Lyrics**; discuss vocabulary that is new to them.

Sing the song together often and with gusto!

Find some piece of nature within walking distance of your classroom, and take your students outside regularly. A tree, or bird on the wing can be a connection point to the wide world of nature. Your findings will change from season to season.

Articles and **Illustrations** about **Alberta Wetlands and Urban Forests** provide an overview of the biodiversity of these ecosystems and can spark further research in libaries and on-line.

Generic activities are flexible, standard practices that offer rich opportunities to promote meaningful learning; they can be adapted throughout the year, and to any grade level.

Science activities are provided for Grades 4 to 6 in each of the Wetlands and Urban Forests sections. **Links** are given to existing, approved curriculum resources and programs.

The idea behind this handbook is to complement existing lesson plans by providing music, illustrations and science writing to make the information accessible to as many learners as possible.

Music & Ecological Literacy

This handbook uses music to support the development of ecological literacy across communities. Becoming more ecologically literate enables us to make more informed decisions and take action as stewards of the planet. All of us... young and old!

The title, *I Am the Future,* implies that present-day actions have long-term effects on the lives of children, their children and grandchildren, and generations that will follow. Our understanding of the present and future worlds is intuitive when we hear and see children sing the title song in chorus and with actions: "I… I am… I am the future, I'm the new… We… We are… We are the future..." Awareness that comes to us through our intuition is important, but passive. As we contemplate the rest of the lyrics, we hear a call to action and realize that we cannot afford to waste any more time. The children sing, "…we're counting on you." We, in turn, are counting on children, recognizing that they embody our hope for the future and sustainability of life on Earth. Such hope is dependent upon developing ecological literacy−the attitudes, skills, and knowledge necessary to change our behaviours and lifestyles to become more Earth friendly.

The ecosystems of the natural world are sustainable communities of plants, animals, and microorganisms. There is no waste in these ecological communities, one species' waste being another species' food. Thus matter cycles continually through the web of life. The energy driving these ecological cycles flows from the sun, and the diversity and cooperation among its members is the source of the community's resilience. Being ecologically literate means understanding these basic principles of organization of ecological communities and being able to embody them in the daily life of human communities.

Center for Ecoliteracy (http://www.ecoliteracy.org/)

Whether we define ecological literacy as a principle of ecology, sustainability, or community is incidental. We are talking about some basic facts of life.

As complex as these concepts are, even very young children can observe, experience, and come to understand their world—especially when the adults who support their learning are also engaged in doing the same. Children ARE the future. They are counting on us to support all aspects of their development and their capacities for curiousity, creativity, and problem solving. Together with them, we can take actions now that will contribute to sustainable communities and new possibilities for the future.

Music is a wonderful and interactive way for adults and children to explore, and learn about the natural world. Singing together is fun and can include everybody.

GRASSLANDS ECOZONE

Southern Alberta, Saskatchewan, Manitoba

Sprague's Pipit, Ferruginous Hawk, Pronghorn, Plains Bison, Long-bill Curlew, Swift Fox, Sagebrush, Western Meadowlark, Prickly Pear Cactus, Grasshopper, Needle and Thread Grass, Richardson's Ground Squirrel

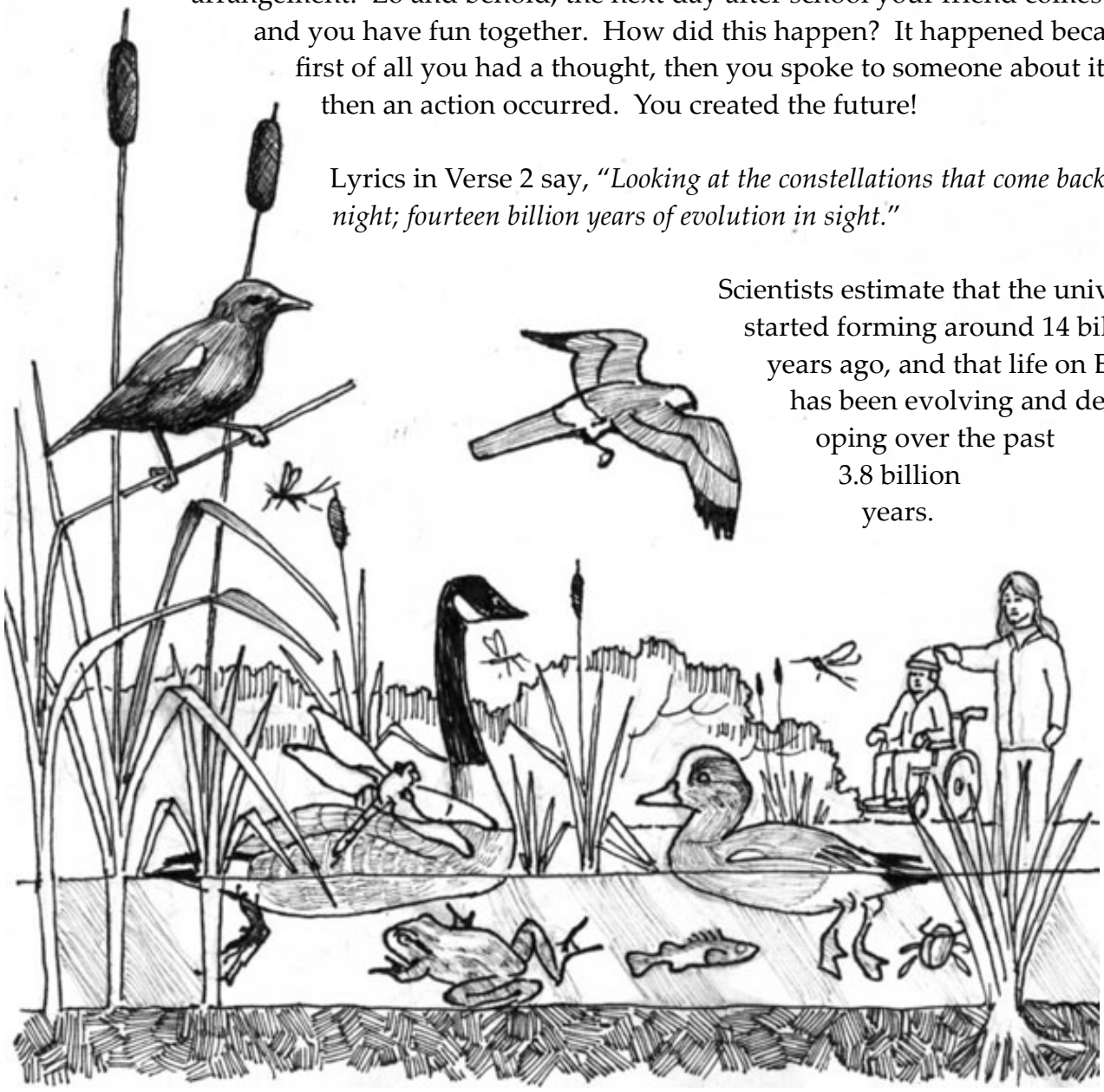
I Am the Future – Story by Holly & Kevin

We are singers and songwriters from British Columbia; those are our voices in the recording. We deliver programs in schools called *Voices of Nature* and work with thousands of students every year, in BC and Alberta. We wrote this song from the point of view of young people, the decision-makers of tomorrow, talking to us adults, the decision-makers of today. You may not realize it, but as young people, you have a great deal of influence on what happens in your family, your school and your community. You influence the future every day.

Here's a small example: The lyrics in the Bridge say,
"With every second, thought, word and deed, the future comes true in me."
Imagine you are at home, and you think to yourself, "I want my friend to come over and play." You ask your parents if your friend can visit. They phone your friend's guardians and make an arrangement. Lo and behold, the next day after school your friend comes over, and you have fun together. How did this happen? It happened because first of all you had a thought, then you spoke to someone about it, and then an action occurred. You created the future!

Lyrics in Verse 2 say, "*Looking at the constellations that come back every night; fourteen billion years of evolution in sight.*"

Scientists estimate that the universe started forming around 14 billion years ago, and that life on Earth has been evolving and developing over the past 3.8 billion years.

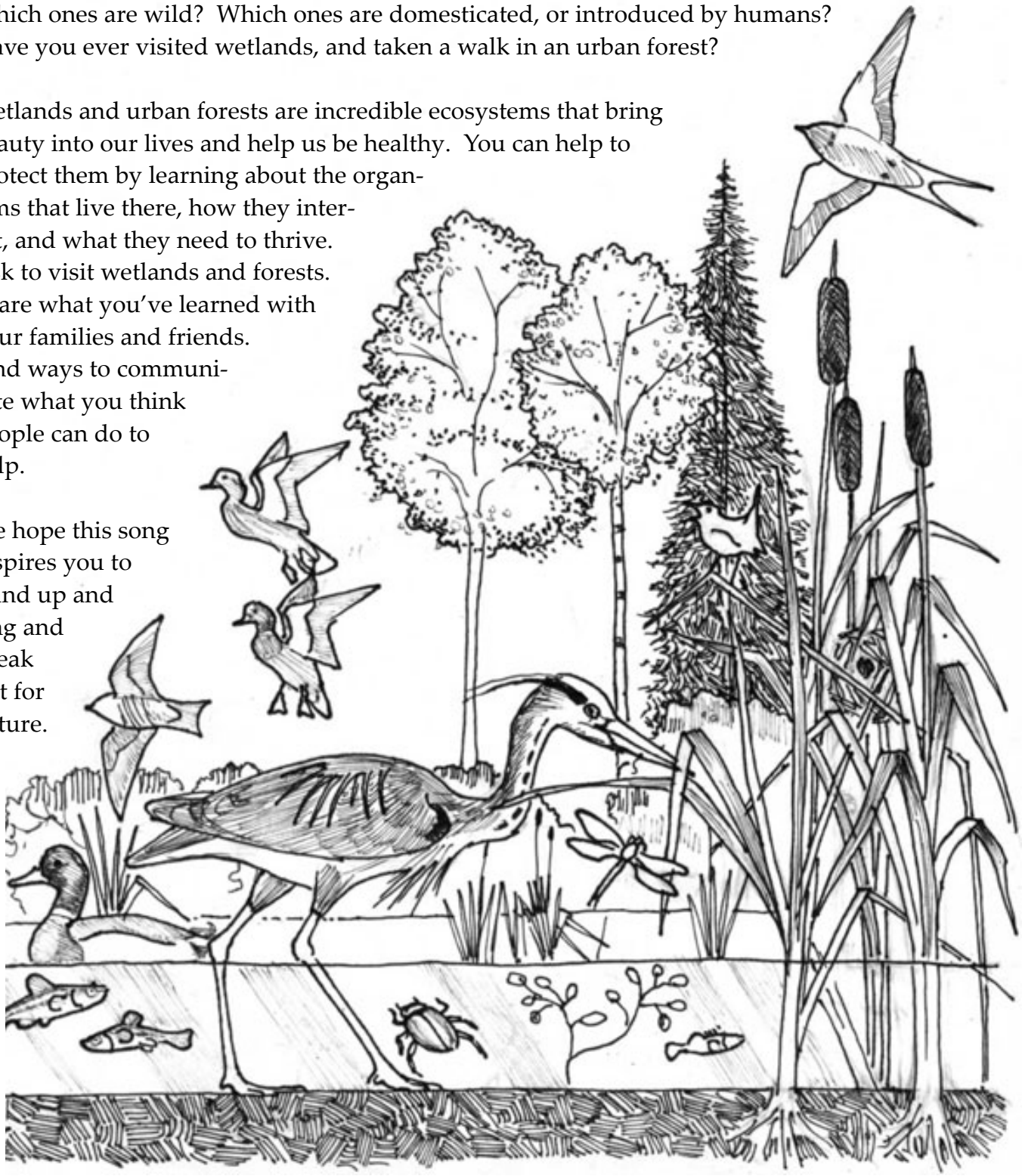


We humans have only been around for 150,000 years, which is miniscule by comparison. Yet our actions are having impacts that affect the entire planet. We are stewards of a unique living system that has been long in the making.

Look around in your neighbourhood. What kinds of plants and animals do you see? Which ones are wild? Which ones are domesticated, or introduced by humans? Have you ever visited wetlands, and taken a walk in an urban forest?

Wetlands and urban forests are incredible ecosystems that bring beauty into our lives and help us be healthy. You can help to protect them by learning about the organisms that live there, how they interact, and what they need to thrive. Ask to visit wetlands and forests. Share what you've learned with your families and friends. Find ways to communicate what you think people can do to help.

We hope this song inspires you to stand up and sing and speak out for nature.



I Am the Future – Lyrics

Holly Arntzen/Kevin Wright

When you think of the distant future
Do you see anything at all?
Will the planet keep on spinning
Or will it fall?

Looking at the constellations
That come back every night
Fourteen billion years of
Evolution in sight

Chorus
I… I am
I am the future, I'm the new
We… we are
We are the future
and we're counting on you

You can hear it in the forest falling
And in the songbirds' song
And in these voices calling
"Don't take too long"

Do you think of what I'll be doing
After you have left this earth?
Picking up the pieces
You got to first

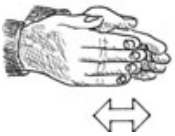
Repeat Chorus 2x

I am stardust
I'm a living, breathing galaxy
With every second,
Thought, word and deed
The future comes true in me

Repeat Chorus 3x

Sound Activity

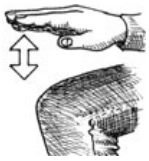
Rub hands together - that's the wind



Snap fingers and cluck tongues

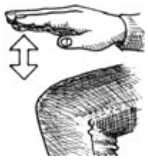
Slap thighs lightly

Slap thighs harder



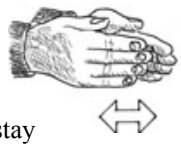
Stamp feet rapidly

Stop feet stamps, go back to slapping thighs



Finger snaps and tongue clucks

Rub hands together



Everyone stop their actions... stay quiet for several seconds

Making Rain

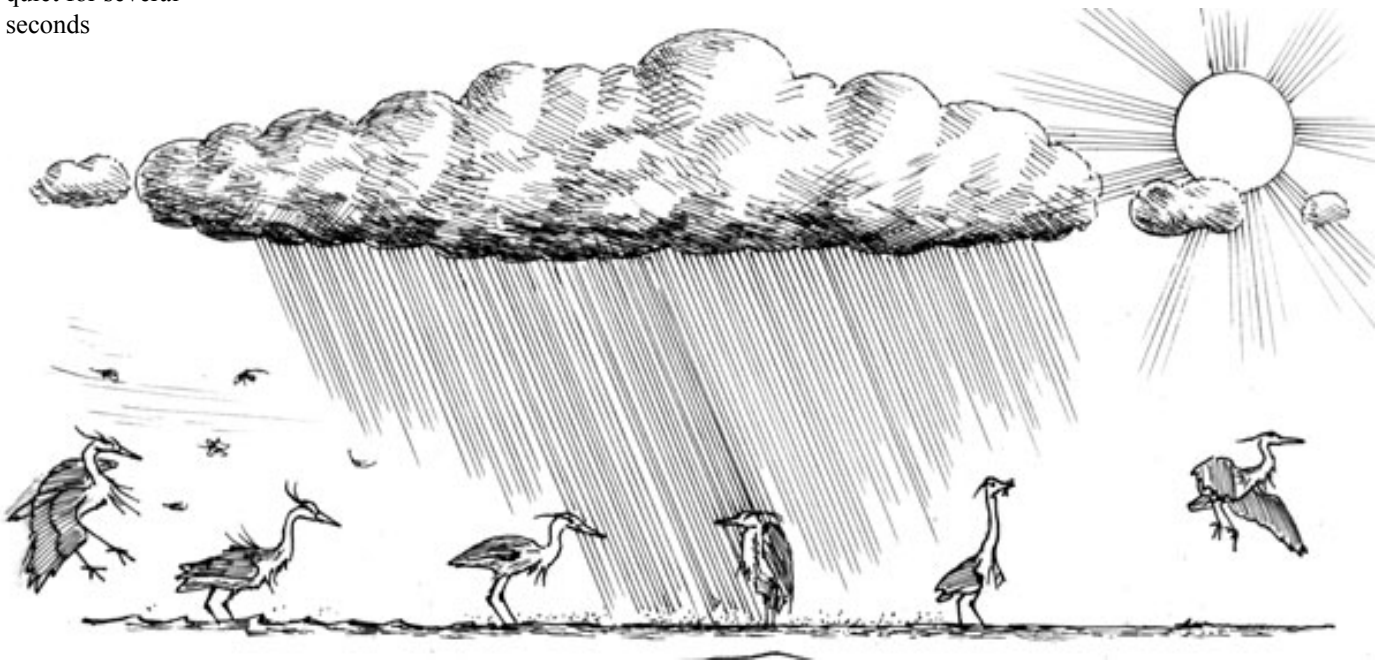
this sounds great in a gym!

Ask the children to imagine a rain storm... the splatting sound as the first raindrops hit the leaves... the "roar" that happens as the rain falls heavier and harder... the sound dying away as the rain slows and finally stops.

Instruct children to remain silent, imitate your actions, and to keep doing a particular action until you show them the next action.

Start at one side of the group and move across, showing them an action. Children begin and change actions when you pass directly in front of them.

When you have passed across the entire group, go back to your beginning point, and show them the next action.



Generic Activities

These Generic Activities are flexible, standard practices that provide rich opportunities to deepen understanding and promote meaningful learning. Through active participation and purposeful repetition, children develop the ability to recognize patterns and relationships, changes, and the effects of human impact on the environment. As experiences are accumulated, curiosity is fostered, and familiarity with their surroundings is cultivated; students will come to know their "home places" and thereby develop the attitudes that give rise to their desire to protect and preserve the environments they value and love.

The generic activities were chosen because we believe that developing ecological literacy is a process that requires much experience and time—time to wonder and question, time to think, time to ponder and revise ideas, time to correct and revise previously held beliefs, and time to refine ways of representing what is known. We also believe it is better to learn how to do a few things very well rather than engage in a multitude of activities at a superficial level.

Create Nature Journals and Diaries

Show students examples of naturalists' journals and illustrated diaries (from the library or on-line sources). Explain that the journal/diary is a tool used to develop powers of observation, deepen understanding, and aid memory once they have returned to the classroom from their work as scientists "in the field." Discuss conventions such as noting the location and date, as well as the weather conditions, combining drawing and labeling and adding brief descriptions. Provide students with journals and encourage them to emulate various conventions and develop their own styles. Have students share their drawings, talk about what they noticed, and what they learned from the experience. Regular excursions for drawing from nature can draw children into nature—increasing their skills and knowledge, stimulating their curiosity, and positively affecting their attitudes. As children see, for themselves, they will notice changes in plants, animals, and seasons; their record-making can stimulate individual or group research and projects and may lead to the emergence of the next Bateman, Landsdowne, Audubon, Darwin…or Chris Fisher (the Alberta biologist who wrote the articles for Wetlands and Urban Forests)!

Nature Journals—Ideas and Tips:
www.squidoo.com/naturejournal
Provides suggestions and annotated samples of students' journal keeping.

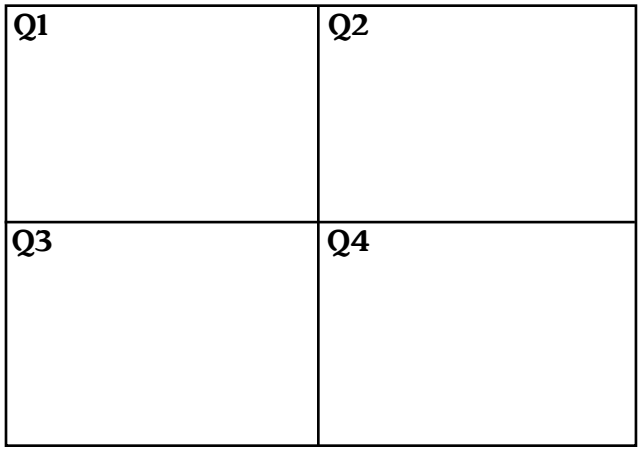
How to Make a Nature Journal:
www.wikihow.com/Make-a-Nature-Journal
Offers step-by step advice for journaling, illustrations, photographs, and a short video.

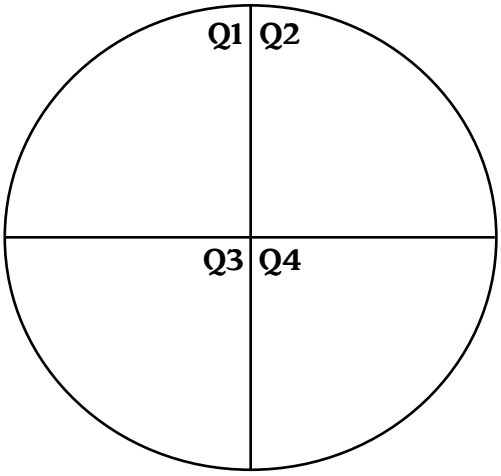
Nature Journal:
http://donnayoung.org/science/nature-journal.htm
Is a site that provides printable blackline masters to use as pages in a journal.

NATURE TABLE

Have a place where natural artifacts and living organisms are displayed and available for observation. Wherever you have your "nature table" (i.e. as a learning station in the classroom), children can bring fossils, shells, snake skins, bird feathers, plant parts, a jar of tadpoles, or insects in a "bug box." Additions to the learning station may include sorting and classification trays, a magnifying glass or table, and paper and crayons for drawing, colouring, and labelling. Encourage students to observe, talk and wonder.

QUADRANT SAMPLING AND MAPPING





Introduce the students to the technique of quadrant mapping by showing them a diagram of a circle or rectangle divided into 4 equal parts, labelled "Q1, Q2, Q3, Q4" to denote each of the quadrants. Tell them they are going out to the school yard, a park, wetland or urban forest where they will be given stakes, or a hoola hoop (for the parameters), and string to delineate the space they will investigate. Students work in groups to establish their observation spaces, find items of interest within the space, and map the location of items in each quadrant on a corresponding recording sheet. When you return to the classroom, younger students can add sketches and labels to indicate what they found in each space; older students can develop symbols and keys for their maps. Display the maps; encourage students to discuss their findings and to generate questions about what they found and why they found the particular organisms and non-living features together. This activity can be repeated often in similar or different locations throughout the year, and is easily adapted to suit the students' varied developmental levels and abilities.

STILL AND VIDEO PHOTOGRAPHY

Have students take indoor and outdoor photographs and videos. The still pictures and video images of items at the nature table, group projects, outdoor excursions, experts' presentations (and much more) can be used in many ways. Individual students can capture (or import) images to complement narratives or poetry, illustrate research reports, or add to booklet making or blog writing. Photographs can be used to enhance classroom and hallway displays. Video can be used as the medium for group research, a class project, or a multi-media presentation for others.

EXPERIENCE THE NATURAL WORLD

There is no substitute for getting outside! Make a commitment to be outdoors on a regular basis (at least once a week, "rain or shine"). Go on purposeful nature walks. Let students know: Today, we are going to look for… listen to… notice signs of… Bring pictures to show students what they are looking for. Engage them in conversations; respond to their explanations and reasoning; encourage their curiosity. After the walk, provide time for students to share their observations with each other and with you. Some children may prefer a more private response to their experiences—recording their observations by drawing, painting, or writing.

Lesson Plans and Tips for Schoolyard Fieldtrips:
www.evergreen.ca/en/resources/schools/teachers/index.sn
Evergreen is a national charity that facilitates sustainable greening projects in schoolyards, parks and communities across Canada. **Teachers' Corner** provides excellent lesson plans, tips and techniques, schoolyard activity kits and much more.

CALCULATE YOUR ECOLOGICAL FOOTPRINT

How we live our daily lives can impact the air, land, forests and wildlife. How we use natural resources, how we dispose of materials, how much energy we use and the source of that energy can all impact the plants and wildlife we try to protect. This is called our ecological or carbon footprint.

Fossil fuels include gasoline that we use to fuel vehicles, natural gas that is used to heat our homes and coal that is burned to produce electricity that powers all sorts of items, like lights, i-pods, computers, fridges and more! When fossil fuels are burned, greenhouse gases are produced. Greenhouse gases are important to keep our Earth's temperature just right for us to live, but too many greenhouse gases can cause the temperature to warm. Plants and animals can be affected by having to live in warmer temperatures than what they are adapted to.
A great way to become more aware of our personal energy use is to calculate our carbon footprint. Here are some links to calculators.

City of Edmonton

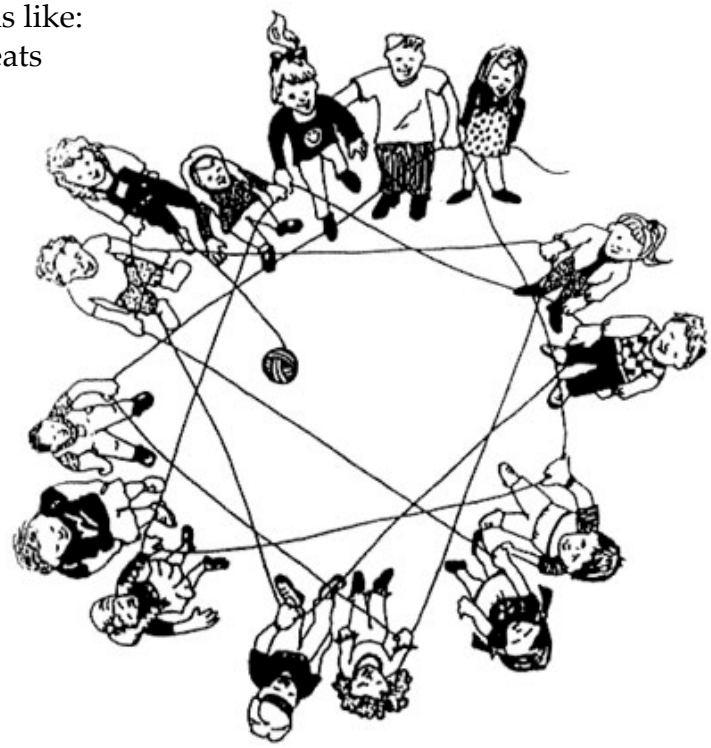
Youth: http://calc.zerofootprint.net/youth/edmonton_kids
Adults: http://edmonton.zerofootprint.net/
Zerofootprint Calculator Presentations for Grades 4, 5 and 6 Classrooms are available!

City of Calgary

Youth and Adults: www.footprintnetwork.org/en/index.php/GFN/page/calgary_footprint_calculator

FOOD WEB GAME

Choose to work with either the Wetlands or Urban Forests ecosystem. Label each student with the name or picture of ecological components; plants, animals, human, rock, water, sun, river, air, etc. Students stand in a circle and one student has a large ball of string. Ask any student questions like: "What thing in the circle do you eat? What eats you? Who else do you affect?" etc. The student holds the end of the string and the ball is passed to the person who represents the answer. That student then is asked a similar question, and the ball is passed on. Continue until all students are connected. Have everyone pull gently to tighten the web, then tell one player to let go, signifying the loss of that item. Discuss the effect.



SIMPLE THINGS TO DO WITH MUSIC

Play *I Am The Future* while students are sitting in a quiet spot and doing Nature Journal entries, either in the classroom or outdoors. Write a short essay about *I Am The Future*, explaining why you like this song, and what it is about. Here are some prompts:

- When I sing this song, it makes me feel...
- I imagine...
- Something I want to learn more about is...
- Something I learned today is...
- What people can do to help is...
- So that I can help the Earth, I am going to...

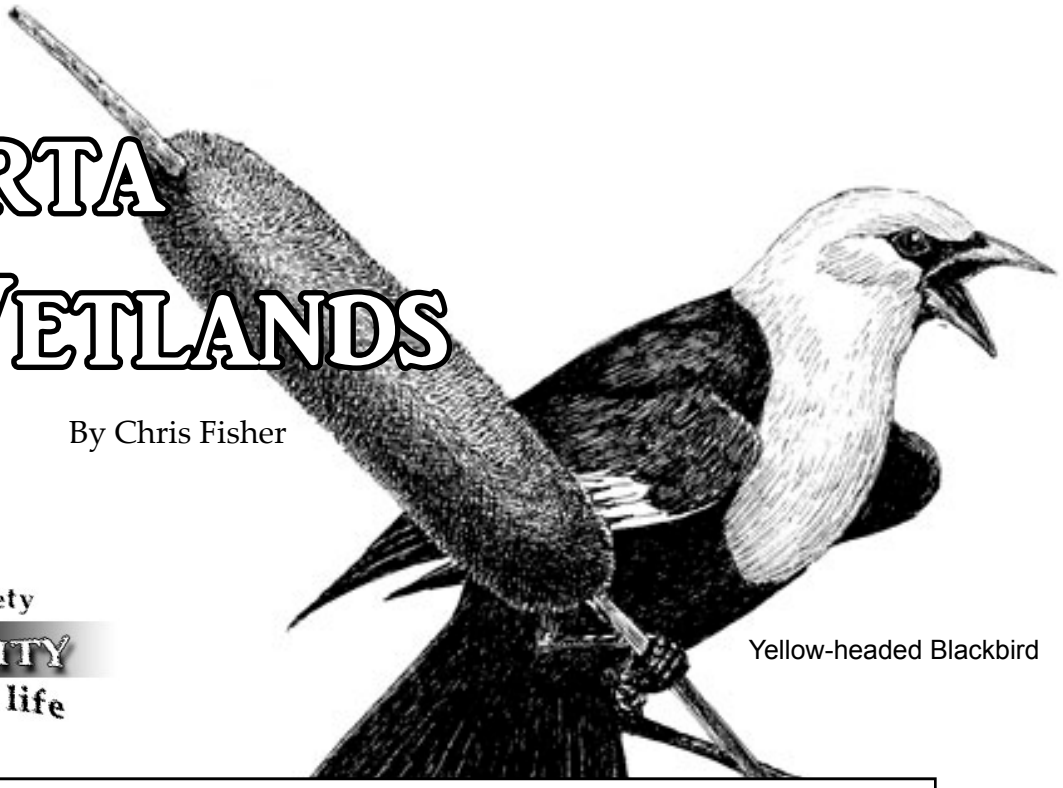
Make up actions that illustrate the lyrics. Students can take turns being the Action Leader**.** Here is a video of a live concert performance, for some ideas:
www.youtube.com/watch?v=PjS143RXN8k

ASK AN EXPERT

Bring in an expert who can answer students' questions and provide guidance as they pursue studies of Wetlands and Urban Forest organisms and natural systems. Examples are scientists, historians, elders, collectors and gardeners. While many people are willing to volunteer their time and share their expertise, the experience is more rewarding for all when students are well-prepared for the visit to the classroom or interviews they may conduct in person or via the internet.

Alberta Wetlands

By Chris Fisher



Yellow-headed Blackbird

Bio = Life
Diversity = Variety
BIODIVERSITY
The variety of life

If you are out for a walk in Alberta

hoping to feel a wild pulse, chances are you will end up going to a wetland. It is along our sloughs, lakes and ponds that much of our wildlife gathers. From the flash of a duck erupting from the surface of a pond and the intent focus of a hunting dragonfly, to the jumbled buzz of voices floating from the cattails, wetlands are where life gathers.

It is no accident that a wide variety of Alberta's wildlife is found in such places. Wetlands are a perfect union of the three key ingredients needed for life: air, soil and water. These come together and contribute in unique ways to form a wetland community. This vital wetland recipe results in Alberta's highest level of biodiversity. Here dozens of birds, hundreds of plants and thousands of invertebrates come together. Their success relies on each of them making a living from one another. The sum of all that is found in a wetland community is possible through the intertwining of many, many life stories.

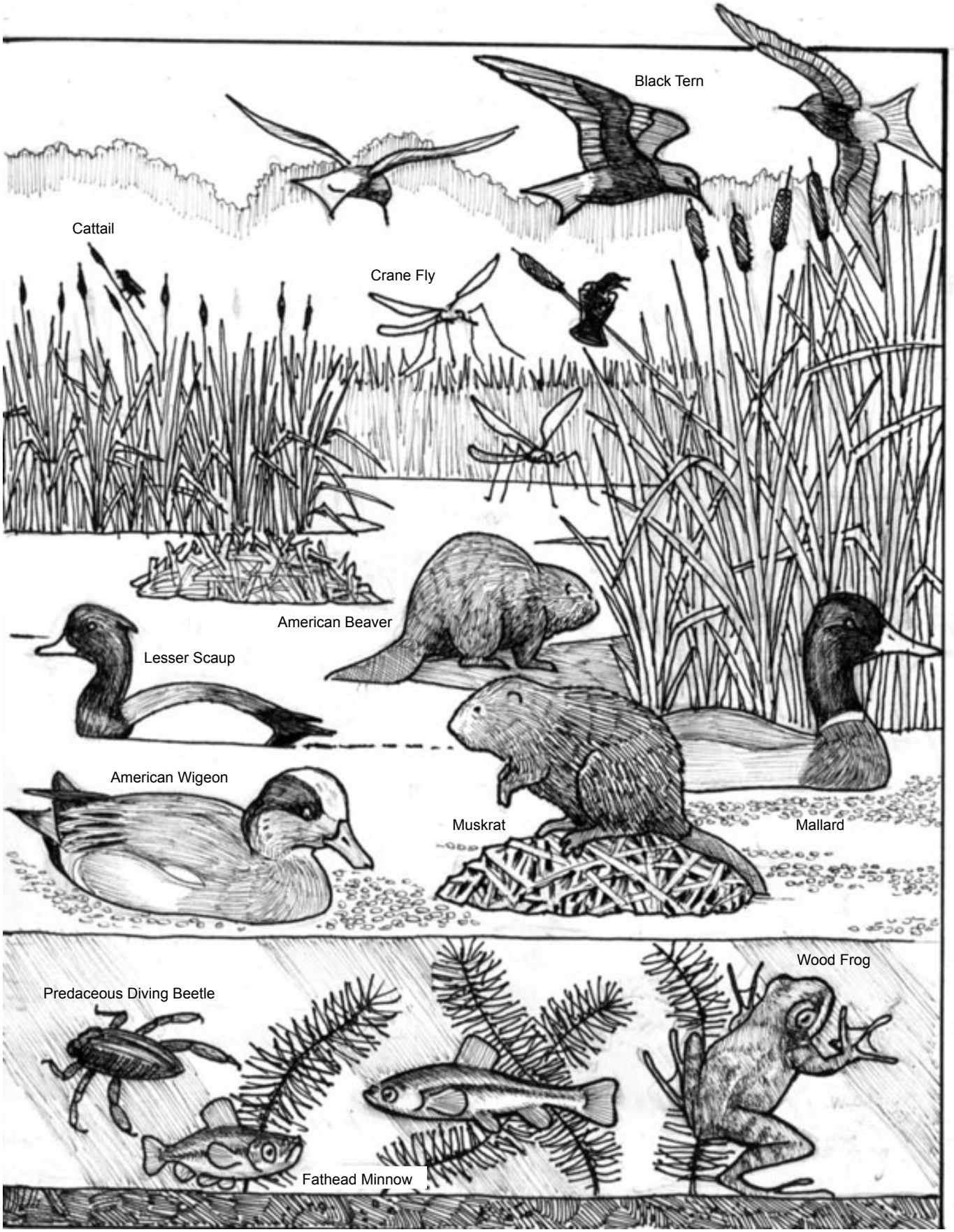
Every summer, Alberta's wetlands

release a staggering weight of flying insects. Taken together, all these insects would far outweigh all our cows. The larval forms of insects climb out of the water, transform and take flight. This bloom of aerial life comprised of mosquitoes, midges and flies is feasted upon by hordes of dragonflies. It also fuels nesting birds like blackbirds, swallows and terns. These bite-sized, winged insects emerge from the wetlands at the hungriest time for newly-hatched birds. While the foods nestlings need are the winged adults, if not for the underwater world of their youth, these insects would have never stood a chance to complete their life cycle. And neither could the birds that prey upon them.

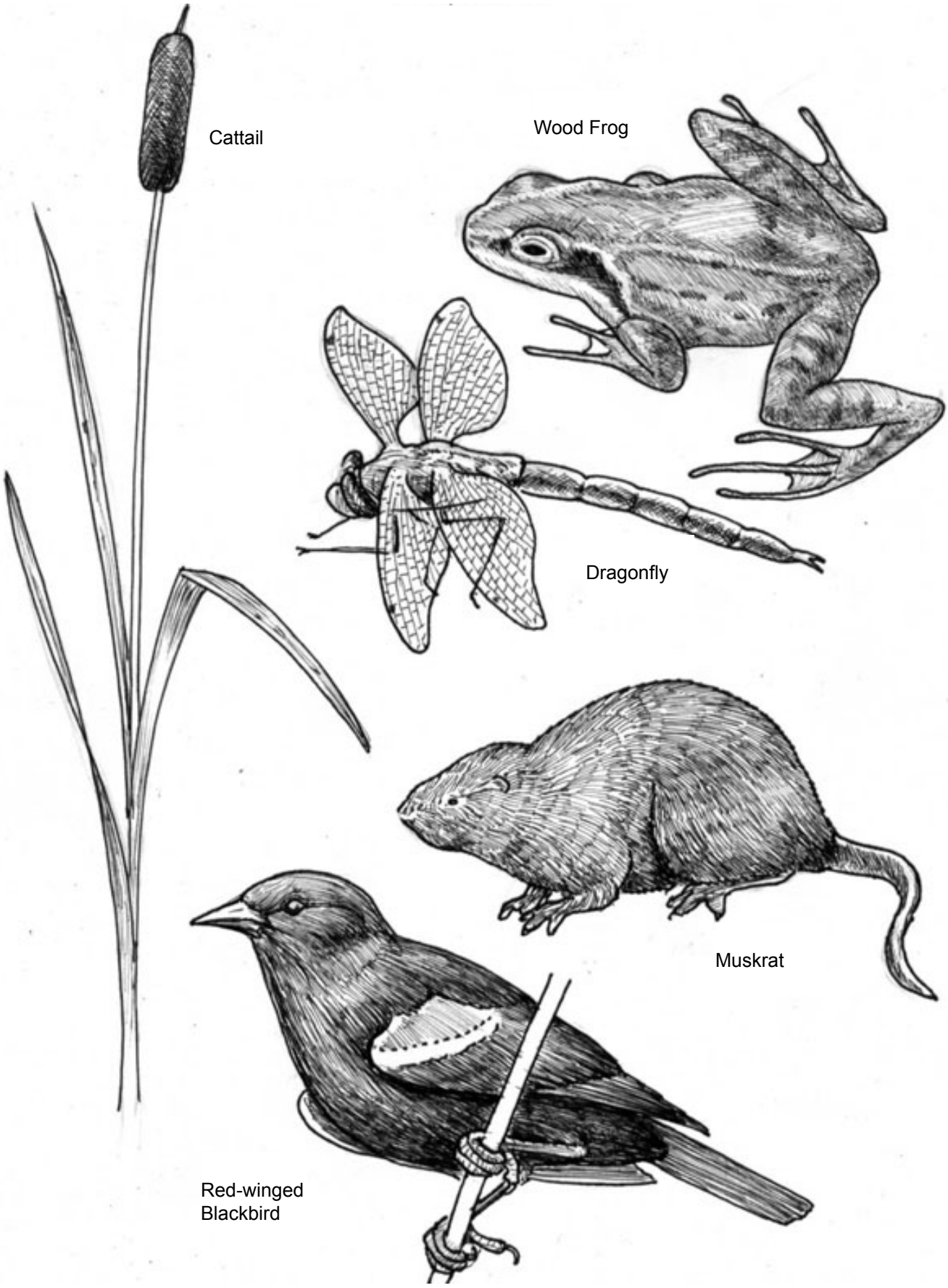
There is an awe in the workings of a wetland. The relationship between the producers and the various consumers is so complex that even top scientists admit to knowing little. Regardless of how wetlands work, we know that they do and provide us with benefits that extend far beyond the lives directly tied to the local waters. When wetland life flourishes, our water quality also improves by reducing erosion, flooding and locking up harmful sediments and pollutants. These are ecological goods and services that we are simply unable to engineer or design by ourselves. Increasingly urban areas in Alberta are realizing nature's perfect design and letting wetlands come back. We are now seeing 'constructed wetlands' appearing in our cities. Here they will bring to our neighbourhoods what natural wetlands have always brought to the wild.

Wetlands have always been an important part of life in Alberta. They are born of life's key components and function in an elegant, clean and efficient way. From something so complex, a wetland enriches natural systems and urban environments with life, function and beauty.

Wetlands Ecosystem


Black Tern
Cattail
Crane Fly
American Beaver
Lesser Scaup
American Wigeon
Muskrat
Mallard
Wood Frog
Predaceous Diving Beetle
Fathead Minnow

Wetlands Organisms



RED–WINGED BLACKBIRD

The *voices of nature* send powerful messages to those who listen. Alberta's most distinctive wild voice is neither wolf, loon or owl but rather the song of the Red-winged Blackbird. Its less-than-musical notes nonetheless produce the anthem of Alberta's wetlands. The bird's voice is as characteristic to our sloughs and ponds as the stagnant waters, buzzing insects and cattail trim. The reason for the blackbird's vocalizing is its over-developed sense of ownership. Males sporting the black body and red shoulders are all bluster and use their colours and song to defend their cattail community against rival trespassers. In the Red-winged Blackbirds chases, stand-offs and warning notes these wetland warriors treat us to some of the grandest dramas in all of wild Alberta.

WOOD FROG

Its not easy being a frog in Alberta, but our most commonly seen one makes the most of what our province has to offer. When the wetlands first begin to melt in April, the times are good and Wood Frogs fill nights with their croaking. Through the warming days and weeks that lie ahead, eggs hatch into tadpoles. In time these transform to miniature versions of the adults and they hop out of the ponds. At last Wood Frogs live up to their name and head to surrounding forests set to meet their toughest challenge of all. Against all logic, September finds Wood Frogs burying themselves among the falling leaves. As the temperatures drop the frogs become deeply buried and insulated against the cold. As the snow piles up, despite all the surrounding leaves, the frogs inevitably freeze solid—but remain alive. In a remarkable feat of survival, Alberta's Wood Frogs remain frozen for months, until the warm days of spring invite them back once again to the pond.

MUSKRAT

Muskrats don't get much love from us but they seem fine in obscurity. These mid-sized rodents are found in nearly every wetland in the province, though you would be hard pressed to find one at work building their home or feeding on water plants. Most times Muskrats are active during the night when the wetlands have calmed down from all the daytime activity of ducks, geese and possible predators. Muskrats are perfectly suited to this part of the world. They take to the waters like a fish, but can also cross great distances on land. Their adaptability is one of the main reasons that Muskrats are abundant and find themselves in our natural wetlands and even ones constructed in our major cities.

DRAGONFLY

For a few dynamic weeks every year, Alberta skies are the hunting grounds of predators that were here before the dinosaurs. Dragonflies are Alberta's natural air force and no mosquito, midge or fly stands a chance against them. As adults, dragonflies rule the skies with unsurpassed maneuverability—but their celebrated time in the air is short lived. By the end of summer adult dragonflies lay their eggs on a wetland's surface. The eggs settle to the lake bottom to hatch and the underwater life of dragonfly larvae begins. Here too, these animals are hunters. As crawling larvae, dragonflies patrol the murky bottoms of Alberta's wetlands with the same fierce instinct that is seen in their more familiar adult form.

CATTAIL

If not for wheat, the cattail may have well made it onto Alberta's flag. By the mid point in summer cattails are a common and a distinctive sight throughout the province wherever water gathers. Cattails frame Alberta's wetlands like no other plant and provide a buffer between the waters and the trees, grasses and croplands. Like a nation's border, all living and non-livings things that flow in and out of a wetland must go through the cattails. As water, nutrients and life pass through the cattail zone there occurs a near perfect yet efficient production and elimination of all that is needed for a wetland to survive.

SCIENCE ACTIVITIES – WETLANDS
LINKS & OTHER RESOURCES

The activities that follow are based on the philosophy expressed in the provincial curriculum guide, Science 1- 6 (1996): http://education.alberta.ca/media/654825/elemsci.pdf and were developed with reference to the content topics, emphases, and general and specific learner expectations for each grade.

GRADE FOUR
WASTE AND OUR WORLD—No waste in the wetlands

In the essay, "Alberta Wetlands" on pp. 12/13, Chris Fisher tells us that the plants and animals "make a living from one another" and that wetlands "…function in an elegant, clean and efficient way." Nothing is wasted in the wetlands. Humans, however, waste much and—as a result of our actions—wetlands and other natural spaces are in jeopardy. Together with the students, construct a question sheet they can use to conduct an audit of water use that occurs in their homes. Ask them: How is water contaminated? How do we waste water? What wastes are biodegradable? Reusable? Toxic? How often does your family flush the toilet, use the dishwasher, run the clothes washer, shower, water the garden, or wash the car? Once they have gathered their data and discussed their findings, invite students' suggestions for what they can do to reduce at-home water consumption and contamination. Have students rehearse how they might talk with others and their families to participate in a waste-reduction campaign for a week. Then, use the same recording sheet to conduct a second audit. Students can then identify positive changes they effected. They may write, draw, or tell about the experience and how their family's actions will benefit natural habitats and organisms.

GRADE FIVE
WETLAND ECOSYSTEMS—Multiple field study excursions

A single "field trip" is not enough to gain full understanding of a wetland, its organisms, or how they interact. Multiple excursions to a particular wetland or to study different kinds of wetlands (streams and river banks, ponds, sloughs, marshes, fens, or bogs) can enable students to conduct inquiries as scientists do—with purpose. Wetlands are biologically diverse and complex ecosystems; students should know, in advance, the variety of life they are looking for. Developing questions of their own will motivate astute observations, careful recording, and thoughtful analysis in their search for answers. There is so much to be learned in a wetland setting and about each organism; defining the objectives for the excursion is necessary.
Each field trip may be devoted to a different purposes, for example: count the number of plants and animals noticed; identify specific organisms and where they were found; locate organisms that have different functions (as food producers, consumers, or decomposers) in advance of diagramming and interpreting life cycles and food chains and webs. Post-excursion activities provide opportunities to consolidate learning—to recall and interpret, describe and synthesize, and refine previous understandings—and to develop new questions, hypotheses, and means to test predictions.

GRADE SIX

AIR AND AERODYNAMICS—Perfection in design

Have students write a short paragraph to describe their theories about how birds and flying insects achieve flight. Then, watch some of the many real-time, slow-motion, or animated videos on the internet that show how these creatures take off, glide, maneuver in the air, and land. Study the bodies and wing structures of birds and insects, and those of planes and helicopters. Incorporate terms (such as force of gravity, lift, streamlining, drag, propulsion, design…) in discussions about the similarities and differences between human-built machines and birds and flying insects. Here's one difference: The creatures seldom crash! On your field trip, identify flying creatures observed and follow up with research about how they achieve flight.

LINKS & OTHER RESOURCES

Alberta Education has an excellent online resource for teachers:
Learn Alberta www.learnalberta.ca
Use the "Find Resources" search widget to access grade- and subject-specific resources.

Government of Alberta: Environmental Education
www.environment.gov.ab.ca/edu/homeEd.asp

EcoKids Earth Day Canada www.ecokids.ca - A fun site with student and teachers sections.

The City of Edmonton offers a number of resources connected to environmental education.

- **Drainage Education:** Find the **Treat it Right!® Wastewater Puppet Show** (Gr. 2 & 4) and **Treat it Right!® Storm Water - Constructed Wetland Field Trip** (Gr. 5) http://www.edmonton.ca/drainage/education
- **Treat it Right!® Wastewater** (Grade 4) Eng./Fr.: www.edmonton.ca/environmental/wastewater_sewers/treat-it-right-wastewater-grade4.aspx
- **Treat it Right!® Storm Water** (Grade 5) Eng./Fr.: www.edmonton.ca/environmental/wastewater_sewers/treat-it-right-storm-water-grade5.aspx
- **Master Naturalist Program:** www.edmonton.ca/environmental/natural_areas/master-naturalist-program.aspx

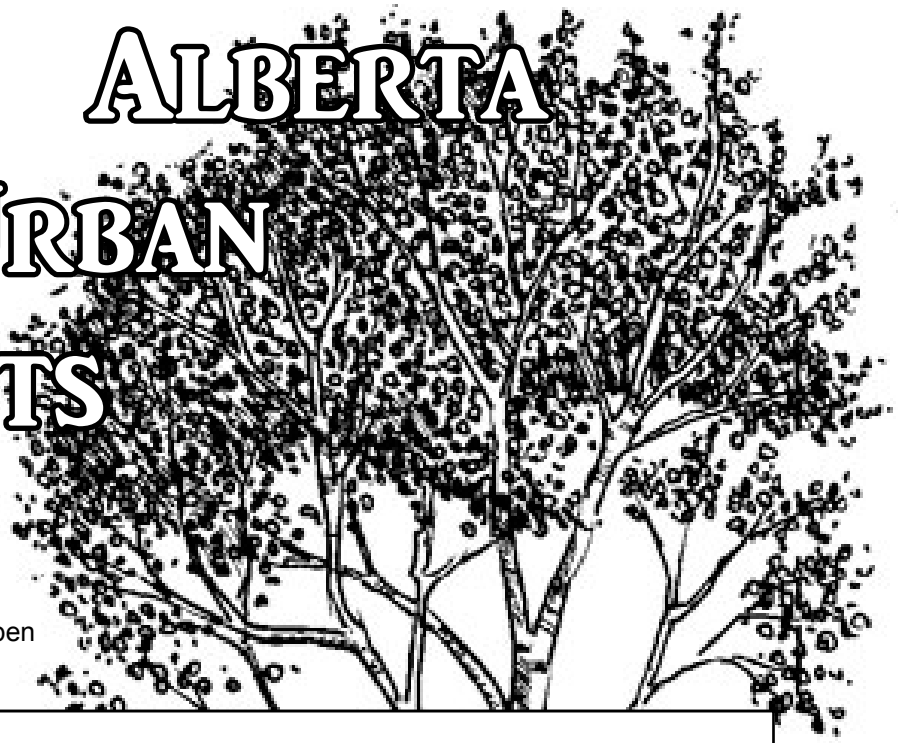
The City of Calgary website provides links to…

- **Nature Explorations School Programs:** This site describes outreach programs, booking information, costs, and interpreted field studies in urban parks: www.calgary.ca/CSPS/Parks/Pages/Programs/School-programs/Short-nature-explorations-grades-4-to-6.aspx
- **Down the Drain:** An international project to monitor water use. www.k12science.org/curriculum/drainproj/
- **Other City of Calgary water-based educational resources:** www.calgary.ca/UEP/Water/Pages/Youth-education/Teacher-Resources.aspx

Project Wet Canada:
www.cwra.org/branches/ProjectWet/goals.aspx
This site also links to Environment Canada "Resources for Educators" at:
www.ec.gc.ca/education/Default.asp?lang=En&n=D3D10112-1

Alberta Urban Forests

By Chris Fisher



Trembling Aspen

In all of Alberta's best-designed cities, we are able to safely walk through a maze of life and look upwards in awe of towering structures. While these opportunities are available in our downtown cores, they are also available to us in our urban forests. Alberta's modern cities have multiple personalities, but one of the most important is expressed in our forested parks. There is a feeling in here that you can't find in any school, stadium or shopping mall.

There's a lot more to a forest than trees, but they are a good place to start. A forest is a community of life that includes all the plants, animals and even non-living things like the air, soil and nutrients. These magnificent collections not only arise in a far off national parks but also in the ravine down the block. Urban forests include all private and public trees which may be found on boulevards, buffers, parks, transportation right of ways, and natural areas.

Bio = Life
Diversity = Variety
BIODIVERSITY
The variety of life

Urban forests are great showcases of life.

No organism stands alone, as **biodiversity** increases so too does the strength of the entire forest community. As the trees grow, birds hatch and fungi rot, the natural cycles of every living thing intertwines with every other. The trees do not grow without the help of water and nutrients cycling in the soil, just as they do not die without paying these riches back into the soil. Forests show us what recycling is all about.

Like the effortless show of a world-class sport or musical performance, the perfection of urban forests hides what is going on behind the scenes. Not only are thousands of organisms living and dying among the trees, the forest itself is performing work that has incredible impact on our cities. Urban forests clean the air, withdraw harmful carbon from our atmosphere, prevent erosion and help to conserve energy loss in our homes. In doing so, the value of the work done by a single urban tree in a year can amount to over $600.

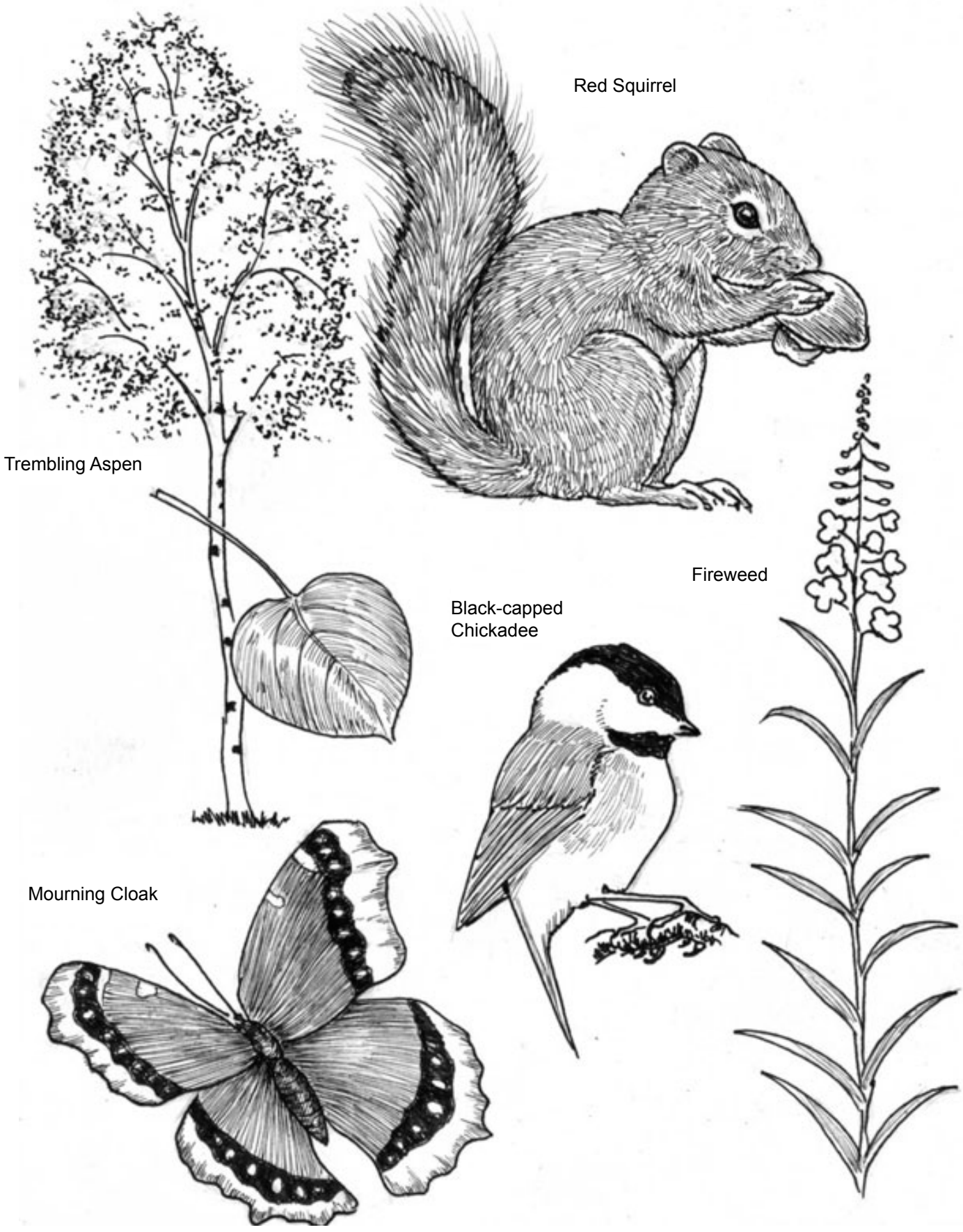
There is a common comfort associated with all forests. The trees shield us from city noises replacing them with the songs of birds, the hum of insects or the magic of silence. Wherever forests grow, they express unquestionable wildness and immerse us with every sight, sound and smell.

Planting a tree to grow a forest is something you can do to unleash nature's potential. This simple act starts a process, that in time can affect thousands of forms of life accomplishing together what none could alone. Our urban forests provide the spark that ignites a series of events that triggers our imagination and improves our lives.

Urban Forest Ecosystem


Blue Jay
Great Horned Owl
Trembling Aspen
Red-eyed Vireo
White Spruce
Balsam Poplar
American Robin
White-tailed Deer
Red-osier Dogwood
Black-capped Chickadee
Meadow Vole

Urban Forest Organisms



TREMBLING ASPEN

Trembling Aspen do things as a group. Whenever the slightest breeze whispers though our forests, the trembling leaves of an entire stand begin to gently wave like a crowd during a royal visit. In spring, when aspens go to seed, they do so collectively and entire trails in our urban forests are blanketed with their white, fluffy down. Trembling Aspens leave their most glorious tribute to the fall. During this season, entire hillsides turn golden in unison and give Albertans another reason to love this province's natural beauty. The cause for this group action lies beneath the surface. Trembling Aspen forests are joined through their roots. What appear to us as individual trees are really multiple trunks arising from a common source that links together all their efforts.

MOURNING CLOAK

In a fair world, Mourning Cloak butterflies would be the best-known butterfly in Alberta. But alas, this large, widespread and commonly-seen butterfly is overshadowed by the likes of seldom-seen varieties like Monarchs and Painted Ladies. This oversight is unfortunate as Mourning Cloaks have a great story to tell. Mourning Cloaks are large, brown and creamy winged butterflies that emerge from their cocoon as flying adults in late summer. As such they are often the last butterflies that we see flying around in the fall. Mourning Cloaks also happen to be the first ones we see in the spring as they find a safe nook in forests to hibernate through the winter in the adult form.

BLACK–CAPPED CHICKADEE

We are lucky that the Black-capped Chickadee is one of our most common birds. It serves as an ideal ambassador to the natural world as it flutters year round in our gardens, yards and urban forests. Chickadees are easily seen in these places since their curiosity makes them all but impossible to overlook. They routinely approach so close that there is no need for binoculars. In doing so, chickadees do something remarkable and potentially life-changing. Through their meetings, Black-capped Chickadees erase any barrier between us and the wild and lend a personality to our natural areas.

RED SQUIRREL

On the coldest and shortest days of winter, you can be thankful that there are Red Squirrels in urban forests to take away some of the season's bleakness. These over-active rodents make themselves noticed through temper tantrums they direct at all trespassers. Despite the show, for us the aggression of tiny squirrels is more comedy than a fright, but all their chatter and foot-stomping does hold a purpose. In order for them to be active throughout the year, they need to horde food. Any threat that Red Squirrels sense to their caches is more than enough reason for them to raise an alarm.

FIREWEED

With so many downright silly plants names like stinkweed, lungwort and toadflax in Alberta, it is nice to have a plant like Fireweed. The name is perfect. Not only does a field filled with these purple flowers appear to be in flames, the name fireweed also holds a deeper meaning. This tall and slender flower is a pioneer species and one of the first to grow after a landscape disturbance. In wild places, the greatest natural disturbance is fire, hence this plant's name. In urban Alberta however fireweed re-colonizes ditches, forest clearings and new subdivisions just as vigorously as after the disturbance which they are so-well named.

SCIENCE ACTIVITIES – URBAN FORESTS

LINKS & OTHER RESOURCES

The activities that follow are based on the philosophy expressed in the provincial curriculum guide, Science 1- 6 (1996): http://education.alberta.ca/media/654825/elemsci.pdf and were developed with reference to the content topics, emphases, and general and specific learner expectations for each grade.

GRADE FOUR

PLANT GROWTH AND CHANGES—Greening our neighbourhoods

While we—and many other organisms—depend on plants to breathe, to remove air-borne particulates and filter water, for food and shelter, and to prevent erosion; there is much more to learn about the important role of plants in sustaining life. Plants moderate the greenhouse effect, and can reduce climate change and overall global warming. While all of this may be "a bit much" for 8- and 9-year-olds to grasp, children can learn about the value of plants and the conditions that foster growth when they plant and nurture seeds, bulbs, or cuttings in the classroom or school garden, or when they select and plant seedlings on the school grounds or at home. Caring for plants enables children to observe changes, monitor growth, and do something to help make the world a greener place.

GRADE FIVE

WEATHER WATCH—Trees affect weather and help to slow down climate change

Trees are living archives and the original weather-keepers. They record changes in the weather through their growth rings, over many years. Weather patterns that support growth such as warm, temperate and moist conditions, induce wider rings. Cold and dry conditions tend to make tree rings thinner. Make a drawing of a tree "cookie" (cross-section) and indicate high growth years and low growth years by the width of the tree rings.

Investigate the difference between climate and weather. Learn how trees affect local weather. Stand in the school yard on a sunny day and record the temperature. Then move into the shade of trees and record the temperature. Repeat this activity on a cold, windy day. Notice and record the differences in how your body feels. Trees appear that they're just standing there, but really they are doing so much work. Did you know that one large tree can lift up to 400 litres of water and discharge it into the air in one day? Fill up 4L ice cream pail with water and go and water a tree; imagine doing this 100 times! If you fan yourself on a hot day to keep cool, you will get tired quickly. But if you just go and sit under a tree, it will keep you cool for hours and hours.

The climate is changing because our Earth's atmosphere is warming. Global warming is happening because of increasing concentrations of greenhouse gases produced by human activities such as burning fossil fuels. Trees help to slow down global warming by absorbing carbon dioxide (CO_2)—the primary greenhouse gas—from the atmosphere during photosynthesis and take it right into their bodies. Trees can also reduce the demand for fossil energy by shading buildings to reduce air conditioning demand, and breaking winter winds to lower our heating needs.

GRADE SIX

TREES AND FORESTS—My tree and me

Have each student "adopt" a tree—a tree in their yard, on the school grounds, along a neighbourhood boulevard, in a local park or the forest. Their first job is to "get to know" their tree and be able to describe it to others. Estimate its height and age and use field guides to aid their descriptions of its shape, leaf and stem structures, bark, flowers, buds, seeds, fruits, and root system. A photo or drawing of their tree—together with bark or leaf rubbings, pressed flowers or leaves, and collected cones, seeds, or fruit—can be used to enhance the report they make to their classmates. Next… Find evidence of life supported by their tree. Do birds nest or find food in their tree? Are there insects on it? Is there evidence of other animal life in or nearby? What do they find at its base? Is their tree the only one of its kind or are there other similar trees close by? Advise students that they will be asked to substantiate their findings by recounting evidence they found to support their answers. Then… Ask students to speculate upon and learn about potential threats to their tree as a result of natural or human-instigated causes. To consolidate their learning, have each student compose a one-page essay or poem titled, "A Pledge to My Tree." Students may illustrate their writing and you may wish to compile and bind their work as a book to be shared with others.

LINKS & OTHER RESOURCES

Alberta Education has an excellent online resource for teachers:
Learn Alberta www.learnalberta.ca
Use the "Find Resources" search widget to access grade- and subject-specific resources.

Tree Canada provides resources to promote the importance of trees - www.treecanada.ca
City of Edmonton urban forestry page - www.edmonton.ca/trees
Evergreen has a school ground greening program and resources - www.evergreen.ca/en/resources/schools/index.sn

The City of Edmonton:

- **Everyday Way** is a commonly seen slogan of the Edmonton Transit System. www.edmonton.ca/transportation/edmonton-transit-system-ets.aspx
- **Master Composter—Recycler Program:** www.edmonton.ca/for_residents/garbage_recycling/master-composter-recycler-program.aspx

The City of Calgary:

- **Nature Explorations School Programs:** This site describes outreach programs, booking information, costs, and interpreted field studies in urban parks: www.calgary.ca/CSPS/Parks/Documents/Programs/School-Programs/nature-exploration-guide.pdf

About the Sponsors

The University is committed to a continuous effort to instill sustainability into the many aspects of university life, on our campuses, in our institutions, and in the larger community of which we are a part. In alignment with its values, vision and mission, the University takes an integrated approach to sustainability that incorporates teaching and learning, research, outreach, and the operations that support them, as it builds one of the great universities for the public good. The University strives to manage all resources in harmony, recognizing the interconnectedness of ecological, social and economic systems.

The University of Alberta is proud to support the development of the *I Am the Future* Song & Educators' Handbook to enhance the educational component of the annual *Voices of Nature* Sustainability Awareness Week concert, and for use as a music-based learning resource. The *Voices of Nature* program and Sustainability Awareness Week provide an important platform for environmental education and bringing the Edmonton and University communities together to celebrate sustainability in an engaging, meaningful and positive way. The University strives to provide experiences that foster awareness, creativity, personal growth and leadership in our students. *Voices of Nature* and the *I Am the Future* Song & Educators' Handbook allow us to extend these experiences to a new generation of young leaders.

In 1908, Henry Marshall Tory, the University of Alberta's first president challenged the university community to remember that: "The modern state university has sprung from a demand on the part of the people themselves….The people demand that knowledge shall not be the concern of scholars alone. The uplifting of the whole people shall be its final goal." Adopting a holistic approach to the advancement of sustainability on our campuses renews our commitment to Tory's promise and allows the learning, discovery and creative activity associated with the University's engagement on this important issue to extend through Edmonton, Alberta, and beyond.

For more information on U of A Sustainability, please visit: **www.sustainability.ualberta.ca**

The City of Edmonton is pleased to provide support for this Teachers' Guide as you help your students learn about and understand the role each of us plays in preserving our natural world.

On July 20, 2011, City Council passed The Way We Green: Edmonton's environmental strategic plan. This plan recommends 12 long-term goals this city must adopt to ensure that in 30 years, when your students are adults, Edmonton will be environmentally sustainable and resilient.

The road to environmental sustainability is a long one and it will take the dedication and action of each Edmontonian to make it happen. Your role as teachers is vital in helping to ensure that students – and by extension their parents – understand the impact their lives have on the environment. We must all begin to understand that our environment can provide only finite resources and we cannot keep taking from our natural world without starting to give back.

Our world is a wondrous place and learning about it should be a fun and exciting experience for children. Through this program, and your dedication, it will be.

For more information about The Way We Green, please visit **www.edmonton.ca/thewaywegreen**

We would like to extend a very special thanks to Guy West and the Alberta Beverage Container Recycling Corporation (ABCRC) for their continuing support of *Voices of Nature* projects over the years. They were an integral part in producing ARTs award-winning *Cycle of Life/Recycle* handbook.

ABCRC is the not-for-profit industry steward responsible for ensuring non-beer beverage containers are kept from landfills and turned into useful products. ABCRC recognizes that the long term success of its mandate rests with generational change within the Alberta population and has created a number of investment programs and encourages volunteer activities to achieve this goal. That is why ABCRC is proud to work with the *Voices of Nature* and the Artist Response Team in bringing environmental and recycling awareness to school children. The *Voices of Nature* innovative approach to the issue works well with ABCRC's leadership in school recycling programs, support of youth initiatives at the Alberta Emerald Foundation and the Recycling Council of Alberta, and ABCRC's Recycling Street Teams which travel the province engaging older youth in the importance of recycling.

To learn more about ABCRC's youth oriented programming please visit **www.abcrc.com** or the Alberta Emerald Foundation at **www.emeraldfoundation.ca**

Other Resources Created by ART

Cycle of Life/Recycle CD and Educators' Handbook (English and French) National Edition
14 songs; Endangered species in 10 eco-zones across Canada; recycling 6 different beverage containers.

Salish Sea CD and Educators' Handbook (English and French)
11songs; Marine conservation.

I Am the Future Early Learning CD and Handbook
8 songs; Ecological literacy for young children and their families.

More on these handbooks, CDs, videos, school music programs and more at

www.artistresponseteam.com

Creative Team


Holly Arntzen

Singer, songwriter and producer, **Holly Arntzen** is blazing new trails in entertainment, education and eco-music in Canada, and is recognized for her extensive library of songs and works dedicated to the environment and related issues. In 1991, she and her late husband, Stephen Foster, founded the Artist Response Team (ART); they developed the innovative *Voices of Nature* learning programs, which have gained national recognition and popularity. The success of *Voices of Nature* is driven by the fact that students love to sing the songs… and Holly's ability to inspire them through her voice and love of music.


Kevin Wright

Kevin Wright has been working with Artist Response Team since 2003 bringing his multimedia and production skills, and long musical history into the mix. Starting out as *Voices of Nature* radio show editor and recordist, Kevin is an integral part of the working force that propels ART forward into the future. His musicianship and songwriting skills shape the "new edge of environmental music" being produced by ART. He works alongside Holly, on vocals and percussion, delivering and producing the *Voices of Nature* School Music Programs.


Daphne Macnaughton

Daphne Macnaughton, M. Ed., has been involved in public education for almost 40 years as a teacher, district consultant, and school principal. She teaches university courses for educators and school leaders, and has published many articles in education journals and co-authored/contributed to four books: *A Buddy Program: Collaborative Learning Through Shared Experiences, Recognition Without Rewards*, *Salish Sea* and *Cycle of Life/Recycle* Handbooks for Educators. Daphne was the 2002 recipient of the BC Principals' & Vice-Principals' Association Leadership Award and a 2003 recipient of the UVIC Faculty of Education "Distinguished Education Alumni" Award.


Donald Gunn

Donald Gunn is a designer/illustrator who grew up in the Highlands of Scotland and was educated at the Inverness Royal Academy and Edinburgh University where he graduated with a Masters Degree in Architecture. He emigrated to Canada in 1991 and has lived on Salt Spring Island, BC ever since. Donald is renowned for his design work in museum displays and illustrations for environmental education resources including *Salish Sea* and *Cycle of Life/Recycle.*


Chris Fisher

Chris Fisher is the author of seventeen books on wildlife and bird identification guides to many North American regions. Best-sellers include Birds of Alberta, Mammals of Alberta, Reptiles and Amphibians of Canada, Birds of New York City, Birds of Seattle and Mammals of the Rocky Mountains. He has also written extensively on environmental education and documentary films featured on The Nature of Things with David Suzuki and Animal Planet. He worked as a co-writer on 'Acorn, the Nature Nut' and ultimately became the host, writer, and singer for his very own children's TV series "Wildfiles." He wrote the biology section in ART's *Cycle of Life/Recycle* Handbook.

SUPPORTERS

Special thanks to the following organizations for their support of *Voices of Nature* and this handbook in Alberta over the past two years.