



**Educational Package of Suggested Activities for  
GRADE EIGHT**

## **WELCOME TO SAFARI NIAGARA**

A class visit to a zoo or nature park such as Safari Niagara is an excellent learning opportunity for students in any grade level. For many grades the experience can fulfill program goals or expectations from Ministry of Education Curriculum Documents, notably Science and Technology 2007 and Social Studies 2004.

Even where, at a particular grade level, there is no direct link to the curriculum documents there are opportunities for you, the teacher, to connect pre visit, on-site and post visit classroom activities to the hands-on experience of the day. The management of Safari Niagara recognized these direct and implied connections beginning with the inception and opening of the park. To assist you in planning for your visit we assembled a team of teachers at all grade levels to produce materials which will hopefully be of use to you. These curriculum materials have been upgraded several times as Ministry of Education documents were revised. However, the suggested activities remain essentially the same because good teaching ideas are forever!

You may note that the format of the attached materials can vary from grade to grade. This reflects the philosophy, experience and teaching styles of the writers. It is expected that in using the materials you will adapt them to your own classroom environment, picking and choosing those most suited to your style.

Regardless of how you plan to enhance your visit to our facility by classroom activities the fundamental truths remain. Zoos and nature parks today are becoming both a last refuge for many endangered species and a hope for their recovery at some point in the future. Humankind must accept the responsibility for the recovery of the planet. The closer we can get our students to physical contact with the real world and the wonders of nature the more they will, as adults, appreciate the gravity of this task.

## **PRESERVING SPECIES AT RISK : A GRADE 8 UNIT INTRODUCTION**

The majority of activities in this package are designed to encourage student research into the natural world before the class visits Safari Niagara. Students will gain an understanding of environmental issues, the interdependence of species, the importance of preserving habitat and the impact humans have upon the biosphere. **These activities will lead to an understanding of the role that zoos, international organizations and non-profit groups play in the preservation of species at risk.**

Emphasis is placed upon the development of language skills. The activities provide opportunities for research, reporting, discussion, decision-making and reflection. The students become more informed about the environment as a whole and the impact that humans have upon it. Each student becomes an “expert” on a particular animal and shares this knowledge with the rest of the class.

Numerous references to websites allow the students to access materials produced by groups and organizations who deal with environmental issues including threats to global biodiversity and efforts being made to preserve species at risk. Appendixes are included on specific organizations, which work with species that are residents of Safari Niagara. These include the Bengal tiger, amur leopard and dark-handed agile gibbon.

The trip to Safari Niagara is a culmination of the work, which will have gone on in the classroom. Students can view the experience as an opportunity to apply, to observe and to appreciate what they have learned.

The post-trip activities are designed to tie together the research and the experience of the Safari Niagara visit. Most of the work will have already been accomplished and put into print in journal form. The final activity, while completing the project is also open ended in respect to where the student goes from there. It encourages students to continue to search for solutions to the environmental problems, which face us and the other creatures with whom, we share the planet.

## **UNIT EXPECTATIONS**

Most of the expectations in this unit are based on the Ontario Ministry of Education's Grade 8 Language Curriculum, although incidentally, students are required to also use knowledge and skills they have learned in Geography, Science and Mathematics. It presupposes students are familiar with reflective journals and have some experience creating media works. The major expectations are:

### **Language – Writing**

- Communicate ideas and information for a variety of purposes, to specific audiences, using appropriate forms and features
- Produce media texts using writing and material from other media (*e.g., a video documentary on an environmental issue*)

### **Language – Reading**

- Explain their interpretation of a written work, supporting it with evidence from their own knowledge and experience

### **Reasoning and Critical Thinking**

- Make judgments and draw conclusions about ideas on the basis of evidence
- Clarify and broaden their own points of view by examining the ideas of others
- Plan a research project and carry out the research

### **Language – Oral and Visual Communication**

- Listen to and communicate connected ideas and relate carefully-constructed narratives about real and fictional events
- Express and respond to a range of ideas and opinions concisely, clearly, and appropriately
- Contribute and work constructively in groups
- Demonstrate the ability to concentrate by identifying the main points
- Analyze and interpret media works
- Create media works of some technical complexity

### **Use of Word**

- Use the specialized vocabulary appropriate to the topic in oral presentations

### **Non-Verbal**

- Use tone of voice and body language to clarify meaning during presentations
- Use resource materials (*e.g., visual aids*) to illustrate ideas in presentations

### **Group Skills**

- Contribute collaboratively in-group situations
- Work with members of their group to establish clear purposes and procedures for solving problems and completing projects

### **Media Communications**

- Identify and analyze the formulas used in different categories of media works
- Describe a media work, outlining its different parts and the steps and choices involved in planning and producing it
- Evaluate the effectiveness of various informational media works
- Create media works of some technical complexity

### **Geography – “Patterns in Human Geography”**

- Demonstrate an understanding of the factors affecting population distribution (*e.g., natural environment*)
- Identify and describe types of land use
- Demonstrate an understanding of the factors affecting urbanization, industrialization, transportation and agriculture

### **Developing Research/Inquiry Skills**

- Formulate questions that synthesize various sources of information and points of view
- Analyze, synthesize, and evaluate data
- Construct a variety of charts, diagrams, and models

### **Developing Map and Globe Skills**

- Produce a variety of maps for specific purposes

## PRE-TRIP ACTIVITIES

### **ACTIVITY ONE – The Background**

#### Objective:

To have students understand that the environmental problem is one of our own creation and that it has come as a result of our values & beliefs

#### Task:

Students will individually read the essay, respond to the questions, and be prepared to discuss their answers/thoughts. Students will begin a personal environmental ethics journal.

1. Open the lesson by engaging students in a discussion about “the environment”. Ask them if there are problems, what are they, and what has caused them.
2. Students will list the usual litany of problem areas, but likely will not see the connection between their lifestyle and individual actions to the problem. Have them read the essay (APPENDIX A) and answer the questions.
3. At the conclusion of their individual work, have them share their answers. Direct the discussion towards examining personal beliefs & values. Introduce the concept of ethics, or the life-governing principals that guide their thinking around the environment.
4. Have the students conclude their discussion by starting a journal to get them to self reflect on their environmental ethics. It could be called ‘Thinking About What You’re Thinking’. They will be making entries into the journal throughout the unit. Entries can be statements, questions, observations or thoughts. Give them a start by having the group summarize the discussion they have just had.

#### Conclusion:

Students will begin to make the connection between their individual choices and actions and the scope of the environmental problem we face. They will begin the process of critically examining their environmental ethics, i.e. their values, beliefs and thinking.

## ACTIVITY TWO – An Interview

### Objectives:

- To determine what students know about the natural world and the creatures in it.
- To get students to analyze their view of nature
- To have students begin the process of creating an interview; using media

### Task:

- To complete a short one minute or two interview of a wild (*i.e., non-domestic*) creature
1. Combine the students into pairs and have them select from a prepared list, a wild (*i.e., non-domestic*) creature which they can interview (*APPENDIX B*). Each pair will conduct two interviews, one where each student is the creature and one where they are the reporter. Their purpose will be to gather as much information about the creature as they can, without referring to any reference materials, i.e. what the students actually know. The list includes several endangered species which are being protected and bred in programs such as Species Survival Program and which are residents of Safari Niagara (*e.g., the amur leopard and the dark handed agile gibbon*).
  2. After forming their groups and selecting a species from the list, they will have to determine questions they will need to ask.
  3. Since this interview is the first in the unit the teacher should have them discuss the media available to them (teacher provides list). Groups will have the opportunity to choose a medium to record and share their interview with the rest of the class.
  4. Upon completion of interviews the teacher determines a mechanism for all to share their work. Analysis of what is presented should look for the following (*a chart would likely be the best way to organize the data*):
    - Were all the creatures chosen actually wild?
    - Were the creatures chosen representative of the world as a whole (*insects, fish, amphibians, reptiles, birds, mammals*)?
    - How hard was it to generate a minute's worth of information? Was the information accurate?
    - Was the animal's dialogue truly from their point of view or was it an imposed human viewpoint (*anthropomorphic*)?

Once all the groups have presented their interviews then each interview might receive a “reality check” mark based on the observations of the class.

5. Make a Journal entry.

Conclusion: The expectation is that for most classes the students’ original knowledge will be limited and fairly anthropomorphic.

### ACTIVITY THREE – Animal Symbols: Fact or Fiction

Objectives:

- To have students critically analyze how nature is portrayed in society.
- To have students discover our “dichotomy” around how we value nature.

Task:

- Students will analyze literature, festivals, advertising, sports and institutional symbols to see how wildlife is portrayed and whether it is accurate.
1. Depending on the number of media sources you have, divide the students into small groups to analyze some of the following. Have at least two groups covering the same medium to account for different opinions and viewpoints.
  2. **A.** Children’s story books, especially fairy tales, contain many animal characters that do not act in the same way as the real creatures, e.g., Curious George, The Three Little Pigs, or Little Red Riding Hood. Have students examine some and note how they are portrayed how they act, as compared to how the real creatures would act in the wild.  
**B.** Festivals, such as Halloween, often depict animals in an anthropomorphic or negative fashion. Have students list several of them, the characteristics we assign them in that context, and then determine if that portrayal is accurate (*e.g. bears or leopards*).  
**C.** Animated cartoons and comic books are full of animals. Have students choose a few and compare how they are portrayed and act versus real creatures in the wild.  
**D.** Sports teams frequently use animals as symbols to imply strength and power. Have students list the team names and their sports, and compare them to real wild animals.

- E. National and provincial symbols also often use animals. Whether it's on stamps, coins, or coats of arms, animals appear frequently – often in places where they no longer exist! Have the groups list those they find, to try and discover if the connection that the symbol implies is real. Is it an accurate representation of that institution? Is that connection still relevant?
3. A visual arts type presentation might be the best way to display the finished results. Students could create a 'before & after' style two frame comparison to contrast what the media portrays and what the reality is.
  4. Make a journal entry.

Conclusion:

Students will begin to see that much of the information they rely upon, and form judgments on, regarding the natural world is not based in reality.

#### **ACTIVITY FOUR – Defining “Ecosystem”**

Objectives:

- To create a simulated, balanced ecosystem that meets the need of its inhabitants
- To have students reflect on statements/writings around holistic systems.

Task:

- Students will identify the basic needs of all living things
  - Students will demonstrate how an ecosystem works
1. Have the student's review the basic needs of all living creatures (*food, water, shelter, space and reproduction; sun, soil, air could be assumed*). They could do this by simply accounting for the needs of a family pet. Students will also review the terms herbivore, omnivore, and carnivore.
  2. Have the students read the page “describing Ecosystems” (*APPENDIX C*) and respond to the questions at the end. They will review their responses prior to engaging in the ecosystem simulation that follows.
  3. **A.** You will now need a large space in order to play the following simulation game. You will need these materials: a) three sets of coloured pinnies; b) at least four pylons or filed markers; c) at least six hula-hoops; d) several dozen food pellets, some of various colours (*film canister tops work well as they're*

*easy to see & pick up, are durable, and free*); e) a whistle to start & stop the action; and f) a group of students (*minimum about 15*).

**B.** Set up the game. Mark out the 'space' your animals will live in with the pylons. Insert within the space the hula-hoop shelters. Distribute the food pellets at the far end of the marked out area. Determine the pinnie colours for each of the three 'vores' of creatures.

**C.** The rules: each creature must 'eat' and return unscathed to the starting point to successfully complete a season of living, and go on to the next year. Herbivores need to collect five (f) food pellets; omnivores can collect either the five pellets or tag an herbivore; carnivores can only tag an herbivore or an omnivore. A tagged animal must accompany the tagger back to the starting point. The hula-hoop shelters can contain only three creatures at a time and no one is to be tagged therein. Once ready, the herbivores will be started first, followed by the omnivores, then the carnivores last. A whistle will sound to stop the game and call everyone back to the starting point to discuss the round. Return the food pellets to the far end before starting again.

**Phase One** – In this first phase, have the students decide whether they are a carnivore, omnivore or herbivore without regard for numbers. The first attempt or two at the game may not work, so be prepared to whistle it dead. While all the students will want to be carnivores at first, they will soon discover a more natural balance, i.e. plenty of herbivores, much fewer omnivores, and very few carnivores.

**Phase Two**—Once a balance has been achieved, the teacher begins to alter the other parameters, e.g. a dry year reduces the number of food pellets, some shelters are removed. This will cause behaviors to alter. Discuss what happened and why.

**Phase Three** – Now we introduce the human factor, e.g. the forest is logged so all shelters are gone, a subdivision encroaches on your space – move the pylons in by half, the coloured food pellets contain toxins that contaminate them. As you try each round with a different problem, the students will complain more vigorously that 'it's not fair'. The final step is to introduce an exotic species, which competes with the native species. If this exotic creature touches a student that person is displaced and "dies". The game then ends.

4. The students return to class and discuss what they learned in the simulation, as it relates to ecosystems, balance within them, and human pressures. From this they can make a journal entry.
5. The last task in this activity is to examine the page with the four statements about the holistic and connectedness of ecosystems (*APPENDIX D*). Students could work in small groups to answer the questions.

Conclusion:

Students will have gained a working understanding of how different factors, both natural and human, can impact on an ecosystem. They will also be asking to incorporate those concepts into their personal environmental ethics through reflections in their journal.

### **ACTIVITY FIVE – What is Biodiversity?**

Objectives:

- To have students recognize that biodiversity is the key to environmental health
- To have students understand that biodiversity has value beyond its economic potential
- To connect students to examples of biodiversity in their own environment.

Task:

- Students will identify the key terms and factors that define the concept biodiversity
  - Students will identify the human activities that threaten biodiversity
  - Students will use their geography skills to compare & map human impact on biodiversity
  - Students will examine their/our neighbourhood for signs of biodiversity
1. Have the students read the selected materials from The Canadian Biodiversity Information Network  
[\[http://www.atlas.ccrs.nrcan.gc.ca/projects/atlas/v2/default.asp\]](http://www.atlas.ccrs.nrcan.gc.ca/projects/atlas/v2/default.asp)
  2. Students are now asked to apply their physical & human geography skills to the concept of biodiversity.
    - A. From either Project Wild [pg 451 & 452] or from the National Atlas of Canada on-line

[<http://www.atlas.ccrs.nrcan.gc.ca/projects/atlas/v2/default.asp>], provide small groups of students acetate/overhead copies of Terrestrial ecozones of Canada & Habitat Impact [Project WILD source] or Terrestrial Ecozones of Canada & Species at Risk [National Atlas source]

- B.** Students next refer to either an atlas, such as Canada and the World (1985) or the National Atlas on-line to obtain maps showing population density, land under agriculture, forestry use, transportation systems, mineral & petroleum extraction. Assign one thematic map type to each group.
    - C.** Using the atlas maps [[http://canada.gc.ca/canadiana/map\\_e.html#res](http://canada.gc.ca/canadiana/map_e.html#res)] and the acetate maps, have the students visually identify where the conflicts between human and natural activity are. Students can use the blank base maps of Canada to record areas of conflict between natural use and human.
  - 3. A.** Students will now examine their local environment for signs of biodiversity. Working in small groups have them go out into the playground to look for examples or signs of the presence of wildlife. Make certain that they are looking both for all creature (e.g., insects, spiders, worms, microbes, etc.) and plants as well. Prior to departing, have them develop a chart in which to record their data, nothing what they saw & where (i.e. what habitat), evidence of habitation, potential food sources, etc.
    - B.** Once the students have examined the schoolyard have them visit another or several other habitats, perhaps one that exhibits a greater variety of life forms. They might also be asked to visit another place near their homes for homework. Have them repeat the observations exercise and record their data.
    - C.** Once all the observations are completed have students share and compare their data. The data can be used to both “see” local diversity and to point out the limitations of students’ knowledge of nature. You might consider inviting in a representative from a local nature club to conduct a guided tour for your class through some of the habitats.
- 4.** As a wrap-up activity have students make a journal entry around the issue of biodiversity, especially as it pertains to their local environment and actions.

Conclusion:

Students should now have an understanding of what biodiversity is and how it relates to them, especially in their local environment.

## ACTIVITY SIX – Zoos and the Protection of Biodiversity

### Objectives:

- To have students discover the modern role of zoos and other wildlife refuges with respect to protecting biodiversity
- To have students apply their ecosystem learning and environmental ethics as they begin a research project.

### Task:

- The students will recognize the role of zoos and wildlife refuges as modern “arks” in retaining and restoring biodiversity.
  - Students will form working groups and select from Safari Niagara’s species list an animal to research and present their media work on.
1. Have the students read the section on zoos and conservation (*APPENDIX F*) and respond to the questions. Resource website:  
[www.peregrinefund.org/cons\\_ccondor.html](http://www.peregrinefund.org/cons_ccondor.html)
  2. **A.** At this point introduce students to the unit’s major objective: the creation of a media work about a threatened or endangered species. Students will need to combine themselves into groups of four with whom they will work for the duration of the unit to a) research a chosen Safari Niagara animal, and b) produce a media work based on that research and a visit to Safari Niagara.  
**B.** Present the entire species list from Safari Niagara (*APPENDIX G*). Have students examine it and sort out what they believe to be wild animals from those that are domestic or hybrid. Identify those at Safari Niagara that are threatened or endangered in their natural habitat.
  3. **A.** Endangered species are not confined to Canada. Students will be asked to access information on endangered species, both here and abroad. Some of the species are identified from the list of Safari Niagara animals and are part of a Survival Species Program, e.g.,

Canadian Site: COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

<http://www.cosewic.gc.ca/COSEWIC/QueryResults.cfm?Desgntn=&Range=&latlon=&Common>

International Site: Animal Info – Information on Rare, Threatened and Endangered Mammals

<http://www.animalinfo.org>

The International Center For Gibbon Studies

[www.gibboncentre.org](http://www.gibboncentre.org)

The Species Survival Program to protect The Amur Leopard

[www.amur-leopard.org](http://www.amur-leopard.org)

**B.** The websites listed above are important because they refer to two endangered species which have individual animals housed at Safari Niagara. These specimens are included in international programs whose purpose is dedicated to the survival of the species. The program concentrates on spreading out captive bloodlines in zoos. Additional information on these three particular species is included as APPENDIX H.

**C.** Once they have selected their animal, the group's first task is to enter the animal's classification data onto the master chart, including identifying where it is on the CITES list. (**Convention on International Trade in Endangered Species of Wild Fauna and Flora**). CITES is an international agreement, which regulates trade in a number of species of animals and plants, their parts and derivatives, and any articles made from them. Usually these animals are not plentiful in the wild. [<http://www.cities.org/>]

- 4.** Have students make another journal entry, this time around the issue of zoos versus biodiversity. Are zoos the best way, or are they the only way at present?

Conclusion:

Students will be guided through the planning of a research process and the developing of their media presentation by their understanding of ecosystems, biodiversity and their own environmental ethics.

## ACTIVITY SEVEN – Animal Research and Media Storyboards

### Objectives:

- To have students recognize that media works take many different forms
- To have students work cooperatively & successfully on a group task

### Task:

- Students will create a model for their project design by examining/experimenting with different media.

**1. A.** Each group will determine how the labour is divided around the task of researching the chosen animal. Group members should know at the outset that they would be evaluated by both the teacher and their peers on their group contributions, plus the rest of the class on their final presentation.

**B.** Students should be allowed to examine animal research presentations in print form. Good examples are the Canadian Wildlife Services fact sheets “Hinterland Who’s Who” which are available in print or

[http://www.cws.scf.ec.gc.ca/hww-fap/video/index\\_e.html](http://www.cws.scf.ec.gc.ca/hww-fap/video/index_e.html). While these deal only with animals common to Canada, they can serve as a template to guide the students. The Internet and print materials will serve as the source for information on creatures found outside of North America. In addition to those already listed in Activity Six some other sites are listed here:

Smithsonian Museum of Natural History – Query by Common Name

<http://nmnhwww.si.edu/cgi-bin/wedb/msw/common/form>

Animal Info – Information on Rare, Threatened and Endangered Mammals

<http://www.animalinfo.org/>

Global Taxonomy Initiative – Species Search

<http://www.biodiv.org/programmes/cross-cutting/taxonomy/in-situ.asp>

The World’s Biomes – Berkley University

<http://www.ucmp.berkeley.edu/glossary/gloss5/biome/index.html>

**C.** The students will need to attempt to acquire information around the following categories: scientific classification, physical description & size,

food, habitat, range & distribution, shelter, seasonal activities, breeding & raising of young, life span/life history, population pressures or fluctuations, species status, relationship with humans, future prospects, etc. In addition they will need visuals, both of the creature, its behavior and its habitat – though some of this can be obtained on the Safari Niagara visit. They will also need to generate a range map and a corresponding map showing a chosen human activity over the same geographic range that indicates the pressure on the creature (*e.g., population density, agriculture, etc., as in Activity 5*).

- D.** The information gathered need only be in rough form at present.
- 2.** The second aspect of the project is organizing both the presentation and the medium chosen. Begin with choosing the medium.
  - A.** This project is intended to avoid the traditional pencil & paper presentation, and because the students will actually see their chosen creature, it begs for a strong visual component. However, fifteen groups using just a video is neither feasible, nor is it desirable. Beyond the obvious choices of video and portable tape recorder, there are still many other media that would support or compliment a visual project. For example: 35 mm slide film, digital camera, Corel Presentation or MICROSOFT Power Point, disposable camera & scanner, hand mad sketches, overheads, magazine cut-outs, diorama, sculpture, skits, songs, puppets, shadow puppets, etc. are all examples of different media students can incorporate into their work. In fact, the marking schema should look for a minimum of two or three varieties to avoid reliance on just video.
  - B.** Once students have an idea of what media they might use, they should examine examples of visual research projects, such as National Geographic videos or the “hinterland Who’s Who” video clips which can also be found at [http://www.cws-scf.ec.gc.ca/hww-fap/video/index\\_e.html](http://www.cws-scf.ec.gc.ca/hww-fap/video/index_e.html). Students should also be encouraged to check out other non-video sources as well.
  - C.** Students should be given opportunities to ‘play’ with a variety of different media. They could take their original interview from Activity Two or try their hand at a series of short experimental efforts.
  - D.** Another important factor to consider is your intended audience. If you are intending to show this to a younger grade, you may want to choose

some of your media that will appeal to them, rather than keeping it all pitched at the grade eight level.

Conclusion:

Students should have their information search and research plan well under way. They should also be close to selecting their media after having had a chance to experiment.

## **ACTIVITY EIGHT – Putting the Pieces Together**

Objectives:

- To have students create media works that incorporate both factual materials and person reflection/opinion.
- To have students work cooperatively and successfully on a group task.

Task:

- Students will plan and organize materials/steps/resources needed for research work
  - Students will plan and organize materials/steps/resources needed to create a media work
1. Now the group needs to determine who is doing what in the final media project. The project will require experts to be interviewed, people to ask questions, others to run the equipment on site and someone to oversee the coordination of the final production. The jobs to be completed on site at Safari Niagara need to be determined well beforehand.
  2. Just before the students visit Safari Niagara they will need to diagram their visual presentation using storyboards. Include reference to any costume or props you may need.
  3. As students gather their research information they should also be noting what data they will also be collecting at Safari Niagara. They will want to set up a chart or checklist to look for certain kinds of expected behaviours and note any that were not expected. They should have questions ready for Safari Niagara staff such as:
    - What do you feed the animals?
    - Where does each come from?
    - What is their lifespan in captivity?

- Are there plans to breed or introduce a mate?
- What kind of veterinary care do they receive?

Conclusion:

Teachers will need to check in with each group to determine that their role assignments, research and storyboards are acceptable.

## **ON-SITE ACTIVITIES**

### **ACTIVITY NINE – The Safari Niagara Visit**

Objectives:

- To have students put their research and planning work into context
- To have students observe their researched animal first hand
- To identify species which are included in Species Survival Programs (*e.g., dark handed agile gibbon*) and Species Management Plans (*e.g., amur leopard*)

Task:

- Students will follow their research plan
  - Students will collect the data they need to support their project
  - Students will gain an understanding of the zoo “ark” concept for some species
1. The visit will have two goals. First is to gather the visuals, sound and answers to the questions you have prepared beforehand. Second is to have significant time to enjoy the rest of the Safari Niagara complex. Don't forget to take along your journals so that you can take a quiet moment at some point to enter your feelings and impressions of the day.

## **POST-TRIP ACTIVITIES**

### **ACTIVITY TEN – Editing and Showing the Project**

Objectives:

- To have students collaboratively create their presentation
- To offer judgments/observations around others' work

Task:

- Students will edit their work into a final form and share it with an audience
1. Upon the return to school you must review both the data gathered and the visual and sound effects recorded to see if they fit into your original storyboard plan. In some cases you will be required to edit things in and out but there is always the Internet as a resource to fill in any gaps.
  2. The next step is to assemble the finished product. You will need to produce the final version of your written script and supporting media. It may involve some reordering and/or rewriting of your original plan. If you can, try to come up with a theme that will help string together your presentation.
  3. Once your work is completed it will be time to share. It might be useful to screen your presentation in front of some who are not in your class first. Often another opinion can help you fix up small problems before the all-important main showing.

Conclusion:

Students will critically reflect on their performance and those of others.

### **ACTIVITY ELEVEN – What’s Next?**

Objective:

- To have students reflect on the whole process of the unit and how their personal values & beliefs may have been changed
- To have students independently seek out a logical next step following the unit

Task:

- Students will complete a journal summary
  - Students may elect to pursue another related project
1. The first last task is to review and ‘close’ your personal journal. Now that the unit has come to a close, what have you learned? More importantly which of your former behaviours, values or attitudes has changed as a result of this exercise? Since a journal can be a private experience, a written summary may be submitted instead.

2. The next last task is to ask yourself, “what’s next?” Perhaps in the processes of the Safari Niagara exercise you have discovered another topic, issue or cause that has attracted your attention? Is there an animal you saw for the first time during your visit that is part of a Species Survival Program or a Species Management Plan? Perhaps you wish to take the Safari Niagara concept further and become involved in assisting biodiversity and ecosystems locally or globally? Perhaps you just want to make another visual presentation. In any case, the end of this exercise should not be the end of the application of its learning, for with the state of our environment being what it is, the world could certainly use your help. Remember: **While we may think globally, real change will occur when we act locally.**

Conclusion:

Students will have found that some aspects of their belief system or ethics have changed. Some will feel motivated to pursue other related issues.

**ADDITONAL RESOURCES  
AND  
BACKGROUND INFORMATION  
TO ACCOMPANY THE ACTIVITES**

## **APPENDIX A**

### **ACTIVITY ONE – The Background**

In the history of Earth, there have been countless numbers of living organisms that have inhabited the planet. The success of any individual species, how long it survived, depended on its ability to exploit its environment to secure its basic needs. Some organisms, like bacteria, have been with us since the dawn of time. Others, such as dinosaurs, had their day and are no longer with us. Our species, *Homo sapiens*, is a relative newcomer to the planet, but we too have thrived and survived. Although we are not the fiercest, fastest or strongest creatures on the planet, we do possess one characteristic that gives us an enormous advantage: our brains.

While many of the living organisms on earth have the ability to observe and make sense of their surroundings, humans can do more with the same information. By developing memories and language, we were also able to identify naturally recurring sequences and patterns (e.g. the seasons). In turn, we could use that information to make predictions about the future that helped us overcome problems (e.g. planting crops to produce food for the winter). This ability gave us a tremendous advantage in our quest for survival.

The real advantage of this knowledge, however, was that through language the accumulated learning and experience of one generation could be passed on to their children and all other generations that were to follow. Over time, humans developed stories and myths about the natural world around them, and these stories not only served as vast oral data banks of practical information, but also attempted to explain humans' place in the cosmos. This continuum of stories connected each generation to their ancestors, and at the same time passed on to each successive generation the responsibility for guarding and protecting the natural world so that it would also be there for future generations.

This 'caretaker' type view of the world, with local and cultural variations, was common to societies the world over for most of the human history of this planet – and is in fact still common in many traditional cultures today (e.g. First Nations peoples). However about six hundred years ago, new ideas about our world began to move our European ancestors away from the traditional view. With the

creation of science, humans had discovered a tool that promised to allow them to unlock the mysteries of the universe. Therefore, since the Renaissance, scientists have been driven to discover more and more about the world, relentlessly pursuing everything in their quest for greater knowledge. Each new discovery answered our previous questions, though after creating just as many new ones, but contributed in some small way towards a greater understanding of the whole. By accumulating knowledge one piece at a time, we would eventually be able to understand our universe and use that knowledge to create a better world.

In the traditional worldview where we had seen ourselves as but a part of a greater whole, what humans took from nature was limited to what was needed to fulfill our basic survival needs. However, as science generated more and more knowledge about how the natural world worked, humans used that knowledge to develop technologies that they then used to fulfill their basic needs – and then some. Quickly we learned how to alter aspects of the natural world to our advantage, and began to fulfill needs that went beyond just basic survival. Through the application of technology, we built cities, developed better agricultural practices and began to accumulate excess production and wealth for its own sake. At the same time a subtle change in our thinking began to occur, the more we were able to offset the negative effects of nature by ‘taming’ parts of it, the more humans began to believe that they were less and less connected to it. Both our success over and our growing sense of disconnection meant that eventually there were fewer reasons to refrain from using our technology to alter whole landscapes, not just to guarantee our survival, but to ‘improve’ the planet. The more success we had, the more convinced we became that the unique position we had achieved on our planet was somehow deserved. We began to feel entitled to use whatever we could find in the world around us, without regard for either the generations to follow, or the consequences to the rest of the inhabitants of the planet.

At first, with the early agricultural societies, the impact of this thinking was not apparent – though poorly planned early farming practices contributed to the turning of North Africa from a breadbasket into a desert. The real impact we were having on the planet only became most obvious with the creation of industrialization in the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. With the creation of factories and the need for raw resources, we began the wholesale extraction of minerals, logging of forests, and harvesting of the seas at a scale never before

seen. Common sense and our former holistic worldview suggested to us that this was not right, but we had placed our faith in the science, which had made these technologies possible. Surely, we reasoned, if science had spawned the technology that had created the problem, and then it could also come up with the solutions. So, either out of blind faith, or selective reasoning, we continued to exploit the Earth's resources for our benefit, without regard for either the future or its effect on other parts of the natural world.

By the latter third of the 20<sup>th</sup> century we could no longer ignore the signs. The negative cumulative effects of our industrial past began to appear everywhere: fouled air, polluted water, species extinction, the collapse of commercial fisheries, and so on. But with over half the world's population living in cities, in human-made environments surrounded only by things of their own choosing, we have become totally disconnected from nature and the air, water and food that we need for our very survival. We have lost our connection with the living planet. Instead of retreating from this unsustainable position, we have chosen to pressure the planet to a point of collapse. Consider these contrasting facts:

- Americans and Canadians today are 4.5 times richer than great-grandparents ...BUT...since 1940 Americans alone have used up as large a share of Earth's natural resources as all the previous generations put together.
- North American can choose from 25,000 supermarket items, 200 kinds of cereal, and 11,000 magazines...BUT...in the last 200 years the United States has lost 50% of its wetlands, 90% of its old growth forest and 99% of its tall grass prairies;
- As of 1987 the number of shopping centers surpassed the number of high schools...BUT...Americans spend just 40 minutes average per week playing with their children (40% less time than they did in 1965) versus 6 hours shopping;
- Educators have spent the last forty years attempting to increase environmental awareness through educational programs...BUT...most children still view nature as something to either be avoided, conquered or cute 'n cuddly, and;
- Children exposed to sound environmental education programs can be taught better practices...BUT...most young children have already created their own worldview based on cartoons and the media, and vigorously resist any efforts to change it.

To save us from ourselves, we need to make a fundamental change in our thinking. Our view of science is an important part of this change. There are limits to what science is limited to examining only very small, very specific parts at one time. As knowledgeable about specific parts as we are, there are still too many parts to know and too many parts missing from the puzzle for us to understand the whole big picture. We can name only a fraction of the billions of organisms that live on this planet, let alone how each of them is connected to one another. But connected they are, probably in ways we couldn't even imagine.

Despite what we may have wanted to believe for some time now, we too are connected to all things, and as we are also the principal cause of the "disconnection" we are facing today, we are the ones responsible for finding the solution. The first step towards that solution involves reflecting on our current values and our behaviours, and beginning the process of altering those that are in conflict with what is in our, and the Earth's, best long term interests. In the end, when we are gone, wealth, status, and power will matter very little; instead we will be measured by the legacy we leave those that follow. What that legacy looks like is still well within our power to determine.

#### **QUESTIONS:**

1. What characteristics did the human species possess that allowed them to have success?
2. In your own words, describe our original worldview.
3. What events caused us to change our worldview? About when did this begin?
4. What worldview took the place of our original?
5. Why is our current worldview problematic?
6. What does the author suggest is the solution?

## APPENDIX B

### ACTIVITY TWO – A Suggested List of Species Student Interviews

African Elephant	Leopard Frog
African Lion	Llama
American Alligator	Massasauga Rattlesnake
American Bison	Moose
American Elk	Mountain Gorilla
Amur Leopard	Mountain Lion
Bald Eagle	Nile Crocodile
Blue Whale	Orangutan
California Condor	Orca (Killer Whale)
Chimpanzee	Peregrine Falcon
Cormorant	Polar Bear
Coyote	Raccoon
Dark-Handed Agile Gibbon	Red-Tailed Hawk
Eastern Bluebird	Ruby-Throated Hummingbird
Eastern Right Whale	Sea Otter
Emu	Siberian Tiger
Giant Panda	Snapping Turtle
Great Horned Owl	Snow Leopard
Grey Wolf	White Rhinoceros
Grizzly Bear	White-Tailed Deer
Jaguar	Whooping Crane
Kangaroo	Wolverine

## APPENDIX C

### ACTIVITY FOUR – Defining “Ecosystem”

The word ecosystem combines two words: ecology and system. It connects the idea of **eco**, the household of nature, what that of **system**, a set of interactions over time among living and non-living elements of that household. One of the problems encountered when using the term ecosystem, is how big are they? Given the interrelated nature of elements the world over, how do we know where one ecosystem ends, and another begins?

The simple answer is that term ecosystem is really more of an idea than it is a place and set of things. It is a term of convenience. On any map we can draw a line around a section of the earth and decide to treat its element separately from the rest, and call that an ecosystem. By drawing boundaries around certain groups of interacting organisms, we are looking to identify the components of these different biological neighbourhoods. By describing how each of the organisms in that ecosystem behaves (*i.e. growth, adaptations, what they eat, lifespan, etc.*), but within the context of that particular place and the other organisms found there, then we are dealing a system. Within that system, we can assign organisms an address, or habitat, that describes their typical location, and an occupation, or niche, that describes the role they play in that ecosystem. Thus an ecosystem is a set of elements, living and non-living (*e.g. water, rocks, etc.*), interacting over time within a defined area, where energy and materials are constantly circulating but have also achieved a kind of balance.

However, while we may be able to identify what those elements are, the connections between the elements are often subtle, and hard to see or understand. Often what prevents us from fully understanding an ecosystem is that it often operates over such long periods that the time frames stretch well beyond the lifespan of the typical human. That, and the fact the relationships between the elements are often not obvious and what we do know about them is so limited, makes an accurate understanding of the full workings of any ecosystem very incomplete indeed. Having students study ecosystems compels them to see not only the individual parts of the system, but their interactions both presently and over time. It will teach them that living systems are mosaics in which all the parts fit together to make the whole, and that the alteration or

removal of even one small, seemingly unimportant component, can have far reaching effects. Knowing that, maintaining the integrity of all ecosystems should be our most important goal, for as Aldo Leopold said in the Sand county Almanac, "A thing is right when it tend to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise."

### **QUESTIONS:**

1. In your words, define the term ecosystem.
2. What are the differences between the terms 'habitat' and 'niche'?
3. What are two factors that make understanding the workings ecosystems so difficult?
4. In terms of understanding ecosystems, what do you think Aldo Leopold meant in the last two lines?

## APPENDIX D

### ACTIVITY FOUR – Defining “Ecosystem”

“And all things are ordered together somehow, but not all alike, both fishes and fowls and plants; and the world is not such that one thing has nothing to do with another, but they are all connected.”

– Aristotle’s *Metaphysics (Book XII, Chapter 10)*

Tree...  
He watching you.  
You look at tree,  
He listen to you.  
He got no finger,  
He can’t speak.  
But that leaf...

he growing, growing  
In the night.  
While you sleeping  
You dream something.  
Tree and grass same thing.  
They grow with your body,  
And with your feeling.

- Australian Aboriginal Song

The Philosophy of Aristotle

<http://classics.mit.edu/Aristotle/metaphysics.html>  
<http://plato.stanford.edu/entries/aristotle-metaphysics/>

Chief Seathl’s reply when asked to sell his land  
[1854]

<http://www.computing.edu.au/-keithmag/seathl.html>

Aldo Leopold’s “Sand County Almanac”

<http://www.wilderness.org/ethic/landethic.htm>

#### **The Message of Chief Seathl of the Suquamish(1854)**

“You must teach your children that the ground beneath their feet is the ashes of our grandfathers. So that they will respect the land, tell your children that the Earth is rich with the lives of our kin. Teach your children what we have taught our children, that the Earth is our mother. Whatever befalls the Earth befalls the sons of the Earth.If men spit upon the ground, they spit upon themselves.

“[A] land ethic changes the role of Homo Sapiens from conqueror of the land-community to plain member and citizen of it. It implies respect for his fellow-members, and also respect for the community as such. The land ethic simply

enlarges the boundaries of the community to include soils, waters, plants and animals, or collectively; the land. It is inconceivable to me that an ethical relation to land can exist without love, respect, and admiration for land, and a high regard for its value. By value, I of course mean something far broader than mere economic value; I mean value in the philosophical sense.”

- Aldo Leopold, *Sand County Almanac*

“Power is not manifested in the human being. True power is in the Creator. If we continue to ignore the message...and continue to destroy the source of our lives, then our children will suffer. The Creator made us equal with one another. And not only human beings, but all life is equal. Economics and technology may assist you, but they will also destroy you if you do not use the principals of equality. Profit and loss will mean nothing to future generations...

I do not see a delegation of the four-footed. I see no seat for the eagles. We forget and consider ourselves superior, but we are after all a mere part of the Creation. And we must continue to understand where we are. And we stand between the mountain and the ant, somewhere and there only, as a part and parcel of Creation. It is our responsibility, since we have been given minds, to take care of these things. The elements, and the animals, and the bird, they live in state of grace. They are absolute, they can do no wrong. It is only we, the two-leggeds, that can do this. And when we do this to our brothers, our own brothers, then we do the worst in the eyes of the Creator.”

- Oren Lyons, from an address to the United Nations (1977)

## QUESTIONS:

1. Each of these quotes come from cultures that are both very different and thousands of years apart, yet they share a common message. What do you think that message is?
2. How can you connect the central message from these passages to the concept of ecosystems?
3. Select the passage that you believe most affects your thinking around environmental ethics and enter its most important points into your journal.

## APPENDIX E

### ACTIVITY FIVE – What is biodiversity?

Biological diversity, or biodiversity for short, refers to the variety in the web of life on Earth. The fundamental “building block” of biological diversity is the species. The best way to protect species or the genetic diversity within species is to protect their ecosystems.

Urban humans might believe that they are self-sufficient and isolated from biodiversity, but biodiversity is what makes our environment habitable. About 1.5 million life forms have been identified so far; estimates are that the real total is between five and 80 million. Most are in the tropics, where there is more biological diversity than in temperate or cold climates. This does not mean that biodiversity is unimportant in Canada, for the loss of a single species here may be more critical to the way that system functions.

We are realizing that we are not doing enough for biodiversity; species that world over are disappearing at an extraordinary rate as a result of human activity, along with entire ecosystems. By managing our environment in a piece-by-piece basis, we have created many problems, the impacts of which we are beginning to see.

**Is the loss of biodiversity important?** *If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.* – Aldo Leopold

Biodiversity has an obvious utilitarian value, i.e. we use it to fulfill our basic needs. Through it we obtain oxygen, soil, fresh water, and the production of food. Many of our medicines come from wild species. Canada’s economy was built on natural resources such as the fur trade, fisheries, forestry, and agriculture.

Yet, is every species essential to the functioning of an ecosystem or to our well-being? Does the average Canadian care whether Ontario loses three beetle species? Would they even notice? What about ‘pest’ species such as mosquitos or ragweed? Sometimes whole species such as the Passenger Pigeon, have

disappeared from an ecosystem, but the systems haven't crashed. The problem with viewing biodiversity as utilitarian is that our knowledge of species and ecosystems is so limited; we don't know which parts are critical to a system's survival. That's why Leopold's message makes sense; when you tinker with a system you don't understand, keep all the parts, because they may prove later to have an importance you didn't expect.

Canadians should also make a conscious decision to preserve biodiversity because they do not wish to destroy the rights of future generations. The value of biodiversity is more than utilitarian or economic; biodiversity is a quality in our lives. It is that variety of life that makes our world a more beautiful and interesting place in which to live.

Has Canada lost biodiversity? – The number of species Canada has lost is relatively small compared with numbers lost from tropical regions, but we have still lost a number of distinct life forms, e.g. the Great Auk. Currently 106 species of animals and plants are classified as endangered or threatened, though many species have not yet even been reviewed.

The greatest threat to biodiversity is the alteration of ecological regions, mainly as a result of competing land use. Few hectares of tall grass prairie remain intact, Carolinian forest survives only in tiny patches, and only small stands of old red & white pines remain in central Canada. Wetlands too, among the habitats richest in species, have been reduced by as much as 90%.

Most of the species native to these regions still exist in Canada, but their populations have been greatly reduced or fragmented, risking the reduction of genetic diversity within species. We have also gained species, i.e. plants and animals have either been deliberately introduced (e.g. the Starling) or have been accidentally released, such as zebra mussels. Ecosystems are not static, and some shifts in species are normal and unavoidable. However, it is not wise to speed up the process or to create conditions that will cause native species to be displaced. The conservation of biodiversity is not a numbers game; a species gained does not make up for one that is lost.

**Evolutionary Perspectives** – Despite the mass extinctions of the past, the overall trend has been towards greater diversity; evolution has replaced lost species lost

with a larger number of new species. The rate of extinction that has been occurring in recent centuries as a result of human activity, equals or exceeds the rate of extinction during the last mass extinction.

**Pressures on Biodiversity** – Human activity affects a large proportion of the Earth’s land area. In Canada, agriculture, forestry, and urbanization are three of the major economic uses of land. Because of their widespread effect, these three have the potential to bring the human economy and Canadian biodiversity into conflict.

Forests cover almost half of Canada. It is impossible to protect Canadian biodiversity without protecting its forest species and ecosystems. Canada’s forests are also central to the economic and social life of the country, with over 800,000 Canadians, 350 communities, and \$18 billion a year in exports dependent on the forest industry.

Canadian agriculture has a significant influence on biodiversity because it covers a large portion of the landscape. Modern farming is intense, and the effects of pesticide and fertilizer use go beyond the cropped areas. The loss of native habitat because of agricultural conversion has been significant; we have less than 13% of short grass prairie, 19% of mixed-grass prairie, 16% of aspen parkland, and almost none of the tall grass prairie remaining in their native state. Loss of habitat to agriculture account for the threats to a disproportionately high number of species in Canada.

Although cities and towns account for only a small proportion of Canada’s land area, most of them are in the richest of Canada’s ecosystems in terms of species. The Quebec City – Windsor corridor, Canada’s most densely populated area, is home to almost half of Canada’s threatened or endangered species.

### **QUESTIONS: What is Biodiversity?**

1. What is meant by the term biodiversity?
2. What is the ‘best’ way to protect species and genetic diversity?
3. About what percentage of all life forms has science been able to identify?  
(Give a range)
4. Why are the greatest number of species to be found in the tropics?

5. Why is the loss of a northern species a potentially greater one than a tropical species?
6. What do scientists identify as the principal reason for species decline world-wide?

### **Is the loss of biodiversity important?**

1. What does utilitarian value of biodiversity mean? Give three examples.
2. Why does the loss of one or more species not always cause an ecosystem to crash? EXTRA: What was the Passenger Pigeon?
3. What is the problem with viewing biodiversity as purely utilitarian?
4. In our society we have a multitude of choices, especially when it comes to purchasing consumer items such as cars, cereal, or jeans. Wouldn't it be better then to product just one kind of each thing? Wouldn't it use fewer resources and create less waste?
5. How are the points you made about diversity in question 4 related to t hose of biodiversity?

The Passenger Pigeon

<http://www.ris.net/-tony/ppigeon.html>

Great Auk

<http://www.rom.on.ca/biodiversity/auk/aukhist.html>

Carolinian Forest

<http://www.carolinian.org/Cc0.htm>

### **Has Canada lost biodiversity?**

1. What is the greatest threat to biodiversity in Canada? EXTRA: What was a Great Auk? What is a Carolinian forest?
2. In places where threatened species still live, how does habitat fragmentation pose a threat?
3. Why would introduced species threaten biodiversity?
4. If ecosystems aren't static, then how can they be balanced?

### **Evolutionary Perspectives:**

1. After a mass extinction, what has happened to biodiversity?
2. How has human activity impacted on species extinction?

### **Pressures on Biodiversity:**

1. What three human activities have the greatest negative effect on biodiversity?
2. How will attempts at protecting Canada's remaining forests create conflicts for Canadians?
3. What are the three factors that make agriculture a threat to biodiversity?
4. If such a small portion of Canada's land area is covered in urban growth, how can urbanization be a threat to biodiversity?

## **APPENDIX F**

### **ACTIVITY SIX – Zoos and Conservation**

**Percentage of species inhabiting rain forests: 50%**

**Hectares of rain forest destroyed per minute: 20**

**Number of species disappearing annually: 12,000 – 17,000**

**Human population by the year 2,000: 6,000,000,000+**

Zoos were originally created to house collections of strange and exotic creatures. Today, however, with animal species vanishing from the Earth at an alarming rate, the display of wild animals in captivity can no longer be just for our curiosity. Zoos have become like Noah's Ark, the last refuge for many species that would otherwise have been swallowed up in the rising sea of human population. Zoos therefore have two purposes: to act as a savings bank for endangered animals and through their work educate society about the value of wildlife and its right to exist.

Many people are concerned with the treatment of animals and are asking themselves if we, as a society, are doing the right thing. Shouldn't all animals have the right to live freely in their natural environment? The answer to those questions difficult at best, but from any viewpoint the most fundamental right animals and plants have, is to be free from human-caused extinction. This is where zoos can help.

The primary reason that most endangered species are threatened is because of habitat destruction or over exploitation. Human over-population daily encroaches on the world's few remaining wild areas, with often-disastrous results for the wildlife that depends on those habitats for their survival. The sad results are that many species will eventually only exist only in captivity; e.g. there are now more Siberian tigers in zoos than in the wild. Where species cannot be maintained in their natural setting, captive breeding becomes the last resort.

Most zoo animals are born in captivity, and some species that have long been extinct in the wild such as the Wisent (European Bison), are doing quite well in zoos. Other such examples include Przewalski's horse, Pere David's deer and the Arabian oryx. For other species, such as the Siberian Tiger, Amur Leopard, Snow

Leopard, and many primates, zoo populations of captive bred animals now exceed those still surviving in the wild. Those captive bred animals may remain within the zoo system, or in some cases may form the nucleus of populations that are re-introduced into the wild. An example of the latter is the Wood bison. In 1985 bison from the Toronto Zoo were shipped to northern Manitoba as part of a Canadian government project to successfully re-introduce this endangered species into the wild. Other species, such as the California condor and Black Footed Ferret survive in the wild today because of vigorous breeding and release programs in zoos protected the few remaining animals at a crucial time in their existence.

Modern zoos are striving for a balance between human needs and the requirements of the Earth's wildlife. This balance can only be achieved through understanding the needs of those plants and animals that are being threatened. However, until humans can re-introduce that balance back into natural systems, zoos will continue to serve an important role, often as the last refuge from any species that have long since effectively disappeared from the wild.

### **QUESTIONS:**

1. What are the two major roles that zoos find themselves performing today?
2. What counter-arguments could you offer to someone who was of the opinion that zoos were unkind to wild animals? What positive roles can zoos play in helping with endangered and threatened species?
3. What is the ultimate goal of zoos, with respect to biodiversity and healthy wild animal populations?

**APPENDIX G** – A list of Animals at Safari Niagara (*May change each year*)

African Hunting Dog	De Brazza's Monkey	Prenhensile Tailed Skink
African Leopard	Donkey	Red Footed Tortoise
African Lion	Eagle Owl	Red Kangaroo
African Spurred Tortoise	Eclectus Parrot	Red Panda
Albino Hognose	Emu	Red River Hog
Alpaca	Fallow Deer	Reindeer
American Badger	Florida Sandhill Crane	Ring-Tailed Lemur
American Golden Eagle	Gila Monster	Rosella
American Red Fox	Giraffe	Rough Legged Hawk
Amur Leopard	Goeldi's Monkey	Royal Python
Andean Condor	Goffin's Parrot	Sacred Ibis
Argus Monitor	Grants Zebra	Savannah Uromastyx
Bactrian Camel	Great Horned Owl	Scarlet Ibis
Barbary Ape	Greater Flamingo	Scarlet Macaw
Barn Owl	Greater One Horn Rhino	Serval Cat
Bearded Dragon	Grey Wolf	Siamang Gibbon
Bengal Tiger	Harris Hawk	Six Banded Armadillo
Black & White Ruffed Lemur	Hippopotamus	Slender Tailed Meerkat
Black Bear	Honduran Milk Snake	Snowy Owl
Blue Bellied Roller	Indian Sarus Crane	Southern White Rhino
Blue Gold Macaw	Japanese Macaque	Spotted Jaguar
Blue Tongue Skink	Lar Gibbon	Striped Skunk
Brazilian Tapir	Leopard Gecko	Stuarts Milk Snake
Brown Lemur	Malagasy Tree Boa	Swift Parrot
Budgerigar	Military Macaw	Syrian Brown Bear
Bush stone Curlew	Miniature Horse	Turkey Vulture
California Kingsnake	Miniature Zebu	White Ibis
Canadian Bobcat	Mississippi Map Turtle	Wildebeest
Canadian Lynx	Moluccan Cockatoo	Yellow-Naped Amazon
Cape Thick Knee	Musk Ox	
Common Eland	Mute Swan	
Common Raven	Nilgai	
Cougar	Northern Bald Eagle	
Dark Handed Agile Gibbon	Nubian Goat Cross	
	Ostrich	
	Prenhensile Tailed Porcupine	

## APPENDIX H-1

### THE AMUR LEOPARD

#### **Introduction:**

Leopards, of all the cats, have the widest distribution in the world. They were once found in almost all of Africa, and large parts of Asia ranging from Turkey to Indonesia and Russia. Of the eight subspecies of leopard, the **Amur Leopard** (*also called the Far Eastern Leopard*) is the most rare. It is the most endangered cat in the world today. There are estimated to be only about 50 left in the wild. Forty of these are in Russia, in the area of the Amur River in a small area west of Vladivostok. Another ten exist in China and North Korea.

There were 168 Amur Leopards in captivity in the year 2000, mostly in zoos throughout North America and Europe.

#### **Description:**

Amur Leopards have long legs and long hair to allow them to survive in cold, snowy climates. Summer hairs of 2.5cm are replaced by winter hairs 7cm long.

Males weigh between 32-48kg with very large males ranging up to 60-75kg. Females are smaller and weigh between 25-43kg. Leopards become sexually mature at about 3 years. Cubs are born in spring or early summer after a gestation period of 90-107 days. A litter can contain from 1-6 cubs. The cubs are weaned at 3 months and leave the mother at 18-24 months.

The diet of this leopard includes roe deer, sika deer, hares, badgers and musk deer. Amur leopards can run for short distances at a speed of 59 km/h. They can leap 6 metres horizontally and 3 metres in to the air. These cats are nocturnal, strong swimmers and stalk their prey alone. Individuals in captivity have lived 23 years. They do not usually live as long in the wild.

#### **Threats to Survival:**

There are three major threats to the survival of this leopard. These are:

1. Habitat destruction;
2. Loss of prey species (*resulting in starvation*);
3. Poaching for fur and trophy

A great threat to the survival of the species is the very small number of cats left in the wild. This can result in inbreeding, which can amplify genetic defects. In addition, with such a small population, a single catastrophic event such as a forest fire or disease could be disastrous.

**Conservation Efforts:**

All of the captive animals are part of a Species Survival Plan concentrating on spreading out captive bloodlines in zoos. A conservation program has also been implemented in Russia which included an anti-poaching team, forest-firefighting, compensation for farmers when leopards kill live-stock, education projects and monitoring of leopard and prey numbers.

The Amur Leopard is listed as Endangered by the IUCN and is on CITES Appendix 1 for protection status.

## **APPENDIX H-2**

### **GIBBONS**

#### **Introduction:**

Gibbons are small, arboreal apes who live in the tropical and subtropical rainforest of Southeast Asia. Today they are found in small populations in China, Laos, Vietnam, Cambodia, Thailand, Bangladesh, Northeast India, Myanmar, Malaysia and Indonesia. There are 13 gibbon species. All species are considered endangered. The Hainan Black-crested gibbon is the most endangered known primate with only 14 individuals left on the island of Hainan off the coast of China.

#### **Description:**

Gibbons live in the canopy layer of rainforests, often up to 60 metres high. They travel by swinging hand over hand from tree to tree, a method of locomotion called brachiating. They can leap distance of 15 metres at a speed of 55km/h. Gibbons can walk upright on the ground as well as long branches.

The colouration of gibbons ranges from cream to brown, grey, and black. In some species the males and females have a sex-specific colouration. Because of colour differences it is often difficult to tell species apart.

They are one of the few monogamous primates. A family group consists of a male and female and their young. Gibbons defend a territory by means of vocal displays. This consists of a spectacular, bird-like duet between the mated pair, with the young occasionally joining in. Their voices can be heard up to 3.2 kilometres.

Females give birth to a single young at a time.

Their food consists of fruits, buds and leaves.

Gibbons can live to be over thirty years of age in captivity.

#### **Threats to Survival:**

The primary threat to their survival is the loss of habitat due to destruction of the rainforests. It is estimated the rainforests of Asia are being destroyed at a rate of 13 hectares/minute.

Gibbons are also victims of the illegal wildlife trade. Their body parts are used for the manufacture of traditional medicines.

Very low number of some species have brought them to the brink of extinction.

**Conservation Efforts:**

The International Center for Gibbon Studies in southern California is the only facility in the world devoted exclusively to the study, propagation and conservation of gibbons. This facility houses nearly 40 gibbons representing 5 of the 13 living species. This is the second largest gibbon population outside Southeast Asia.

In the wild remaining populations are protected by projects devoted to their conservation, notably in Java, Thailand, India, China and Vietnam.

Gibbons are housed in a number of zoos around the world. A Species Protection Plan is designed to increase populations and maintain a viable gene pool through captive breeding programs. The ultimate goal is to release offspring into protected native habitats. A major obstacle to increasing captive populations is the slow rate of reproduction. Females give birth about one every second year. Young gibbons remain with the family unit until they reach adulthood. At this time the individual is removed from the family and housed with a mate, as would normally happen in the wild.

Gibbons are protected by CITES Appendix 1

## APPENDIX H-3

### SNOW LEOPARD

#### **Introduction:**

Snow Leopards (also known as PHANTOM or GHOST CAT) have a large but extremely patchy and fragmented distribution. It consists of a mix of long narrow mountain systems and islands of montane habitat scatter throughout a vast region surround by central Asian deserts and plateaus. This includes central Russia, Mongolia, western China, Tibet, and the Himalayan portion of India, Pakistan, Afghanistan, Bhutan and Nepal. They are generally found at elevations of 3,000 to 4,500 metres and occasionally go above 5,500 metres in the Himalayas. They occur as low as 900 metres in parts of Russia and Mongolia.

#### **Description:**

Males are larger than females with average weights between 45-55kg (*100-120 pounds*) as opposed to 35-40kg (*77-88 pounds*) for females. They are only about 60cm (*2 feet*) tall at the shoulder.

Snow Leopards are opportunistic predators capable of killing animals up to three times their own weight. They take whatever is available. In one study in China the diet was found to be 45% marmots. They will also take wild sheep and goats, deer, gazelle, young yaks, wild ass and domestic livestock. They kill on average every 1-15 days and will stay on a kill for 3-4 days.

They are solitary animals. Individual ranges of animals can vary from 30km<sup>2</sup> to up to 1,000 km<sup>2</sup> in Mongolia. Collared animals have been tracked for over 600 km<sup>2</sup> in moving from one area to another.

Females become mature at just under 3 years. The gestation period is 98 to 104 days. Two or three young are born every other year. The young become independent at 18 to 22 months.

In the wild they seldom live 12 years but can live to be over 15 years of age in captivity.

#### **Threats to Survival:**

Loss of habitat is a major threat to survival. Poaching is also a serious threat with body parts being used in traditional medicines.

These leopards are capable of taking large animals and often will attack livestock. Farmers may then want the leopard killed to protect their remaining animals.

Natural disasters and disease are also a possible threat.

### **Conservation Efforts:**

There are only about 3,500 snow leopards in the wild and 600 in captivity. The International Snow Leopard Trust works at local levels with communities in snow leopard habitat to educate farmers on how to protect their livestock from leopard predation. There is also the American Zoo and Aquarium Association Species Survival Plan program which is a captive breeding program initiated in 1984. Under this program cubs born in one zoo can be sent to other zoos around the world to help diversify the captive population. At present there are approximately 250 captive bred snow leopards in Canadian and American zoos. Eighty-five to ninety percent of captive populations breed in their lifetime. A captive population of 250 animals can maintain a 90% of original genetic diversity for 200 years. Only 25-30 cubs per year are needed to achieve population stability in North America.

In the wild remaining populations are protected by projects devoted to their conservation, notably in Java, Thailand, India, China and Vietnam.