FortWhyte Alive
HUMAN. NATURE.

ADAPT OR DIE

Grade 4
2 Hours

Thank you for booking our “Adapt or Die” program at FortWhyte Alive. This Program is designed to help your students learn about the concept of adaptation in plants and animals. Students will have the opportunity to make observations in our Interpretive Centre, participate in hands-on games and activities, and explore local habitats on the trail.

Appropriate Dress for Your Field Trip

To ensure that students get the most out of their FortWhyte experience, we ask that they be appropriately dressed for a 2-hour outdoor excursion. All of our programs include time outdoors, regardless of weather. Comfort and safety are key in making this an enjoyable and memorable experience.

Suggestions for Outdoor Dress

Layering of clothing is very important in maintaining body temperature and in remaining dry. Four thin garments may offer the same degree of warmth as one thick overcoat, but the four layers allow much greater flexibility. Layers can be shed or added as temperature, wind, exertion, or other variables dictate.

Waterproof outer layers are also important. Rain may get us wet but so will dew on grass, melting snow on pants and puddles in the spring. Boots in the winter are always important to keep moisture out and heat in.

***Please share this information with other teachers that are coming to FWA with your group.**

GOAL

To understand the concept of adaptation in plants and animals.

OBJECTIVES

Students will:

1. Define adaptation and distinguish between physical and behavioural adaptations.
2. Define habitat and list the five essential components every habitat provides.
3. Explain how adaptations help animals and plants acquire the five major habitat components.
4. Investigate and recognize the relationships between different habitats and communities.

VOCABULARY

Adaptation: A trait that helps an organism survive in its habitat. There are two kinds of adaptations:

- **Physical (or structural):** a body structure or function that helps an organism survive (i.e. what an animal has that enables it to survive).
- **Behavioural**: A particular way that an organism acts or reacts to its environment that helps it to survive (i.e. what an animal does that enables it to survive).

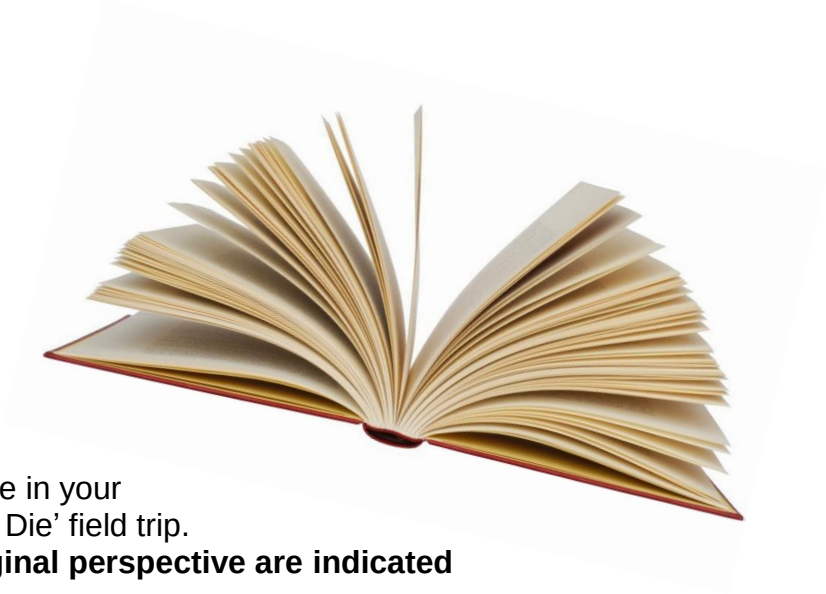
Competition: The process in which organisms with similar requirements compete for limited resources such as space, sunlight, water and food in a given area,

Camouflage: A method that allows an otherwise visible organism to blend in with its immediate surroundings by the shape of its body, colouration, texture, patterning or behaviour. This form of adaptation allows an organism to either hide or avoid predators, or to catch food.

Habitat: A spatial area where a particular species lives (plant or animal). It is essentially the natural environment of a population of organisms that acquire the essential components necessary for survival: food, water, air, shelter and space.

Food Chain: Shows the relationships of who-eats-who, starting with a species that eats no other species and ending with one that is eaten by no other species.

LITERATURE CONNECTIONS



All of the books listed below relate to the theme of adaptations, are recommended for upper elementary children, and are available through the Winnipeg Public Libraries and/or the Manitoba Education Instructional Resources Library. You may wish to make these titles available in your classroom surrounding your 'Adapt or Die' field trip.
Books and activities with an Aboriginal perspective are indicated with a medicine wheel.

Fiction

- **How the Fox Got His Crossed Legs** by Virginia Football
- **How the Bees Got Their Stingers** by Mary Lou Fox
- **How Turtle Got its Shell** by Joseph McLellan
- **Just So Stories** by Rudyard Kipling
- **Chameleon's Colours** by Chisato Tashiro
- **Animorphs series** by K.A. Applegate
- **What Mr. Darwin Saw** by Mick Manning and Brita Granstrom
- **Song of the Water Boatman** by Joyce Sidman

Non-Fiction

- **What Do You Do With a Tail Like This?, What Do You Do When Something Wants to Eat You?, and Eye to Eye: How Animals See the World** by Steve Jenkins
- **Amazing Animal Adaptations (series)** by Julie Murphy and/or Lisa J. Amstutz
- **A Seed is Sleepy** by Dianna Hutts Aston
- **The Dandelion Seed and In a Nutshell** by Joseph Anthony
- **Claws, Coats and Camouflage** by Susan Goodman
- **Fur, Feathers and Flippers: How Animals Live Where They Do** by Patricia Lauber
- **Evolve or Die (Horrible Science Series)** by Phil Gates and Tony De Saulles
- **Animals Charles Darwin Saw** by Sandra Markle and Zina Saunders
- **Nature's Yucky** by Lee Ann Landstrom

PRE-VISIT ACTIVITIES

HABITAT LAP SIT (1 lesson)

Science

In the program *Adapt or Die*, students will explore how animals adapt to their environments or **habitats**. A habitat includes five crucial elements for plants and animals alike—food, water, shelter, air, and space (sunlight may also be included for plants). In this quick game students will see how all five parts are necessary for a strong and healthy habitat.

Have your class stand in a circle and number off students by fives as “food”, “water”, “shelter”, “air”, and “space”. Have students all turn to face along the circle (front to back) and tighten the circle up until everyone is almost touching. On the count of three have everyone sit on the lap of the person behind them. Practice a few times to represent a healthy, balanced habitat. Next, have everyone sit down but ask those in one particular category (e.g. “space”) to remove themselves. The circle will quickly topple. Repeat with other groups and discuss how living things cannot survive in a habitat unless it has all five components.

***Modified from Project WILD (*[*http://cwf-fcf.org/en/explore-our-work/education/for-educators/project-wild.html*](http://cwf-fcf.org/en/explore-our-work/education/for-educators/project-wild.html)*)*

SEED STORIES (1-2 lessons)

Science

In the program *Adapt or Die* students will learn about how plants adapt to disperse their seeds. The three main dispersal methods are: wind (wind travelers); being eaten and excreted (tummy travelers); and sticking to fur or clothing (hitchhikers). Some local examples of each are listed below:

> **Wind Travelers**: cattail, cottonwood, dandelion, Manitoba Maple
> **Tummy Travelers**: rose hip, raspberry, saskatoon berry, hawthorn berry
> **Hitchhikers**: wild licorice, burdock

Collect seeds in your schoolyard or local neighborhood and sort them according to dispersal method. If you have time, you may also wish to identify the seeds you have found. What are the advantages to each dispersal method? Why are these adaptations important for plants?

Visual Arts Extension: Use the seeds you have collected and sorted as stamps. Dip them in paint or ink to create unique patterns and shapes.

CRITTER CREATION (1-2 lessons)

Science/Visual Art

Review the concepts of physical and behavioural adaptations (Grade 4, Cluster 1) and have students design imaginary critters and describe how they are adapted to survive in their environment. Students may design an imaginary environment to suit their critters (e.g. a planet where the ground is made of Jello or where volcanoes constantly fill the air with smoke). Alternatively, they can use the habitat cards provided (**Attachment #4***)* to create critters that must adapt to more realistic environments such as a marsh, desert, or stream. Invent some enemies for your critter. Adapt them to overcome the defenses of the critter. Repeat for the food organisms (plants or animals). Adapt them to be able to avoid being eaten by your critter. Develop a whole alien ecosystem. Be sure to include biotic and abiotic parts of your ecosystem. Create producers, consumers and decomposers in each ecosystem. This activity indirectly illustrates how closely linked animals are to other organisms and their surroundings. You may wish to use various art media to paint, draw, model or sculpt the beasts. Be sure to let the FortWhyte Alive know how you do. We would love to see how creative you can be!

Language Arts Extension: Now that your critters/ecosystems have been designed and represented, write about a day in the life of the creatures, create a critter journal that highlights special adaptations and environmental hazards from the critters' perspectives, or put together a class field guide that includes a page for each critter and/or ecosystem.

The book *Diary of a Fly* by Doreen Cronin is a good model text for perspective writing.

POST-VISIT ACTIVITIES

HABITAT HUSTLE (1 lesson)

Science/Social Studies

Objective

Demonstrate to the students the interconnectedness of the earth. Recognize that the food chain is a system in which some of the energy from the sun is transferred to animals. Recognize that animals and plants live in specific habitats because they are dependent on those habitats and have adapted to them. Show how a removal of a species may affect the rest of the community. Discuss the length of time an adaptation takes to develop and the possibility of extinction when animals and plants have no time to adapt to a disturbance in their habitat.

Materials

Habitat Hustle cards as provided in Attachment #5
Long length of rope in a ball
Example scenarios in Attachment #6

Procedure

Get the students to form a circle. Hand out the habitat cards as provided in **Attachment #5**. Written on each card is something that can be found in a forest habitat. For example, squirrels, butterflies and black bears can all be found in a forest. As the interpreter, you will play the sun. You must gently toss the ball of rope to one of the students in the circle, holding onto the end of the rope.

The student who receives the rope must make a connection between their card and the sun. For example, if the student has a card with a deer on it, they could say that the deer relies on the sun because plants need the sun in order to grow and the deer needs to eat plants in order to survive. That student must toss the ball to another person in the circle while holding onto a section of the rope (starting a web). It will then be up to the next student to make a connection between their card and the card before them. For example, if the next student had a card with a creek on it, they could say that the deer needs the creek as a source of water. If students are having trouble coming up with connections, you can give prompt them with ideas. Continue passing the rope around the circle until everyone has discussed their card. The string can and should be criss-crossed in the circle.

At this point the students should gently pull on the string and feel the resistance that's been created. Once this is accomplished, the students will explore cause and effects of different scenarios. Make up your own or use the sample scenario questions in **Attachment #6**. If any of the habitat cards are affected by the scenario, ask those students to drop their string. Ask the remaining students to raise their string free hand if they felt the release in tension. Discuss the impacts. Continue to give the group scenarios until everyone has dropped their string. Discuss whether or not plants and animals can adapt to new scenarios.

Part of the grade 4 curriculum is to discuss *extinction*. What if an entire forest was cleared? Animals dependent on the forest for food and shelter are greatly impacted. If they cannot cope with this drastic change in their environment, they could die. If there are no remaining individuals from a certain species, they are considered extinct.

Discussion
Discuss habitat loss. How does this affect the adaptations of a species? Describe ways in which humans change habitats, for better or worse. Discuss ways which humans are dependent on animals and plants. What are some of the ways the students can help protect natural habitats?

HABITAT HIERARCHIES (4 lessons or more)

Science/Social Studies

Now that students are familiar with the concept of a habitat, investigate different types of habitats around the world, in Canada, in Manitoba, and locally.

World Biomes

On a map of the world, identify different regions. Where on our planet is warmest? Coldest? Most dry? Most wet? Do all countries on a continent have similar habitats? Use a World Biomes Map (**Attachment #1**), to locate some of the most common natural regions in the world. Students might cut out photographs from magazines or calendars to illustrate general characteristics of the different biomes. Which are similar to those found in Canada? Which are not?

Regions of Canada

Canada's six basic regions are: Canadian Shield (also sometimes referred to as Boreal Forest), Western Cordillera, St. Lawrence-Great Lakes Lowlands, Arctic Region (also known as the Far North), Atlantic Region (also known as Appalachian Region), and Prairie Region (also known as Great Plains or Interior Plains).

Use a map of Canada's regions (**Attachment #2**) to locate these six regions. Depending on how much time you have, this could become many lessons in itself. Laminated calendar pages make great examples of various regions. Students might make dioramas using natural materials collected outdoors, paintings, poems, or research projects to learn more about the plants and animals that live in each region. At the very least, have students map out the regions and note the differences that occur north to south and east to west. What causes these changes? Answers include geology/soil, climate, and topography.

Extension Ideas:

> Explore the concept of a keystone species. A keystone species is a plant or animal that has an especially big impact on its ecosystem. Without keystone species an ecosystem would be dramatically changed or cease to exist.
> Examples of keystone species in Canada's six regions include:

- Canadian Shield – Spruce
- Arctic Region—Arctic Fox
- Western Cordillera—Salmon
- Appalachian Region—Lobster
- Prairies—Prairie Dog
- St. Lawrence-Great Lakes Lowlands—Sugar Maple

Research these and other keystone species to identify why they are so important to their ecosystems. Who eats them and who do they eat in the food chain? Do other species rely on them for shelter?

> Go to **http://education.nationalgeographic.com/education/encyclopedia/keystone-species/?ar_a=1**
Create a mural of one of Canada's regions. Assign each student a specific plant or animal to research and have students work collaboratively with paints or other media to bring the habitat to life in detail.

Habitats of Manitoba:
If we zoom in on just the province of Manitoba we see that there are two major Canadian regions included in our province—Prairie and Canadian Shield (Boreal Forest). But there are also some more detailed regions. One of these is the transition zone between Prairie and Boreal Forest known as the ***Parkland Region***. This habitat is characterized by a mix of prairie grassland and stands of trees, primarily Aspen. The city of Winnipeg and FortWhyte Alive are both located within the Parkland Region.
See **Attachment #3** for a detailed map of Manitoba's ecological regions. Research the plants and animals that live in Manitoba. What are their special physical and behavioural adaptations? The animals you saw in the Touch Museum and on FortWhyte's property are a good starting place for inquiry.

Local Habitats:
On the smallest scale, we all live and go to school within local habitats. Go outside with your class and find evidence of the animals that live in your neighborhood—tracks, scat, chewed leaves, spiderwebs, nests, and holes are all great starting points. Start a list of plants and animals you would like to know more about and create a class field guide to your schoolyard/neighborhood. Look at examples of field guides and don't forget to include a sketch or photo, special adaptations, and a site map that shows where this organism might be found locally. Add to this project throughout the year!

CAMOUFLAGE GAME (Movement Break)

Science/Physical Education

In this game students will attempt to hide from a predator (you). Define boundaries in a large outdoor area. Close your eyes and count out loud to ten while students scatter and try to hide or camouflage themselves. Open your eyes and, without moving from your place, call out the students you can see. When you have called out all the students you can see hold up a "secret number" on your

hands for those who are still hiding to observe. Call out any more students you see in the process. Finally, call out the remaining students. Any students who remained hidden and were able to see the "secret number" have survived. They were able to camouflage themselves while also keeping an eye on the predator (you). This is a quick game and always a favorite with students.

ADAPTATION STORIES (1-3 lessons)

Language Arts/Social Studies/Science

Many Aboriginal stories (and stories from around the world) tell of how animals and plants got their specialized adaptations. A few examples are listed in the *Literature Connections* section of this package, but many more can easily be found. Read aloud stories of plant and animal adaptations from different cultures and discuss the world view that goes along with these narratives. Have students write their own stories and/or dramatize them for their classmates.

SEED STORIES PART 2 (ongoing)

Science

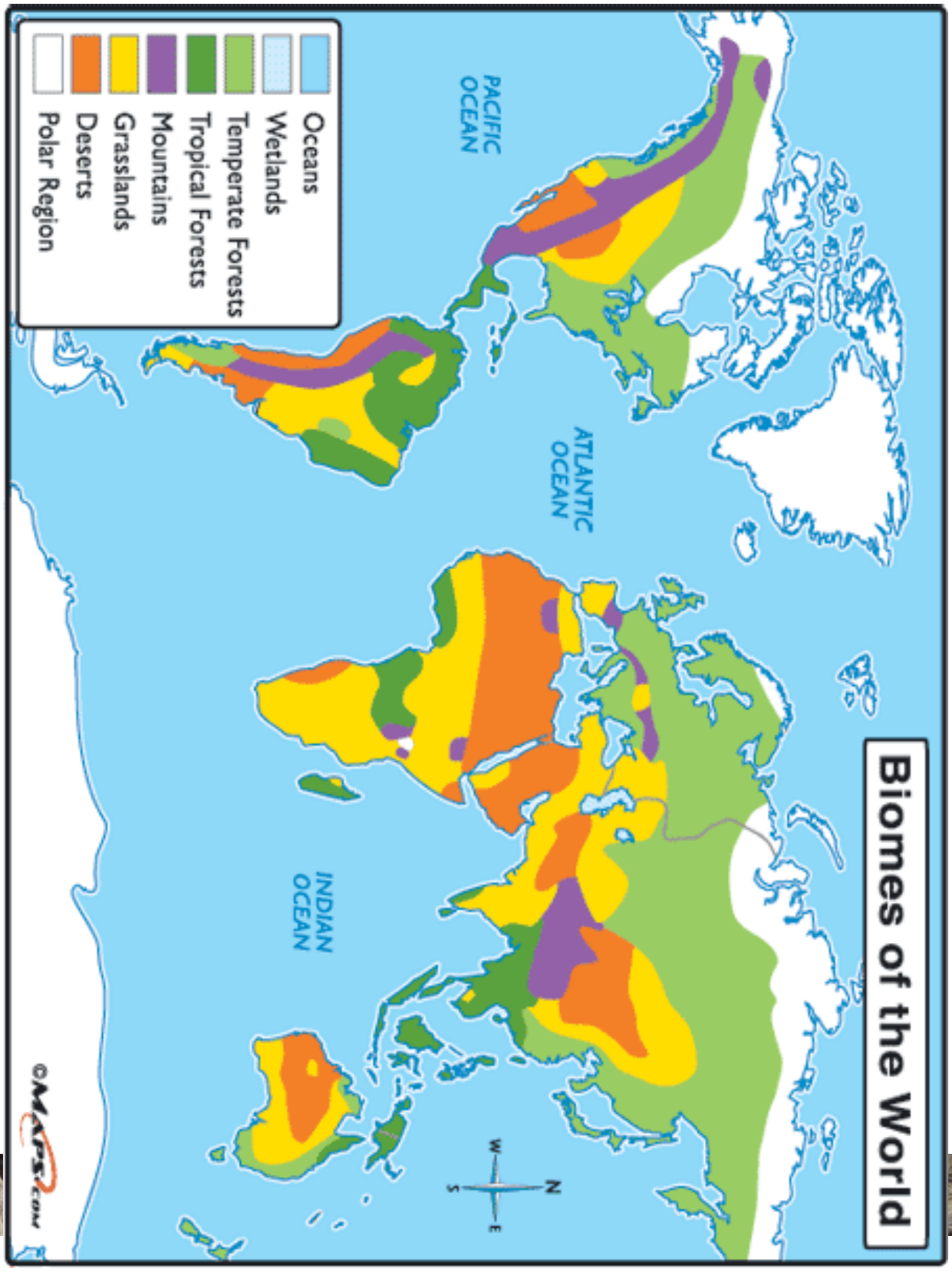
Grow plants in the classroom using obstructions, tilted pots, etc. to observe plant behaviour. Tropism is the term used to describe the simple avoidance/attraction responses of plants to light, gravity, contact and other stimuli. How are these behaviours adaptive?

HUMAN IMPACTS (1-2 Lessons)

Science/Social Studies

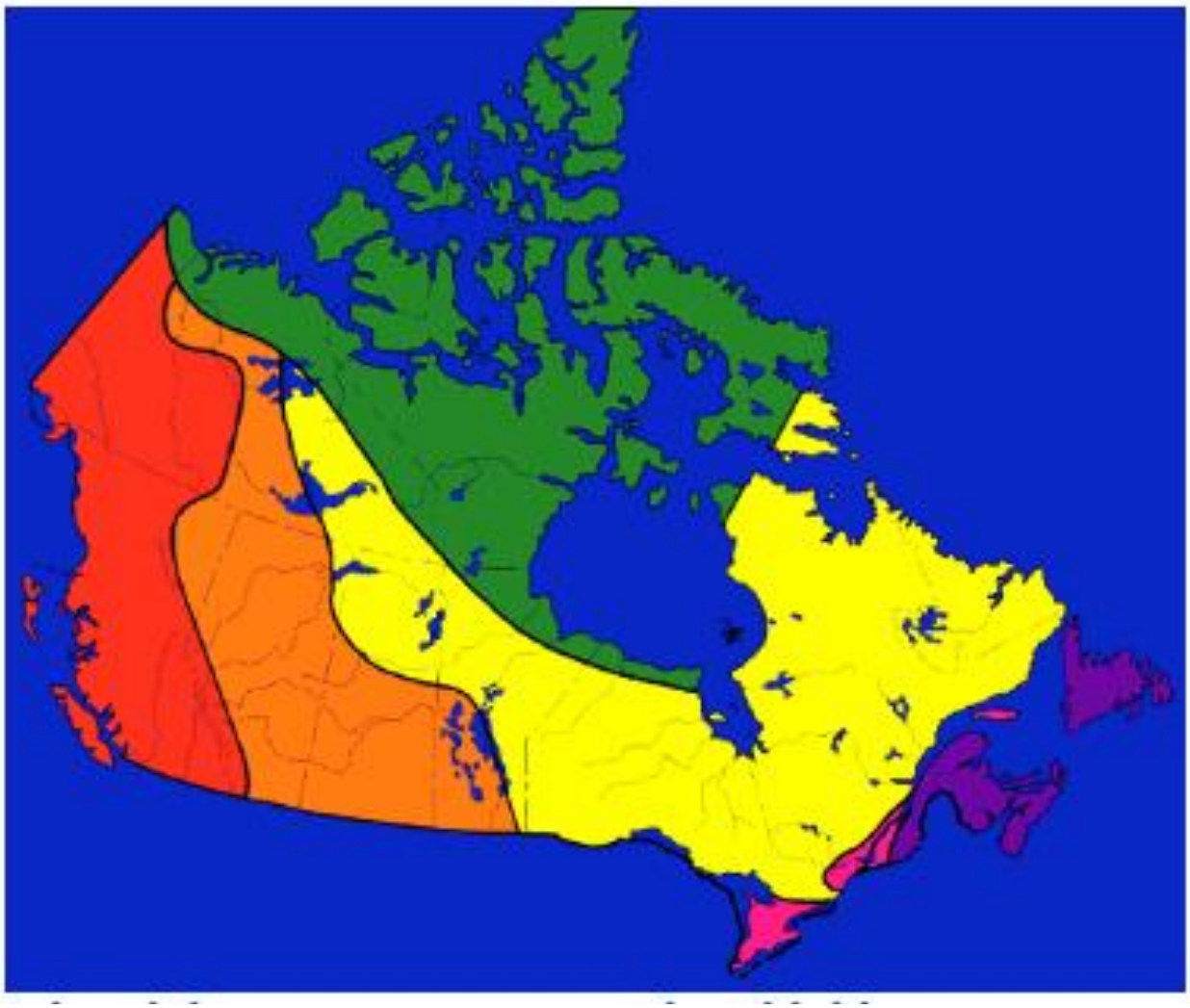
How are people affecting various habitats in terms of food, water, shelter, air, and space? Collect examples of each. Examples could include starvation in developing countries, water quality problems, housing shortages in our province, air pollution (stratospheric ozone, smog, greenhouse effect, etc.) and endangered spaces (i.e. habitat destruction). Discuss consequences and possible solutions to these problems. To what new factors must animals adapt in today's world? (e.g. climate change including elevated temperatures, change in rainfall, and more extreme weather events, plastic six-pack rings from pop cans, piles of garbage, deserts where forests once stood, etc.).

Attachment #1



Attachment #2

PHYSICAL REGIONS OF CANADA

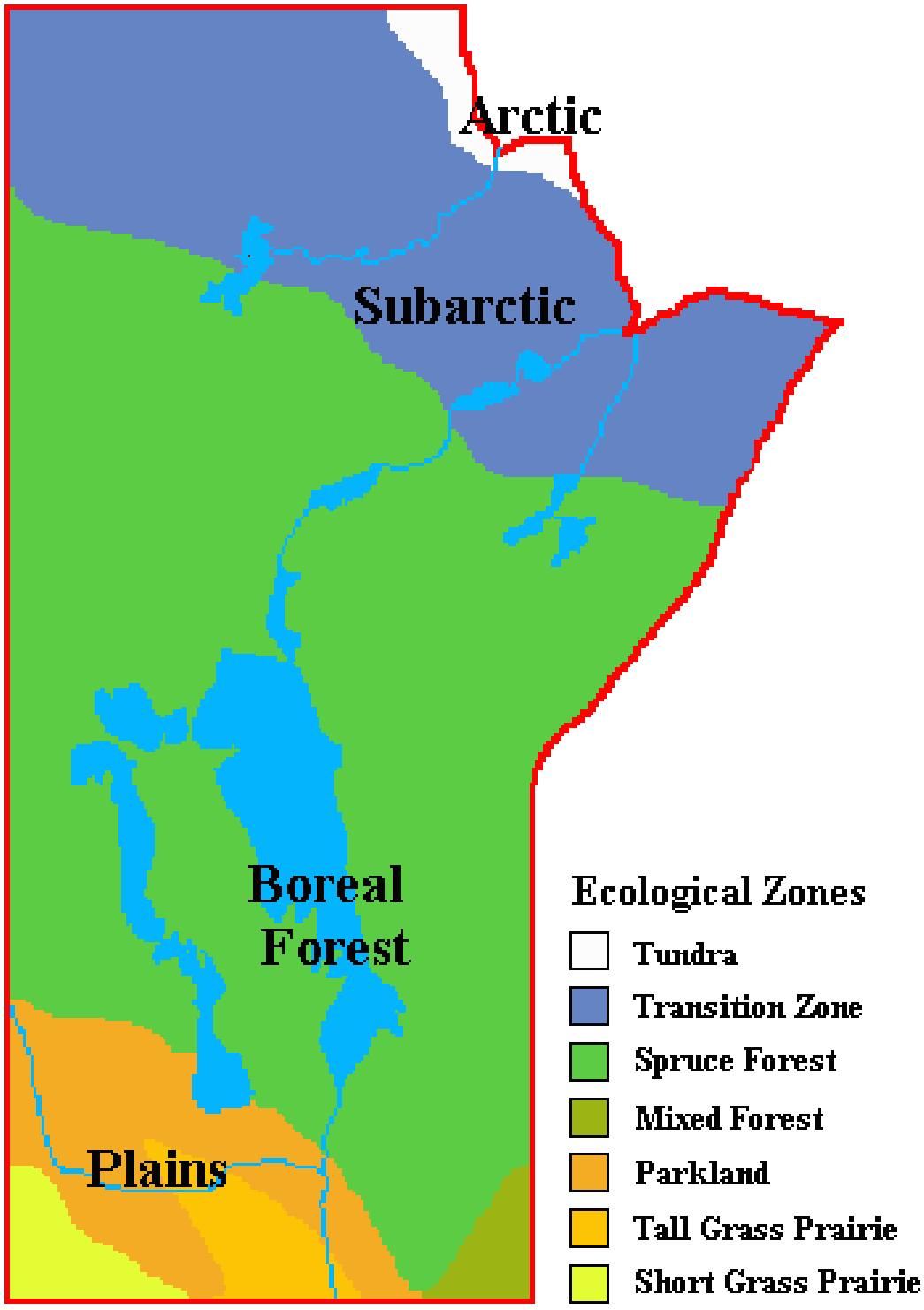


Red: _____
Orange: _____
Yellow: _____
Green: _____
Blue: _____
Purple: _____
Pink: _____

Western Cordillera, Great Plains, Canadian Shield, Arctic Region, St. Lawrence-Great Lakes Lowlands, Appalachian Region

Attachment #3

REGIONS OF MANITOBA



Attachment #4

Habitat 1: Freshwater Stream

Water: underwater (freshwater)
Conditions: cool, strong current, very rocky, lots of light
Hazards: many predators
Food: insects, small fish

Habitat 2: Grasslands

Water: very little water
Conditions: windy, hot summer, cold winter, dry (some grass fires), full view above grass, good cover in grass, no cover in winter
Hazards: flying and stalking predators
Food: leaves

Habitat 3: Lake Bottom

Water: underwater (freshwater)
Conditions: very little light, many weeds, soft muddy bottom
Hazards: large predatory fish
Food: small insects and fish

Habitat 4: Treetops

Water: humid, rainy
Conditions: many branches, very hot, thick bark, very high
Hazards: many biting insects
Food: leaves

Habitat 5: Desert

Water: hard to find
Conditions: dry
hot days, cold nights
frequent sandstorms
bright sunlight
soft sand
Hazards: large predatory birds
Food: small insects

Habitat 6: Underground

Water: little water
Conditions: no light, poor air quality, must dig small dirt particles
Hazards: predators from above
Food: insects

Habitat 7: Forest Floor

Water: wet
Conditions: many plants, dark, cool
Hazards: many predators day and night
Food: insects

Habitat 8: Marsh

Water: wet
Conditions: windy, warm, tall, dense grasses
Hazards: many predators day and night
Food: frogs and small fish

Attachment #5: Habitat Hustle Cards

Cave 	Woodpecker 
Aspen tree 	Black bear 
Berries 	Fish 
Hollow tree	Squirrel

Stream

Lake

Insect

Cougar

White-tailed deer

Pine tree

Wildflower	Red fox
	

Attachment #6: Habitat Hustle Example Scenarios

Example Scenarios
Habitat Hustle

1. A cottager spilled fuel in the lake when they were re-filling their boat.
2. A fisherperson dumped their tangled fishing line into the lake.
3. A cottager put out poison in order to get rid of the squirrels that were nesting in the roof of their cabin.
4. An invasive species of tree was accidently transplanted into the forest.
5. A cottager sprayed some insecticide in order to get rid of a wasp's nest.
6. A small tract of forest was cleared in order to build a water treatment facility.
7. A truck carrying a toxic substance hit the ditch and spilled chemicals into the creek.
8. A large tract of forest was cleared in order to build a road.