



# ADAPT OR DIE!

## Grade 4-6

Please share this kit with the other teachers in your group.

Thank you for booking FortWhyte Alive's Adapt or Die! Program. **The goal of this program is to introduce students to the concept of adaptation in plants and animals.** Students will learn about physical and structural adaptations through games and hands on outdoor experiences, in the habitats of our local flora and fauna.

### OBJECTIVES

Students should be able to:

1. Define adaptation and distinguish between physical and behavioural adaptations.
2. Define habitat and list the five essential components habitats provide which living organisms need for survival.
3. Explain how adaptations help animals and plants acquire the five major habitat components.

### CURRICULUM LINKS

SLO: 4-1-04

SLO: 5-4-06, 07, 16

SLO: 6-3-16, 18

### 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 (ie. 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 (ie. What an animal *does* to enable 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:** Is a method which 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 and avoid predators, or to catch food.

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

**Natural Selection:** A process in nature resulting in the survival of organisms having certain favorable characteristics that enable them to adapt best to their environment. Only the most "fit" organisms survive to produce offspring and pass their "fit" genes on to future

generations. It is also the process by which an organism with unfavorable qualities is removed from the environment.

**Mutation:** A spontaneous change in an organism's genes. Mutations are often small changes, altering slightly, an animal's body structure or behaviour. Occasionally a small change may occur that results in a large and obvious alteration -- for example, albino animals have mutated cells that cannot produce pigment, resulting in a white animal.

**Mimicry:** A form of adaptation in which an organism (either plant or animal) resembles, copies or imitates another in behaviour or appearance for the sole purpose of survival. Mimics resemble their models most often for protection from predators, or to gain access to food.

## PRE-VISIT ACTIVITIES

1. Review the vocabulary. Decide if you wish to use the term "structural" or "physical" adaptation. The terms "behavioural" and "physical" (or "structural") are not just used in science. What do these words mean in everyday life? Do they mean the same thing in science? Use examples from their own experience, e.g. ask what it means to be "on good behaviour", or what "physical education" means. Give examples of structures they know. What does it mean to "select" something? What do you think "natural selection" means?
2. Introduce/review the concept of "habitat" by discussing the student's habitats. Ask them where they spend most of their lives. They may live in a house or an apartment; however their habitat is likely a city, town or farmland. Ask the students what they need to survive. There are five essential components that every living organism requires in their habitat in order to survive: food, water, air, space and shelter.
3. List as many wild fruits and berries that grow in schoolyards and backyards (acorns, juniper berries, maple seeds, crabapples and pinecones) and discuss the ways in which plants reproduce and disperse their seeds. For example, plants make berries so animals will eat them and excrete them some distance away from the mother plant. Some of these "tummy travelers" have seeds, which will not germinate (sprout) until they have passed through the digestive tract of an animal. Other plants make burrs which will "hitchhike" a ride on a furry mammal to spread the seeds to a new location. Other plants like Cattails and Dandelions use the wind to spread their seeds. These seeds are said to be "wind travelers".
4. Discuss some different habitat types in the world. What would it be like to live in the arctic? What about the rainforest? What would the seasons be like? What would you do for food, water, shelter and space? Would the air be any different? Precipitation? Collect clippings of various habitats of the world and display them on the wall. A good backdrop would be a world map; the habitats could be pinned on the continent in which they are found (see post visit activity #7).
5. Draw or describe interesting or favourite animals. If the student prefers one type of animal, have them discuss what makes that animal special or different. What does that animal eat? Where does it live? Read about the animal in textbooks. There may be many interesting facts and features about the animal waiting to be discovered. For example, many young people are interested in bats. Insectivorous bats use their tail membranes to catch insects. They also fold this membrane over, and use it like a shopping bag to carry the evening's meal!

6. Make a list of local animals and plants, including very small organisms. What do the animals eat? Do some of them eat each other? Create a food chain for these animals and plants.
7. Keepers of the Wild, by Michael J. Caduto and Joseph Bruchac, is an excellent resource for stories and activities about plant and animal adaptations.

## POST VISIT ACTIVITIES

1. Use photos, models, videos or specimens of animals to look for all possible features. Choose some animals already covered on the visit, but also try some different ones. Every feature of an animal has some adaptive value. How is each feature an adaptation? Repeat this procedure for humans.
2. 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?
3. Watch live animals or films of animals and discuss the behaviours that were observed (in both cases be wary of the way in which humans may affect or even create the situation observed; e.g. many nature films are set up by photographers with captive animals). Why do the animals behave as they do? How do their behaviours fit in with their habitats (e.g. allow them to obtain food, air, water, shelter and space)?
4. Look at habitats around us, locally and regionally. Millions of animals and plants live in the soil, ditches and fields around the school. Observe fish, pond invertebrates, earthworms, etc. in the classroom. Observe microenvironments such as the bark of trees or under rocks, etc. What different habitats can you identify in Manitoba? The MANITOBA MUSEUM has several spectacular displays showing different Manitoba habitat types.
5. Have the students describe (orally, in a paragraph, or artistically) the habitat of their favourite (wild) animal, showing how they fulfill their five basic needs.
6. How are people affecting various habitats in terms of food, water, shelter, air, and space? Collect examples of each. Examples should 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 the 2000's? (e.g. acid rain, increased UV from ozone holes, elevated temperatures, plastic six-pack rings from pop cans, piles of garbage, deserts where forests once stood, etc.).
7. Another project could be to make a mural of the world. On the mural, paste cut-out pictures from magazines to show examples of habitats and where they are located in the world. List some plants and animals that live in each habitat. For each animal or plant, describe its habitat in terms of the available food, water, shelter, air, and space. Compare and contrast the different types of animals and plants found in the different habitats around the world. Why do some organisms exist in some habitats but not in others? As a solo project, each student could choose two different habitats and compare and contrast the organisms within them.

8. Create a critter in your class using the habitat definitions provided. Using the table below have the students decide in which habitat their critters belong. 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 landscape/habitat. Create producers, consumers and decomposers in each environment. 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!

CREATE-A-CRITTER - Habitat Definitions

<p><u>Habitat 1:</u> <b>Freshwater Stream</b>            Water: underwater (freshwater)            Conditions: cool                              strong current                              very rocky                              lots of light            Hazards: many predators            Food: insects, small fish</p>	<p><u>Habitat 2:</u> <b>Grasslands</b>            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</p>
<p><u>Habitat 3:</u> <b>Lake Bottom</b>            Water: underwater (freshwater)            Conditions: very little light                              many weeds                              soft muddy bottom            Hazards: large predatory fish            Food: small insects and fish</p>	<p><u>Habitat 4:</u> <b>Treetops</b>            Water: humid, rainy            Conditions: many branches                              very hot                              thick bark                              very high            Hazards: many biting insects            Food: leaves</p>
<p><u>Habitat 5:</u> <b>Desert</b>            Water: hard to find            Conditions: dry                              hot days, cold nights                              frequent sandstorms                              bright sunlight                              soft sand            Hazards: large predatory birds            Food: small insects</p>	<p><u>Habitat 6:</u> <b>Underground</b>            Water: little water            Conditions: no light                              poor air quality                              must dig                              small dirt particles            Hazards: predators from above            Food: insects</p>
<p><u>Habitat 7:</u> <b>Forest Floor</b>            Water: wet            Conditions: many plants                              dark                              cool            Hazards: many predators day and night            Food: insects</p>	<p><u>Habitat 8:</u> <b>Marsh</b>            Water: wet            Conditions: windy                              warm                              tall, dense grasses            Hazards: many predators day and night            Food: frogs and small fish</p>