



LESSON SUMMARY

Students will study the effects of fire on habitats and create a new creature (plant or animal) that has adapted to the environmental changes.

Activity Information

Estimated Duration:	Two class periods (one for introduction, discussion and initial development of art project; one to complete art project and present to class)
Materials:	Poster paper, paints, crayons, markers, scissors, glue
Setting:	Indoors
Key Vocabulary:	Habitats, adaptations, food chain, nocturnal, diurnal

Teacher Background

An adaptive trait is a behavior, physical feature or other characteristic that helps a plant or animal survive and thrive in a specific habitat. All living things have some traits that are adaptations to the disturbances and constraints of their environments. Animals and plants have developed adaptations to deal with threats to their survival, including fire. Compared to animals, plants have a distinct disadvantage in the face of fire. Plants are unable to run, fly, creep or crawl out of a fire's path, so they have adapted in other ways.

To survive a fire, a plant must be able to insulate itself from the heat of the flames. Bark thickness is the most important factor determining the fire resistance of trees. Small woody plants and shrubs normally have thin bark – these plants use the soil as an insulating layer to protect themselves. Trees such as the Jack pine have another survival strategy – the seed-carrying cones of the Jack pine only open to release their seeds after exposure to a fire's heat. Some plants resist being killed in fires by producing new growth (shoots) from their roots – the aspen is an example of a species that has this ability. Other shrub and tree species specialize in growing in areas that have recently burned.

When a fire occurs, the most important survival behaviour for animals is escape. Wildlife species have developed different methods or strategies to escape fires. Animals such as deer, moose, bear and fox are accomplished runners and use that skill to escape the flames. Others that are not as fleet-footed hide in underground burrows, in rock cliffs or other refuges. Rats, mice, moles, shrews, snakes, lizards and turtles burrow to escape fire. Birds that can fly are able to escape to a safer area until the flames have passed. However, nestlings and other birds unable to fly are often the victims of fire. Their remains attract scavengers and predators, such as ravens and coyotes, to recently burned areas.

When people hear about forest fires, they often ask, "Where do all the animals go?" Fire may eliminate the habitat of some species, but it also creates a habitat for others. When one species suffers, others can often thrive. The Black-capped Woodpecker, for example, which lives in Canada's boreal forest, feeds on the insects that inhabit recently burned areas. Populations of deer mice (wild relatives of house mice) have often been recorded in greater numbers in recently burned areas.

After a fire, populations of organisms that inhabit the litter or humus layer (the top few centimetres of soil) decrease. Some of the insects in the humus layer are considered pests because they damage timber stands. Sawflies, maple leaf cutters and red pine cone beetles are examples of forest pests whose numbers are reduced by fires.

Teacher Preparation

No special preparation required for this activity.

ACTIVITY

Step 1 Review the background information above with your students, to ensure that they understand the concepts of habitat and adaptation. Ask students what they think their own habitat is (house, water, etc.).

Ask your students to provide examples of how some species have characteristics that allow them to live in certain habitats. All species have specific and individual habitat needs (e.g. plants need differing amounts and types of light, soil, water and shelter). Some examples might include:

- A bird has a beak to crack seeds and wings to fly
- A rabbit has fur to protect itself during the winter, colours for camouflage and quickness to escape predators
- A beaver has strong teeth to cut down trees and a uniquely shaped tail to help it swim
- The Pitcher plant, a carnivorous plant species, has funnel shaped leaves that collect water and small hairs to snare insects within its leaves

Step 2 Explain that plants and animals have adapted to their various habitats by developing fins, growing longer fur, changing growing seasons and/or moving to new areas in an effort to survive. In some instances, environmental disturbances can impact on the habitat and range of a species. Ask your students to identify some examples, such as:

- Climate change may alter the growing season for plants and some species will migrate to new habitats
- Oil pipelines interrupt the breeding grounds of the caribou and are barriers to the migratory movements of these animals
- A new development (e.g. industrial park, large scale logging activity) near a protected area may disrupt migration routes or travel corridors for deer and other ungulates
- An invasive plant species chokes out native vegetation, causing species to decline or move to a new area

Step 3 Fire is an example of an environmental disturbance. Many habitats are damaged or destroyed by fires, while others are created and supported. Explain to your students that they will create a fictitious species – this can be a plant or an animal – that has adapted to its new environment. The habitat for this new species is a forest that has been burned and is re-growing.

Step 4 Divide your class into groups of two to four students each. Each group's goal is to invent a new species and create a piece of artwork that illustrates the adaptations of this new species. Each group will present its species to the rest of the class. The students in each group must be able to provide answers to the following questions:

- Where exactly does your species live?
- What does your species eat?
- Where is its position in the food chain? (e.g. does anything eat it or is it at the top of the food chain?)
- Is your animal active during the night (nocturnal) or day (diurnal)?
- Does anything (human or naturally caused) impact its existence?
- How has it adapted to fire?

NOTE: The new plant or animal must be all-natural – it cannot have non-living parts.

Evaluation

Have each group of students select a new species from another group. Each group will then write a letter about this new species to an imaginary pen pal in another part of Canada. In this letter, students must describe the new species, its habitat, what it eats and its position in the local food web. They can then add anything else that might better describe the new species to their friend.

Extensions

Take all of the new species that have been designed and ask students to label them as carnivore, herbivore or omnivore. Students can then build a “new” food web that includes all of the species.