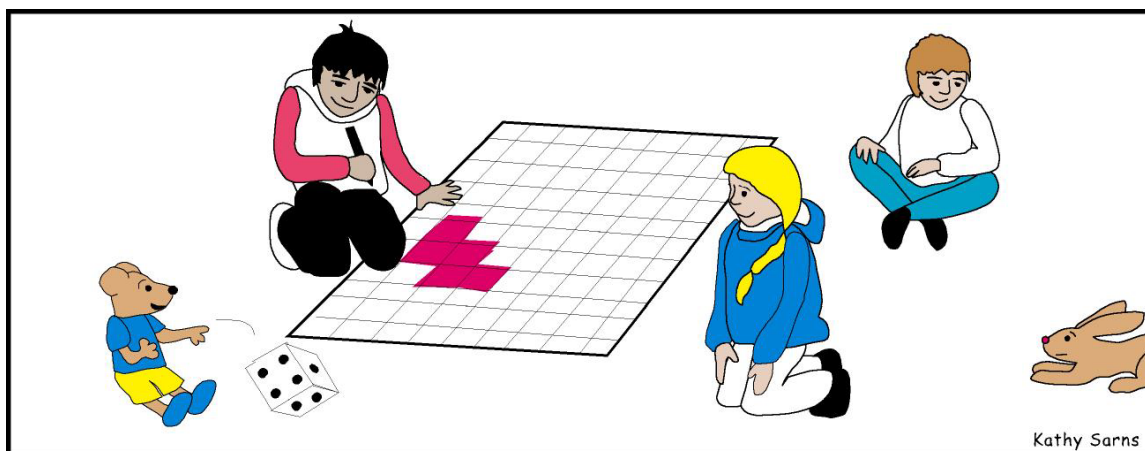


LIVING ON THE EDGE



Grade Level: 5-8

Alaska State Content Standards: SA14, SA15

Subject: Science

Skills: Application, Construction, Description

Duration: 1 class period

Group Size: 2

Setting: indoors

Vocabulary: vegetation mosaic

OBJECTIVE

Students will describe a vegetation mosaic, how it is created, and its influence on wildlife diversity.

TEACHING STRATEGY

Students play a game to create a vegetation mosaic and discuss their influence on wildlife diversity.

MATERIALS

- 1 Die (every 2 students)
- crayons or colored pencils (every 2 students)
- 1 Living on the Edge Forest Graph Paper (every 2 students)
- 1 Living on the Edge Key (every 2 students)
- Forest Mosaic of Yukon Flats
- *Alaska Ecology Cards*

TEACHER BACKGROUND

Interior Alaska's vegetation is primarily a result of fire. Fire rarely spreads evenly through a forest: its path is often an erratic one - totally burning some areas, while barely touching others, and completely skipping other areas. Viewed from a distance, forest fire in the boreal forest burn in a patchwork pattern called a **vegetation mosaic**.

Successive fires in the same area help maintain the variety of meadows, shrub lands, and forest stands of different ages. This diversity of vegetation helps create a diversity and abundance in wildlife. The different plant communities that are maintained by fire provide the **diversity** of habitat needed for a healthy ecosystem.

The effects of fire on habitat are generally more significant than the effects on animals themselves. Forests of different ages support different kinds of wildlife. Different types of birds and mammals seeking food and shelter are attracted to different types of forest types. All of these animals, in turn, need a variety of resources to provide shelter, food, water, and space. These resources are often found on the borders of two or more plant communities, such as meadow / black spruce or birch / shrub. These edges are created by fires and other disturbance and are beneficial to maintaining a healthy wildlife habitat. Many small fires occurring in Alaska usually create more edges than one large burn. In fact, the majority of species generally do best in forest that provides a combination of habitats.

Fires can have a short-term negative impact on animals by temporarily displacing them or disrupting their reproductive activities. Larger animals are rarely killed by fire; most simply escape by moving away from the flames. Some, such as voles and squirrels, may escape by moving into underground burrows. Some animals, primarily small rodents, may be killed by fire.

Many of the animals present in the interior of Alaska are thriving here because of fire, not in spite of it. The grasses, seedling shrubs, and trees that reestablish burned areas provide an ideal environment for many small seed-eating mammals and birds, such as voles and sparrows. This abundance of small prey attracts predators like foxes, red-tailed hawks, and weasels. Burned trees provide sites for cavity nesting

birds like flickers, kestrels, and chickadees. Woodpeckers thrive on the insects that invade fire-killed trees.

As the natural habitat changes from low-growing plants and shrubs to small trees and larger shrubs, the forest wildlife community changes accordingly. The tall shrubs and tree saplings which are found in an area 5-30 years after a fire, provide excellent shelter and forage for a great variety of wildlife. New nesting sites abound for more bird species, such as warblers and thrushes. Abundant grasses and shrubs create perfect cover for ground-nesting birds and ever-increasing small mammals. In addition to the small rodents, moose, snowshoe hares and ptarmigan use these young forests. More predators follow; foxes, marten, weasel, and lynx prey on the small animals, while wolves may move in to hunt moose. Blueberries and cranberries can also become abundant after a burn, particularly in upland areas. These are an excellent food source for many wildlife species, including black and grizzly bears.

By the time the forest has matured into birch, aspen, and spruce stands, many of the grasses, sapling, and smaller shrubs have been shaded out. Animals that relied on these plants have moved elsewhere. Some new animals may be found, including ruffed grouse and hermit thrushes. In the later stages, as the hardwoods are replaced by spruce, porcupines, spruce grouse, red and northern flying squirrels become common residents. These old, mature coniferous forests support fewer numbers and species of wildlife and are considered by us less productive.



When fires burn naturally a vegetation mosaic of different forest types is created. This provides a great diversity of vegetation and consequently a greater diversity of wildlife species. Some wildlife species prefer a particular forest type while others use and need all ages and types of the boreal forest.

Background from Fire and Wildlife, US Fish and Wildlife Service.

PROCEDURE

1. Ask students if they think a forest burns all in one sweep? Use the Teacher Background section to discuss vegetation mosaics and their importance to wildlife.
2. Explain to the students that they will be creating their own model of a vegetation mosaic in a game format.
3. Explain that the graph paper represents 160 acres of forest. The roll of the die represents the kind of fire (low intensity, moderate intensity, high intensity) and the amount of acreage burned. It also represents where the fire burned. For instance, if you were to roll a 3, this represents a high intensity fire that burns 10 acres of the forest in the SE quadrant. The student then marks 10 squares in the lower right hand corner of the grid.
4. Students continue to roll 10 times, each roll representing the fires for that year only. Each year is marked on the grid in a specific color. For instance, using the example above of a student rolling a 3, if that roll was done on the 4th year, then those 10 squares would be marked in yellow. If the roll was made on the 5th year, then the squares would be blue.
5. Students should always mark adjoining squares whenever possible, but if there are no adjoining squares left in the quadrant, they can mark any that are open. If there are not enough left to mark, then students may choose to mark over a square that has been marked in a previous round. Explain that fires do burn in the same place more than once occasionally, but not often as there usually isn't enough fuel left to make it a significant burn.
6. Note that after the grid is complete, each year represents a specific forest stage. Those burning in the 6th-10th years are all meadows. Those burning in the 1st-5th years are all in the shrub stages. Those not having been marked at all, or burned, are mature forest stands.
7. After students have created their grid, ask them the following questions:

- a. Does this explain how vegetation mosaics are created? How or how not?
- b. If you were a lynx (who prefers access to mature forest, meadows, and shrub areas) where would you live?
- c. Do you think a low intensity fire would burn fewer acres than a high intensity fire? Why or why not? Do you think the high intensity fires were canopy fires or ground fires? Why?

EVALUATION

Have each student write a description of vegetation mosaics, including how they are created and why they are important. Then have each student use the Alaska Ecology Cards to choose 2 animals that would live in the meadow stage only, 2 in the shrub stage only, 2 in the mature stand only, and 2 that would require a combination of stages to live. Next, have them mark on their graph where each of these animals would find their best habitat.