



## **SIMPLE FORESTRY: SUCCESSION IN A ROCKY MOUNTAIN FOREST**

For thousands of years, fires have shaped North American ecosystems. Many species thrived when their habitats burned at predictable intervals. In forests, some fires burned only grass and low shrubs under the large trees, others killed nearly every tree, and still others produced a mosaic of fire-killed trees and patches left unburned because of random changes in wind direction or other conditions (Brown and Smith 2000). In some habitats, plants and animals are actually harmed if fire is not allowed to burn, so land managers attempt to reintroduce fire and use naturally-occurring fires to benefit these landscapes.

Fire in these environments prepares the soil for seeding by creating an open seedbed, making nutrients more available for uptake and often killing plants that are invading into the habitat and competing with native species.

**Ponderosa pine ecosystems** occur as transitions between grasslands and deserts at lower elevations and higher-level alpine communities. Fire exclusion has been fairly effective in reducing the number of fire cycles that these low elevation dry coniferous forests have experienced over the last century. Fire exclusion leads to more intense fires in these areas when fires do occur.

**Lodgepole pine** are most prevalent in the montane and subalpine forests of Colorado's northern Rocky Mountains, generally in unmixed stands at higher elevations. Studies have shown fire-free intervals in lodgepole pine to vary between 150-300 years. Lodgepole pine is intolerant of shade and thrives in the aftermath of fire. Many lodgepole produce serotinous cones, which open in response to extreme heat and release an abundance of seeds.

At 40 to 50 years following a stand-replacing fire, herbaceous plants and lodgepole seedlings grow between snags and logs that were damaged by the

fire. The forest tends to resist fire at this stage, in that the only fuels available are large logs that do not readily burn.

From the age of 50 to 150 years, seedlings grow to a height of 50 feet, and the stands become so dense that little sunlight reaches the forest floor, therefore suppressing the growth of the understory. The sparseness of undergrowth also discourages the possibility of wildfire.

It is during the next successional stage of 150 to 300 years that the threat of wildland fire increases. Because of overcrowding, some of the lodgepole pines begin to die, which allows sunlight through, spurring vegetative growth.

After 300 years, the original lodgepole pines die, making the forest highly susceptible to wildland fire. When fire does not occur, lodgepole pines are sometimes gradually replaced by **Engelmann spruce** and **subalpine fir**, although the successional pathway is site dependent. Fire regimes in lodgepole pine communities can be very irregular, thus community dynamics are difficult to predict.

#### **MATERIALS:**

Writing/Drawing materials

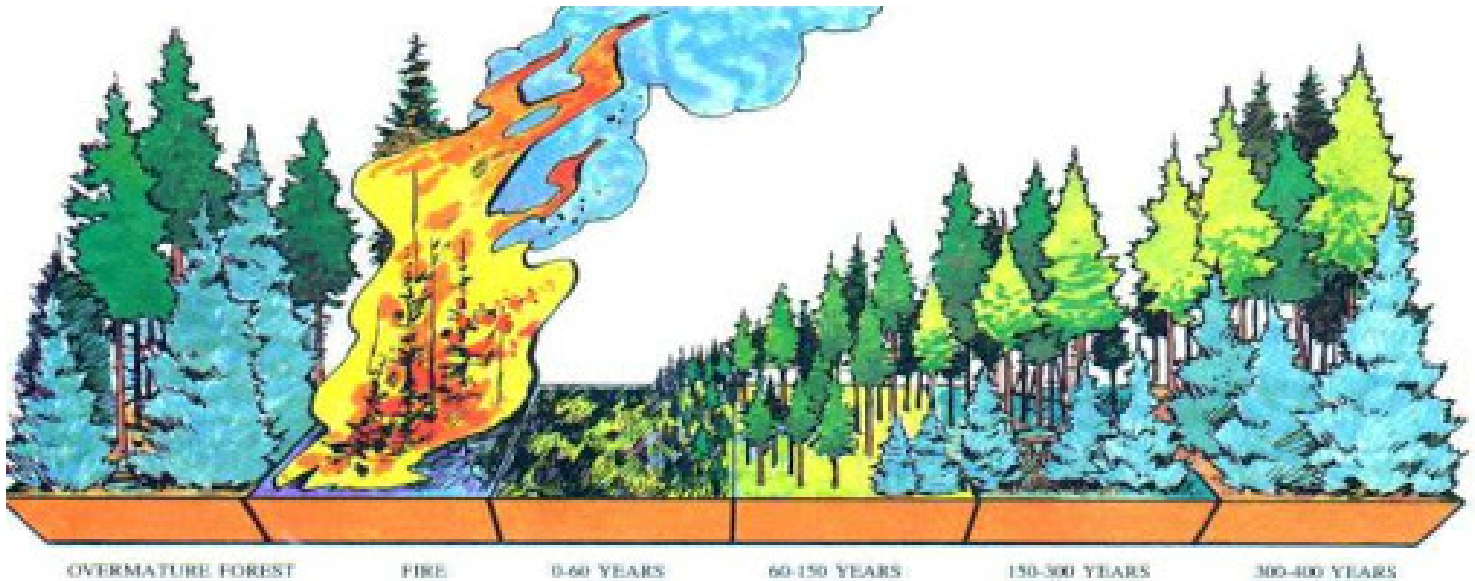
Paper

Descriptions of succession stages

#### **PROCEDURE:**

1. Watch the story of [Tree Top Valley](#).
2. Make sketches and notes at pauses in story.
3. Create an illustration of forest succession.
4. You could also use playdough, make model plants and trees and create a model.

## PLANT SUCCESSION IN A ROCKY MOUNTAIN CONIFEROUS FOREST



1. A disturbance, such as a wild fire, destroys the forest
2. The fire burns the forest to the ground
3. The fire leaves behind empty, but not destroyed, soil
4. Grasses and other herbaceous plants grow back first
5. Small bushes and trees begin to colonize the area
6. Fast growing evergreen trees develop to their fullest. In the Rocky Mountains, Lodgepole Pine reach full growth (climax) at 75-100 years. Ponderosa Pine can live up to 500 years.

# SUCCESSION IN A FOREST TYPE NATURALLY MANAGED BY A FIRE REGIME

