

4-H Virtual Forest User's Guide

Old-Field Succession

Concept

This module will illustrate how abandoned agricultural lands revert back to forest through a process called old-field succession. Students will use a timeline to investigate seven successional stages. Each stage includes examples of plant and animal species that use the habitat provided.

This module supports the following Science SOLs:

Scientific and Engineering Practices

3.1 e) use models to demonstrate simple phenomena and natural processes

Living Systems and Processes

4.3 a) interrelationships exist in populations, communities, and ecosystems;

4.3 b) food webs show the flow of energy within an ecosystem;

4.3 c) changes in an organism's niche and habitat may occur at various stages in its life cycle

Earth Resources

4.8 b) plants and animals

4.8 d) forests, soil, and land

Life Science

LS.8 a) organisms respond to daily, seasonal, and long-term changes

LS.11 a) mutation, adaptation, natural selection, and extinction change populations;

LS.11 c) environmental factors and genetic variation, influence survivability and diversity of organisms.

Module Description

Intro to old-field succession. Introduces the concept of old-field succession.

“Have you ever looked out of the school bus window and seen a grassy area

where crops used to grow? Many fields are left behind when they're no longer used for farming. If we let nature take its course, these fields can transform back into forests over time. This amazing transformation is known as old-field succession.

It might surprise you, but much of Virginia was once farmland. Indigenous peoples cultivated and maintained the land long before Captain John Smith explored the James River in 1607.

Later, European settlers cleared vast areas for crops, especially tobacco.

This cycle of clearing, farming, and abandoning fields has been repeated for centuries. Let's dive deeper into the journey of an abandoned field in the Virginia Piedmont to understand the stages of old-field succession!"

Bare Land. Old-field succession begins when agricultural land is abandoned. Throughout history, land has been abandoned for many reasons, including worn-out soil, poor markets for crops, human migration, and war.

Annual Plants. In the first two years after abandonment, a field will become covered with many species of annual plants, such as crabgrass and horseweed. Biennial and perennial plants will also begin to grow at this time.

Annual plants live for one year, biennial plants live for two years, and perennial plants live longer. Insects, voles, and songbirds, like bluebirds and mourning doves, will begin moving in.

Perennial Plants. By the time an abandoned field in the Virginia Piedmont is three years old, it will be dominated by broomsedge, a perennial grass that will remain for several years.

Shrub Stage. After about five years, scattered eastern redcedar, pine seedlings, and blackberry will begin growing. These species thrive in full sunlight that bathes abandoned fields. This habitat attracts wildlife like the bobwhite quail, cottontail rabbits, brown thrashers, and white-tailed deer.

Young Woodland. Over time, the pines and cedars grow and gradually overtop the sun-loving grasses and briars. These pines will grow for 50 to 75 years, or longer depending on the species, and then gradually die out.

Wild turkey, white-tailed deer, ruffed grouse, and hairy woodpeckers are a few of the species that utilize this young forest.

Mature Woodland. As the pines die, they are gradually replaced by hardwood trees. Forest stands that are 100 years old will often have as many hardwoods as pines, or perhaps even more!

After 200 years, the Piedmont forest that started out as a bare, abandoned field will primarily contain hardwood trees like white oak and mockernut hickory.

This forest is home to gray squirrels, raccoons, wild turkeys, and great horned owls, and it won't change much over time unless it is disturbed.