



## Environmental Factors Affecting Tree Health Cards

### Instructions

Print and cut out the 12 cards below. Distribute the cards one at a time to students, and have them read the card aloud and decide if it is referring to a positive or negative environmental impact on tree health.

<p style="text-align: center;"><b>Invasive Plants</b></p> <p>Plants that are nonnative and that aggressively out-compete native vegetation are considered invasive plants.</p> <p>Many invasive vines (e.g., oriental bittersweet and English ivy) climb up trees to reach the sun, preventing the tree’s access to sunlight. The vines can get so big and heavy that they girdle the tree, crushing its branches and eventually pulling it down. Invasive trees, such as Tree of Heaven, grow much quicker than native trees and so, are able to out-compete them for nutrients, water, and sunlight.</p>	<p style="text-align: center;"><b>Animal Browse</b></p> <p>Some animals actually harm trees. For example, deer like to eat young trees, and they damage larger trees when they rub their antlers on them. An overabundance of deer in the Potomac River watershed has caused a loss of understory trees.</p> <p>Small rodents, such as voles, eat tree roots, sometimes killing young trees. Deer and vole browse are big problems for regenerating forests and understory growth. Every year, thousands of dollars are spent placing protective tree shelters around small saplings in an attempt to protect the trees from these animals.</p>	<p style="text-align: center;"><b>Development</b></p> <p>Development is one of the leading causes of the loss of forest cover in the region. Every day, more than 30 acres of forest are lost to development in the Potomac River <b>watershed</b>.</p> <p>When open spaces are <b>developed</b>, a typical practice is to clear the area of trees and other vegetation, and cover it with concrete and asphalt. Development, including roads and major highways, can also cause the <b>fragmentation</b> of forested areas. This can open the area to invasive plants, disrupting the natural balance of the forest ecosystem.</p>
<p style="text-align: center;"><b>Soil Compaction</b></p> <p>Soil is essential to the life and health of trees. But the soil around trees in urban environments often becomes compacted from overuse (e.g., people walking on it) or from the construction of structures (e.g., sidewalks).</p> <p>Compacted soil inhibits plant roots from growing and accessing air. Compaction can also reduce the amount of nutrients in the soil. These problems can prevent a tree from growing, and eventually cause it to die.</p>	<p style="text-align: center;"><b>Fire Suppression</b></p> <p>Fire is a natural part of forest ecology. Many trees, such as red pine, depend on fire to help their seeds <b>germinate</b>, clear smaller competing brush, and add nutrients to the soil. Other trees, such as oaks, benefit from the opening of the tree canopy caused by fires, allowing them to better compete against other trees. If fire is suppressed for a long time, there is a buildup of <b>biomass</b> from dead branches, logs, and leaves that can result in uncontrollable fires.</p>	<p style="text-align: center;"><b>Insects and Disease</b></p> <p>Some insects can greatly damage trees, and even entire forests. One example is the Emerald ash borer beetle, which bores through the bark of ash trees into the growing <b>cambium</b> layer, eventually killing the tree. Pupae of gypsy moths also harm trees, especially oaks, by eating their leaves. Root rot, the most common disease affecting hardwood trees, is caused by a fungus. While certain fungi can harm trees, fungi are necessary for the breakdown of decaying material that enables roots to absorb nutrients.</p>



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<p style="text-align: center;"><b>Animals</b></p> <p>Trees spread their seeds in many ways, and animals are sometimes the perfect vehicle. Birds like the bluebird favor sassafras seeds, and after digesting the fruit, they expel the seeds in their droppings in a new area. Squirrels help disperse acorns by burying them. Trees that rely on animals to disperse their seeds produce seeds that attract these animals.</p>	<p style="text-align: center;"><b>Pollinators and Beneficial Insects</b></p> <p>Insects pollinate many trees, enabling the trees to reproduce. Bats, moths, bees, and butterflies are attracted to tree flowers and spread pollen by visiting different flowers for nectar or for the pollen itself. Beetles are also vital for tree health. They break down leaf debris and other particles on the ground to help tree roots access nutrients. The vast majority of insects are either neutral or beneficial to tree health, with only a few considered pests.</p>	<p style="text-align: center;"><b>Sun/Photosynthesis</b></p> <p>Unlike animals and fungi that must get energy from the food they eat, plants have the ability to make their own food. As the main source of energy that trees harvest to create this food, the sun is essential for tree survival.</p>
<p style="text-align: center;"><b>Pruning</b></p> <p>In a healthy forest, trees naturally <b>prune</b> themselves as they grow taller and closer in proximity to other trees. For example, Virginia pines will naturally shed their lower branches each year and grow new branches upward.</p> <p>Trees that grow in open areas may not prune themselves. Because pruning encourages healthy new growth, trees can sometimes benefit from pruning assistance from humans.</p>	<p style="text-align: center;"><b>Tree Harvesting</b></p> <p>Cutting down trees is commonly viewed as a bad thing. However, when done properly, thinning out trees can greatly improve the health of a forest.</p> <p>In nature, trees are thinned by fire, competition, and natural disasters. Today, many of these activities are prevented, resulting in forests becoming overgrown. Proper selective cutting allows new trees to grow, and creates a well-balanced forest.</p>	<p style="text-align: center;"><b>Water</b></p> <p>Trees, like every other living thing on the planet, need water to survive. Tree roots absorb water. Through <b>osmosis</b>, the tree's <b>xylem</b> brings the water up to the leaves for use in <b>photosynthesis</b>. Water is essential to keeping the cells of a tree firm and the tree functioning.</p>