



Tree Health Survey

Students Observe and Evaluate Schoolyard Trees

Students conduct a survey for some of the most common symptoms of plant diseases or damage to trees from insects, birds, animals, or weather. This activity develops observation skills and connects to units about food chains and ecosystems. Two versions are provided: a simpler color version for younger and beginning students and a more complex and detailed worksheet for older and more advanced students.

GRADES 3-12

SCIENCE

SURVEY

WORKSHEETS

Introduction

Students can play a vital role in monitoring school trees while also developing their observational skills and knowledge of tree biology and ecosystems. Healthy trees live longer and are safer in a schoolyard. Regular monitoring helps ensure that any issues are taken care of before they need professional help. Trees that are stressed, such as from lack of water, extreme temperatures, or soil compaction, are more susceptible to large-scale insect outbreaks and diseases.

Plants have many of their own defenses, so you may not need to take any action when you notice a tree with insect and disease damage, other than continuing to monitor it. A short video overview on plant defenses is provided in [The Amazing Ways Plants Defend Themselves \(TedEd\)](#). Some insect damage to plants is natural and a vital part of the ecosystem since most insects are essential food sources for other species higher up the food chain, such as birds, lizards, spiders, and small mammals. Insects eating leaves may also be the larvae (young) of species you would be delighted to see, such as butterflies!

A large insect outbreak, however, may lead to serious tree health issues. If you notice signs of this, it is best to consult an arborist for advice, if possible. We remind

everyone that pesticides are unsafe to use around children, bees and other pollinators, as well as other species. There are many non-chemical options, such as in [Alternatives to Pesticides \(UC IPM\)](#).

Materials

- Printed copies of the worksheet (simple color version OR advanced black-and-white version, provided below)
- Clipboards
- Pencils
- (Optional) Magnifying glasses

Instructions

There are two versions of the worksheet to choose from: a simpler color version with visuals for younger and beginning students and a more advanced and detailed black-and-white version for older and more advanced students.

Pass out copies of the worksheet (provided below) and allow 30 to 45 minutes outdoors for students to observe the school's trees. It is best to address only one individual tree on a worksheet. Depending on the number of trees and students, students can work independently or in small teams.

Extensions

Teachers may choose to stop after a one-time tree health survey or continue with these possible next steps:

1. Invite students to conduct further research on what pests or diseases are causing any symptoms, both through further observation outdoors and by using online resources such as [IPM's Plant Problem Diagnostic Tool](#) and [Tree and Shrubs: Pests in Gardens and Landscapes \(UC IPM\)](#). It is helpful to know the species of your tree since many insects and diseases are specific to certain species.
2. Evaluate whether just a few leaves have damage (normal) or whether a significant portion (greater than 10% of the tree) is affected.
3. Check to see whether the tree is stressed in ways you can rectify, such as by lack of water or soil compaction.
4. Watch and wait to see whether the tree's natural defenses kick in and whether natural predators arrive. Research the adaptations that trees have for defense.

5. Join a citizen science project such as [Pest Patrol \(USA National Phenology Network\)](#) to help scientists track certain insect pest species.
6. Treat any significant pests with non-chemical options, such as in [Alternatives to Pesticides \(UC IPM\)](#). Science experiment protocols can be developed in the process.
7. Invite facilities staff, an arborist, or other experts to evaluate the tree's health.
8. Repeat the survey periodically, such as once a month or once every season, to see whether there are any changes in the tree's health.

NEXT GENERATION SCIENCE STANDARDS

Disciplinary Core Ideas

- Ecosystems: Interactions, Energy, and Dynamics

Crosscutting Concepts

- Patterns
- Cause and Effect
- Energy and Matter

Science and Engineering Practices

- Obtaining, Evaluating, and Communicating Information
- Asking Questions

NATIONAL SCHOOLYARD FOREST SYSTEM

The National Schoolyard Forest System™ seeks to create schoolyard forests on PreK-12 public school grounds across the country to directly shade and protect students from extreme heat and rising temperatures due to climate change. This initiative was founded by Green Schoolyards America, and launched with California as the first state in partnership with the California Department of Education, the California Department of Forestry and Fire Protection, and Ten Strands.

For more information, visit:
greenschoolyards.org/schoolyard-forest-system

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Tree Health Visual Guide

Name: _____ Date: _____



Place a checkmark in the box if you see any of these signs of insect damage or disease on a tree.



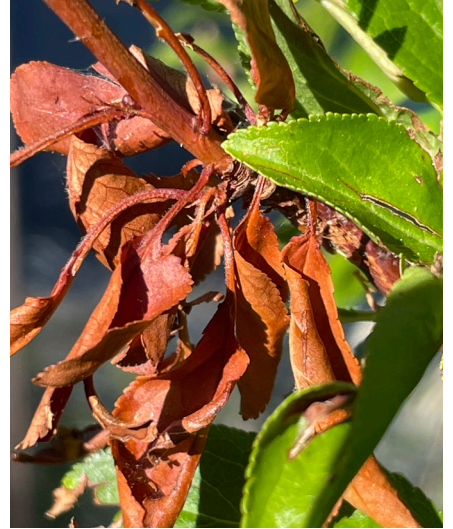
An example of a healthy leaf.



Leaves with brown tips



Leaves with many spots



Leaves unusually brown



Leaves with many holes



Oozing sap/resin on trunk



Brown needle tips

Next steps: This can include (1) doing further research on what pests or diseases cause these symptoms; (2) evaluating whether just a few leaves have damage (normal) or whether the damage is significant enough that the tree's health might be affected; (3) alerting an expert to look at the tree. Remember that many insects that eat leaves are also an important part of the food chain and/or may be the larvae of butterflies. Take action only if necessary to save the tree. Avoid toxic chemicals that will harm children and wildlife.

Tree Health Worksheet

Name: _____ Date: _____

Tree species: _____ Tree location: _____

Observe a tree carefully. Look on all sides of the tree and on both surfaces of leaves (conifer needles are also leaves). Make a ✓ for any signs you notice.

Leaves

- Leaves with holes (insects or birds feeding)
- Leaves that are yellowing (nutrient imbalance or root rot disease)
- Leaves that are brown and/or falling out of season (lack of water, damaged roots, disease, air pollution, extreme heat, or hard freeze)
- Leaves that are discolored (insects such as thrips or fungal disease)
- Leaves with spots or bumps (diseases, insects, or mites)
- Leaves that are drooping or partly curled in (lack of water)
- Leaves that are twisted, wrinkled, or malformed (diseases, insects, or herbicide damage)
- Needles with brown spots (air pollution)
- Leaves with curvy lines and blotches (leaf miners)
- Leaves that are mostly healthy, with none or few of the above symptoms

Trunk

- Unusual peeling or broken bark (animals, humans, or disease)
- Dripping or oozing sap (wound from animals, humans, fungal disease, insect borers, or sunscald)
- Small, scattered holes not in rows (bark beetles)
- Small holes in rows (birds, sapsuckers)
- Healthy, with none of the above symptoms

Branches

- Broken or dead branches (wound from humans or animals, storm damage, hard freeze, insects, or disease)
- Healthy, with none of the above symptoms

Fruit

- Spots (diseases or insects)
- Bites (animals or birds)
- Healthy, with none of the above symptoms