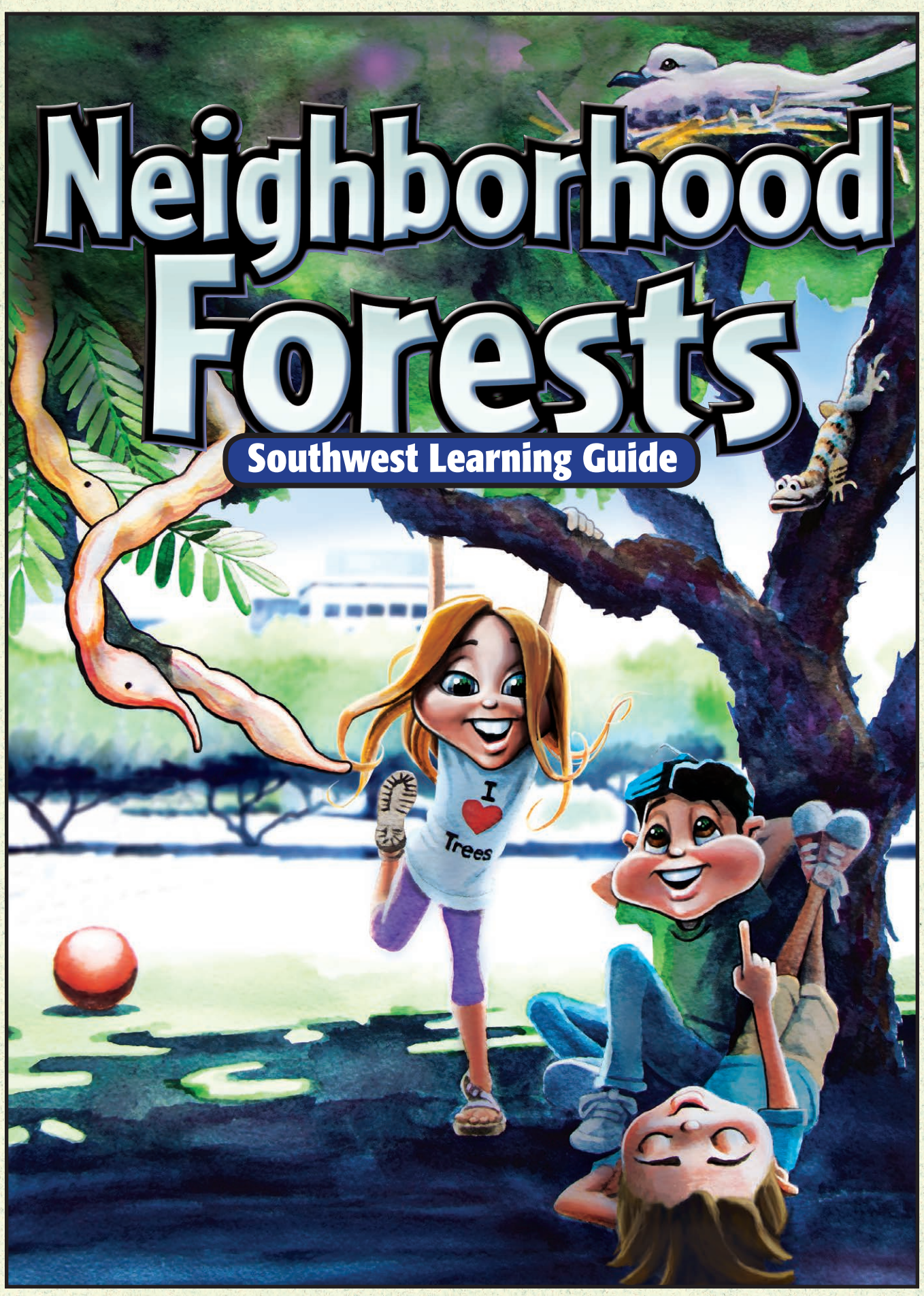
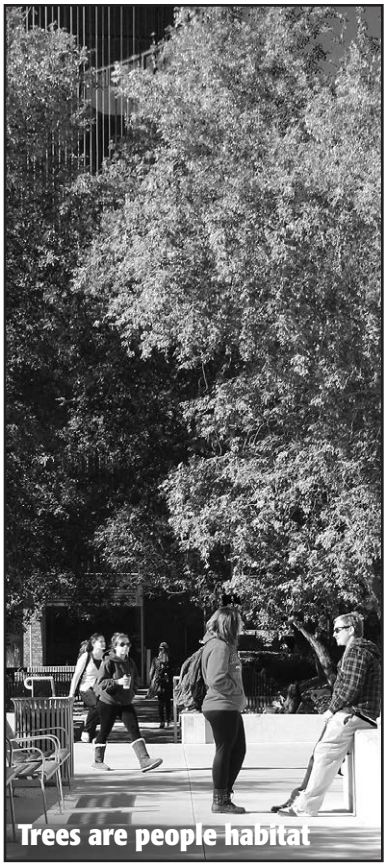
Neighborhood Forests

Southwest Learning Guide



SPECIAL PLACES


Trees are people habitat


Trees are food

Trees in Your Neighborhood

Neighborhood forests are trees for people!
Neighborhood forests are found in our community and are also called urban forests. Urban forests are the collection of trees in and around populated areas that occur naturally or have been planted and are typically managed. They are part of dynamic ecosystems that include humans, and they provide important environmental services such as clean air, clean water, and shade. Trees cool cities and save energy, reduce storm water runoff, and provide sustenance to wildlife. Urban forests broadly include school grounds, urban parks, street trees, landscaped boulevards, public gardens, river corridors, wetlands, nature preserves, natural areas, shelter belts of trees, and working trees at industrial brownfield sites.

Neighborhood trees help take care of people!
In Activity 1 of this Learning Guide, your students will learn about an important service that trees provide to the Earth. Community trees provide many social, environmental, and economic benefits every day. For example, community trees can provide ***food*** in the form of fruits, nuts, and seeds. Edible trees you may find in your neighborhood include mesquite, hackberry, ironwood, pomegranate, fig, true date palm, sour orange, horseradish tree, calamondin orange, and mulberry.

Trees provide ***wood*** which is a renewable resource. Some trees that are native to the southwest are used to make furniture and cabinets. These include mesquite, saguaro ribs, oak, and cottonwood.

Neighborhood trees can increase ***groundwater recharge***. Trees reduce topsoil erosion by catching precipitation with their leaf canopies, which decreases the force of storms and slows down water runoff that in turn ensures that groundwater supplies are replenished. Along with breaking the fall of rainwater, tree roots improve ***water quality*** by removing nutrients that are good for the tree, but may be harmful in water. Leaves that fall from the trees and begin to decay form an organic layer that allows water to percolate into the soil, which also aids in the reduction of runoff. Tree roots hold the soil in place, which reduces erosion (movement of sediment from one place to another), street flooding and sedimentation in streams.

Trees also make our ***air quality*** better just by doing photosynthesis. During photosynthesis, trees give off the oxygen we need to breathe and take greenhouse gases out of the air, like carbon dioxide and other pollutants. Greenhouse gases trap heat (like the roof of a greenhouse) and warm the planet. Trees store those greenhouse gases in their wood. This is called carbon sequestration.

Trees provide ***habitat*** for wildlife, supplying not only the food they need but also shelter from weather and predators. Trees bring birds, lizards, insects, and squirrels right into your neighborhood!

Trees ***beautify*** communities by bringing natural elements into urban surroundings, increasing the

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quality of life for residents. Trees provide comfort, peace, and restful spaces.

Exposure to greenspaces increases mental and physical ***health*** by promoting physical activity and reducing stress and fatigue. Community trees can also help keep us cool by providing ***shade***.

Trees also ***reduce energy costs***. A 24-foot tree may reduce the heating and cooling costs of a typical residence by 8 to 12 percent. Trees also enhance property values, offering another economic benefit to residential property owners.

Neighborhood trees need our help!
In Activity 2, students will learn about simple inventory techniques that are used to help maintain healthy trees. Because trees are so important to our planet and to us, it is crucial that we take care of trees, and that includes the trees found in our own neighborhoods. Arborists, scientists, and city managers use many tools to make sure that our trees are healthy. The most important tool they use is called a ***tree inventory***. A tree inventory is the gathering of information about trees. A simple tree inventory can tell you how many trees you have, where your trees are located, how many different kinds of trees you have (diversity), and if your trees are healthy.

A more complex inventory can tell us even more, such as how much carbon is being stored inside the tree (carbon sequestration), how much water it uses, the amount of wood that the tree would yield if harvested, and how much shade it provides.

Neighborhood trees are amazing!
In Activity 3, students will explore why they love trees and how they can help take care of them. There are a lot of reasons to cherish the trees in and around our community.

- They make the air we need to survive.
- They help clean the water we drink.
- They keep soil under control.
- They help to shelter animals, insects, and smaller plants.
- They help us heal when we are sick.

The Desert Southwest is home to many fascinating trees.

- More than 160 Sonoran Desert plant species depend on other plants, called nurse plants, to germinate and grow into mature plants. Examples include the nitrogen-fixing desert ironwood, mesquite, and Palo Verde trees.
- The ironwood tree is one of the largest and longest-lived plants in the desert. It can reach heights of 45 feet and can live as long as 1500 years.
- To survive the harsh desert climate, the palo verde tree can do some amazing things. The bark of the tree is green and can photosynthesize, something that in most plants only leaves do. This allows the leaves to be very small which decreases water loss through evaporation and transpiration. The leaves can also be shed if extreme drought occurs. During periods of extended drought, small branches will also die back. When water again becomes available, new branches will sprout out and the tree will return to "normal" growth patterns.
- The roots of the mesquite tree can grow down almost 100 feet into the soil to find moisture.
- The rare elephant tree is so named not for its size but for its short and tapering trunks and branches, which look like the trunks and legs of elephants. It grows to a height of just 10 feet. Native Americans used this tree to make potent medicines.


Trees are wildlife habitat


Trees need our care


Trees are fascinating (palo verde)

activity 1

Trees are Cool!

Subjects
Science, Math

Objectives
- Learn benefits of trees to people and the planet.
- Make a prediction about air temperatures and compare predictions to actual data.
- Measure and compare temperatures in three different conditions.

Materials
- Science notebook, paper or Trees Are Cool lab sheet
- Thermometer
- Pencil

Time Considerations
Prep time: 30-45 minutes
Doing the activity: 50 – 75 minutes

Arizona Science Standards
Strand 1: concepts 1-4, Strand 2: concept 2, Strand 4: concepts 1-3

Arizona's College and Career Ready Math Standards
3.NF.A.3., 3.MD.B.4., 3.MP.2., 3.MP.3.

Background

In this activity, students will explore just one of the ways that trees help people – by keeping us cool! The urban heat island effect is an example of unintentional climate change that takes place when man-made structures (buildings, sidewalks, parking lots) hold more heat than natural structures (trees and plants). Leaves absorb and deflect the sun's radiant energy reducing the heat island effect of buildings and paved areas in city centers. Trees provide shaded areas where temperatures are cooler. Let's explore how trees help reduce the heat island effect.

Getting Ready

Begin by asking students discussion questions like:

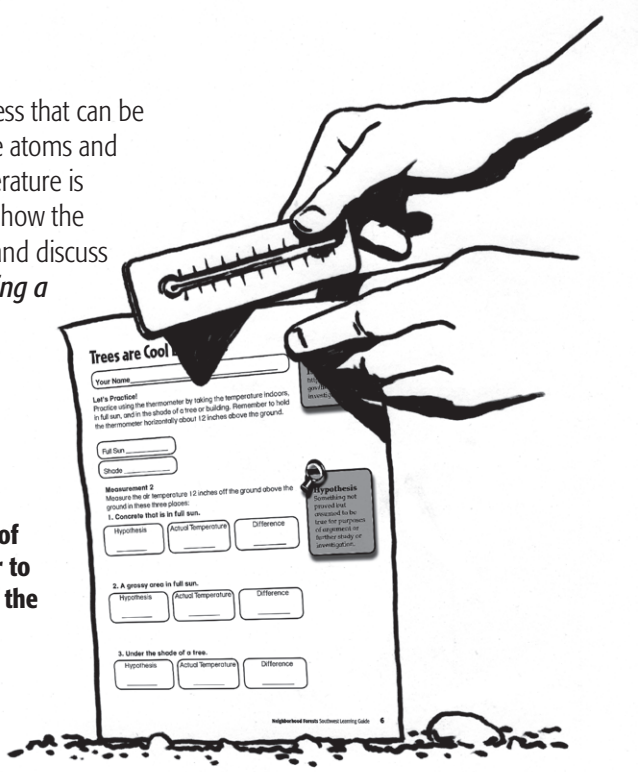
- What happens when you stand in the sun?
- What happens when you stand in the shade?
- What do we use to describe differences in how we feel temperature?
- What do we use to find out the temperature of something?
- When have you ever measured the temperature of something?

Take students outside, stand in the sun for a few minutes and ask students to describe their experience. Then ask them where they see shade (could be building or tree) and have them stand in the shade. Ask them to describe what they feel. Then ask them to compare what they felt in the sun and the shade.

Ask the students how we tell for sure that there is a difference between the temperature in the sun and the temperature in the shade. If they get stuck, ask them how a doctor or parent can tell when they have a fever.

Using a Thermometer

Temperature is a degree of hotness or coldness that can be measured. It's also a measure of how fast the atoms and molecules of a substance are moving. Temperature is measured in degrees using a thermometer. Show the students a thermometer, point out its parts, and discuss its purpose. Have the students fill out the ***Using a Thermometer Lab Sheet*** (page 5)



Measure the temperature about 12" off the ground, or about the length of a regular sheet of paper. Remember to hold the thermometer horizontal to the ground, not straight up and down.

Doing the Activity

Step 1: Have students practice measuring the air temperature indoors, in full sun, and in the shade of a tree or building. They should hold the thermometers horizontally about 12" above the ground, or about the height of the student lab sheet. To get readings that are closer to actual ambient temperature when measuring in full sun, the students can use the shade of their own bodies to protect the thermometer from direct sunlight. Have students record these measurements on the ***Trees are Cool Lab Sheet*** (page 6) under ***Let's Practice***.

Step 2: After measuring one spot in the sun and one spot in the shade, ask the students to form a ***hypothesis***, or make a prediction, about other areas of sun and shade based on the data already collected. What will the temperature be in an area of:

1. **Concrete that is in full sun** (playground, sidewalk, basketball court)
2. **A grassy area in full sun**
3. **Under the shade of a tree**

Have students record their predictions in the ***Hypothesis*** boxes under ***Measurement 2*** on the ***Trees are Cool Lab Sheet***.

Step 3: Have the students measure the air temperature about 12" off the ground and record in the three ***Actual Temperature*** boxes under ***Measurement 2*** on the ***Trees are Cool Lab Sheet***.

Step 4: Have the students calculate the difference between their hypothesis and the actual temperature.

Discussion/Application

Either as one group or in pairs, ask students where they felt the hottest and where they felt the coolest. Ask them which area measured the lowest and highest temperatures. Ask them to describe the difference between the temperature they predicted and the temperature they measured.

Discuss how trees provide shade that decreases the air temperature. It's one way that trees provide a more comfortable neighborhood. Ask students to recall what the urban heat island effect is and how trees impact it (i.e. trees reduce the urban heat island effect). Ask the students how we can help reduce the urban heat island effect (i.e. plant trees). Ask students how they might keep their house cooler in the summer time (i.e. plant a tree that provides shade).

If possible, have the students look again at the playground and/or neighborhood. Ask them to point out trees that will shade buildings and trees that will shade people. Ask your students to consider whether shade for people will help reduce the heat island effect.

Hypothesis

noun

hy·poth·e·sis\

hī-'pä-thə-səs

Definition:

Something not proved but assumed to be true for purposes of argument or further study or investigation.

Urban Heat Island effect

www2.epa.gov/heat-islands

The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F warmer than its surroundings. Evenings can be as high as 22°F warmer. This affects us by increasing air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness, and mortality.

What You Can Do?

Planting trees and other vegetation lowers surface and air temperatures by providing shade and cooling through evapotranspiration. Trees that directly shade your home can decrease the need for air conditioning, reducing your energy bill. Trees also protect your family's health by improving air quality, providing cooling shade for outdoor activities, and reducing exposure to harmful UV radiation.

Using a Thermometer Lab Sheet

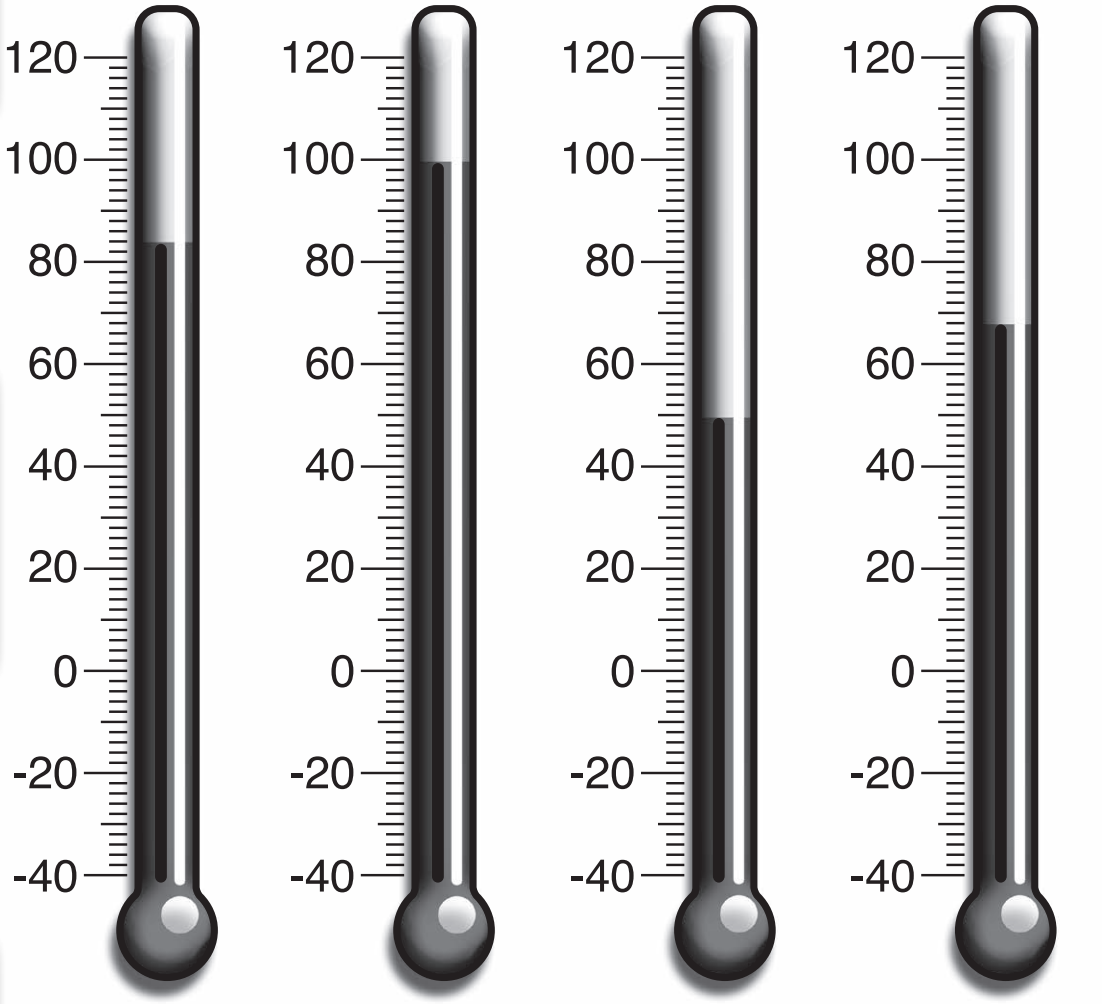
Your Name_____

In these images, the dark area on the bottom represents the liquid that tells us the temperature we are measuring. To read the temperatures look at the highest number that the dark liquid reaches and record that number in the space below each image. Remember to record your temperature with ˚F (degrees Fahrenheit).

Temperature
Degree of hotness or coldness that can be measured. It's also a measure of how fast the atoms and molecules of a substance are moving. Temperature is measured in degrees using a thermometer.

Utah's coldest recorded temperature
-69°F, Logan Canyon, February 1, 1985

New Mexico's hottest temperature
122°F, Lakewood New Mexico, July 27, 1994



84°F

Trees are Cool Lab Sheet

Urban Heat Island Effect
http://www2.epa.gov/heat-islands investigation

Your Name_____

Let's Practice!
Practice using the thermometer by taking the temperature indoors, in full sun, and in the shade of a tree or building. Remember to hold the thermometer horizontally about 12 inches above the ground.

Full Sun _____

Shade _____

Measurement 2
Measure the air temperature 12 inches above the ground in these three places:

1. Concrete that is in full sun.

Hypothesis	Actual Temperature	Difference
_____	_____	_____

Hypothesis
Something not proved but assumed to be true for purposes of argument or further study or investigation.

2. A grassy area in full sun.

Hypothesis	Actual Temperature	Difference
_____	_____	_____

3. Under the shade of a tree.

Hypothesis	Actual Temperature	Difference
_____	_____	_____

Room Temperature
The most comfortable temperature for most people is 75°F.

activity 2

Tree Inventory

Subjects
Science, Math

Objectives
- Observe and record general leaf shape categories.
- Learn how to use a measuring tape.
- Measure and record data regarding tree circumference and height.
- Use estimation to record tree measurements.
- Synthesize learning to identify trees and determine their health.

Materials
- Science notebook, paper or Tree Inventory Lab Sheet
- Yardstick
- Tape measure or string
- Pencil

Time Considerations
Prep time: 30 – 45 minutes
Doing the activity: 75 - 90 minutes

Arizona Science Standards
Strand 1: concepts 1-4, Strand 2: concept 2, Strand 4: concepts 1-4

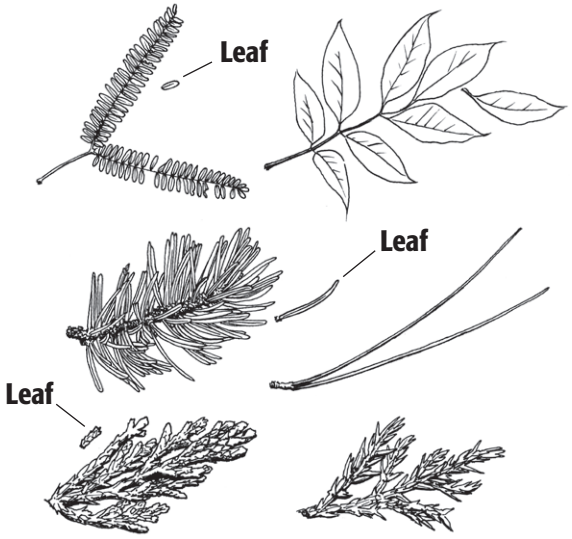
Arizona's College and Career Ready Math Standards
NF.A.3., 3.MD.B.4., 3.MP.2., 3.MP.3., 3.MP.5.

Background

A tree inventory is a recording of information on the health and diversity of a community forest. In this activity, students will take three simple measurements of a tree: leaf shape, trunk circumference, and tree height. These measurements are the same ones that foresters and arborists (tree scientists) use to learn about and care for trees and forests.

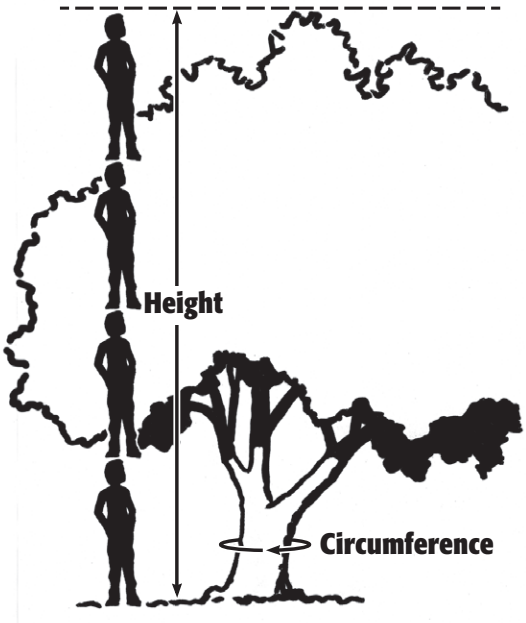
Arborists use leaf shape to identify the species of the tree (i.e. what kind of tree it is). There are three basic leaf shapes and they are very literal:

- **Broad leaf** plants have wide leaves like oak or ash trees. They may be large or very small, smooth or sort of velvety, the edges can be smooth or rough but they are still considered broad leaf.
- **Needle leaves** have skinny needle-like leaves like pine trees. They may have one single needle as a leaf or they may have clusters of needles in a bunch, called a fascicle.
- **Scaly leaves** are rough like cedar or cypress trees. They do not look so much like leaves, more like a dragon's scales, but they are leaves.



Arborists also want to know how big around the tree trunk is, or trunk circumference. Finding out what kind of tree it is and how big the trunk is can tell us a lot of things, like how much water the tree needs to be healthy, how much water it helps keep in the ground, and how much CO_2 (greenhouse gas) it can store over its lifetime (see the Introduction on page 1 for more information on how trees help the environment).

Another measurement commonly taken in a tree inventory is tree height. Knowing how tall a tree is can help us make an estimate of the shaded area or ground cover a tree produces and this helps scientists calculate the total benefit a tree offers a community and the environment.



Getting Ready

Ask the students to close their eyes and picture a tree. Ask them to list things that help them know it's a tree. In other words, what characteristics does the tree have? They might list things like:

- It has leaves.
- It has bark.
- It's tall.

Arborist
noun
ar·bor·ist \är-bə-rist\

Definition:
A specialist in the care and maintenance of trees.

Next, ask the students how they would tell if a tree was healthy or not. What would they look for? They might list things like:

- Broken branches
- Brown leaves
- An absence of leaves

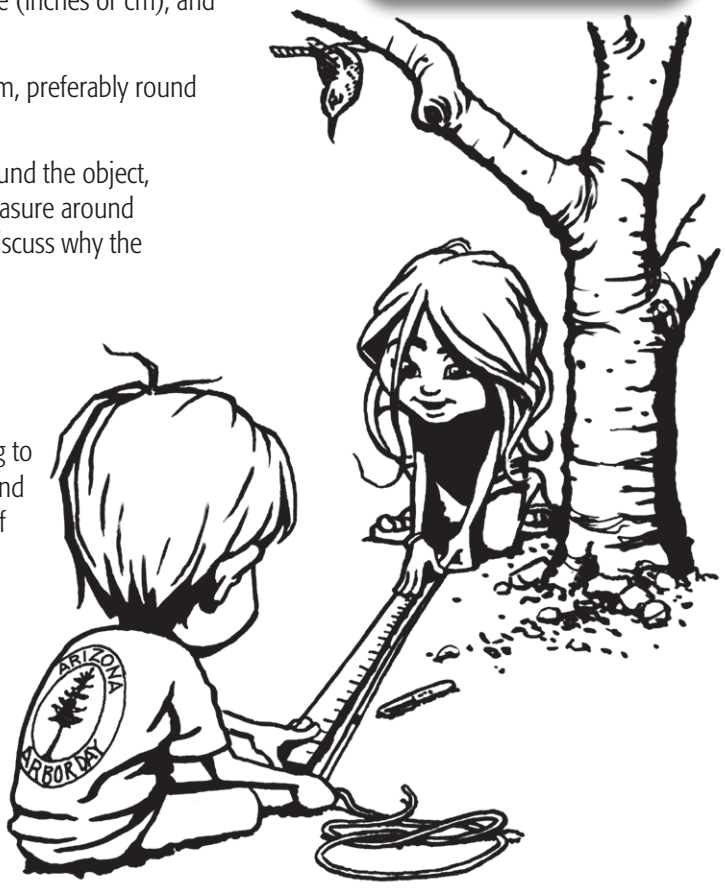
Finally, ask students how they might notice that a tree had these problems. They have to make observations about the trees. Tell students that there are people whose job it is to inventory trees and make sure they are healthy. These people are called ***arborists***. A tree inventory is the gathering of accurate information on the health and diversity of a forest. During an inventory, arborists take measurements and make observations that help them take care of trees.

Tree Inventory
The gathering of accurate information on the health and diversity of a community forest. During an inventory, arborists take measurements and make observations about trees that help them take care of trees.

Using a Measuring Tape

If your students have never used a measuring tape, you may want to practice before you head outside. To begin, ask the students:

- If they have ever measured anything and if so what did they use?
- If they were going to measure a tree trunk what would they use? Discuss the possible devices they suggest then show them the cloth measuring tape in the kit.
- Discuss the use of a tape measure, the calibrations of the measure (inches or cm), and explain how to read those calibrations.
- Have students practice measuring around some things in the room, preferably round items: e.g. a trash can or water bottle.
- Show students that if the tape is slack, or does not go straight around the object, it will not give an accurate measurement. To demonstrate this measure around a student's forearm first straight around and then at a slant and discuss why the measurements are different.
- Tell the students that scientists are very careful when taking these kinds of measurements so their data is accurate.



Alternatives to Using a Measuring Tape

If a cloth measuring tape is not available, students can use a piece of string to estimate the circumference of an object. They should wrap the string around the object, mark where the end overlaps, and then measure that section of string with a yard stick, ruler, or measuring tape. Alternatively students can use their hands to measure the tree trunk. For example, it might take two of Sam's hands and 1 of Sally's hands to go around the object.

Estimating Height

Before or after your students measure their partner's height (see Step 1 of this Activity on page 9), ask your students to practice estimating the height of familiar objects in the room using their own height as the unit of measure. Examples include the top of the white board or the height of a wall clock.

Oldest Tree?
There is a rare eucalyptus in Australia that is thought to be around 13,000 years old!

Tallest Tree?
Giant redwoods of Northern California can reach heights of nearly 380 feet tall!

The tallest Fremont cottonwood tree in the USA
Skull Valley, Arizona
102 feet tall!

Doing the Activity

In these exercises students will select one tree in the school yard, neighborhood, or park to measure. If possible, break students into smaller groups so that each group can do a different tree.

Step 1: Put students in groups or ask each to pick a partner. Have the students practice measuring accurately using a tape measure. Tack or tape a cloth measuring tape to a wall in the classroom. Have groups/partners measure each other against the tape. Each student should then record their partner's height on the ***Tree Inventory Lab Sheet***.

Step 2: Have each group choose a tree and ask them to look closely at its leaves. Have them draw a single leaf or group of leaves and record observations. They might look for things like:

- Is the leaf part of a larger bunch of leaves or is it on the branch by itself? A small leaf that is part of a larger bunch is called a leaflet.
- Are the edges of the leaf smooth, rounded, or toothed/serrated?
- Are there a lot of small lines or veins in the leaf?

Desert ironwood leaves form bunches and are classified as leaflets

Step 3: Have the students use the measuring tape or a string to measure the circumference of the tree trunk and record their answers on the worksheet.

Step 4: Using their partner's height, have the students estimate the tree's height and record it on the worksheet (for example: this tree is 5 Sam's tall). Estimate the tree height from the ground to the top of the highest branches.

Discussion/Application

Take a survey of how many different kinds of trees the students found: how many had leaves that were broad, needle, or scaly. You may choose to graph this. Either in a group or in pairs, ask the students to compare their leaf drawings. Optionally, graph the tree circumferences and heights. Ask students, based on the evidence they collected and the observations they made, if they think the trees in their school yard are healthy and why or why not. If they think they are not healthy, ask what they think should be done to help them. Ask the students to recall why tree scientists take these measurements (i.e. to learn about trees and help keep them healthy). Discuss why it is important to take care of trees (i.e. because they take care of us and the planet Earth).

As an alternative to using the provided Tree Inventory Lab Sheet, you can have students make a data collection chart, like this one, in their science notebook or journal.

Tree	Leaf Shape Observations (words and drawings)	Circumference	Height Estimate
1. Mesquite	Smooth edges, Clusters of tiny leaves.	32 inches	24 feet
2.			

Tree Inventory Lab Sheet

Tree Inventory
The gathering of accurate information on the health and diversity of a community forest.

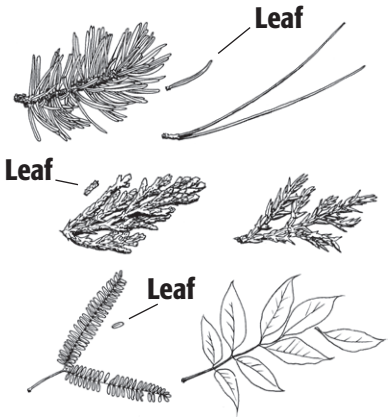
Your Name_____

Your Partner's Height_____

Step 1. Choose a tree and look closely at its leaves. Draw your leaf. Add as many details as you can.

What does your leaf look like? (Check the box):

- ☐ **Like a needle**
- ☐ **Rough and scaly**
- ☐ **Flat and smooth**



Step 2. Record three observations about your leaf or the whole tree.

_____

_____

_____

Step 3. Measure the circumference of the tree trunk using a tape measure, a string, or your hands.

Trunk Circumference_____

Step 4. Estimate the height of the tree by using your partner's height. How many of them would it take standing top to bottom to equal the height of this tree?

Tree Height Estimate_____

activity 3

Forest Manners

Subjects
Science, Math

Objectives
- Students will explore the outdoors while respecting the living and non-living objects they find there.
- Students will express appropriate ways to treat living objects and to act in forests, parks, and other natural areas.
- Students will express their own rules for respecting their surroundings and others.

Materials
- *Your Own Best Secret Place* book
- One large paper or two regular pieces of paper per student
- Pencil, crayons or markers

Time Considerations
Prep time: 35 – 40 minutes
Doing the activity: 55 - 70 minutes

Arizona Science Standards
Strand 1: concepts 1-4, Strand 2: concept 2, Strand 4: concepts 1-3

Background

An urban forest is a forest or collection of trees that grow within a city, town, or suburb. In a wider sense it may include any kind of woody plant vegetation growing in and around human settlements. This term is often used to refer to plants managed by the city or local government but also includes schoolyards and private land. Urban forests are an essential part of healthy communities for many reasons (see Introduction on page 1):

- Improving air and water quality
- Food production
- Reducing urban heat island effect
- Beautification
- Providing wildlife habitat

Because urban forests are so important to our neighborhoods, it's important to take care of them. ***Arborists*** are people whose job is to take care of urban forests by cultivating, managing, and studying individual trees, shrubs, vines, and other perennial woody plants. Arborists generally focus on the health and safety of individual plants and trees. They will inspect, trim, feed, and adjust watering cycles to help keep trees healthy. In an urban setting an arborist may work in parks, on city streets, or on public lands. But you don't have to be an arborist to help trees. Anyone can be a ***tree steward*** by being observant and respectful while enjoying nature.

Getting Ready

When scientists explore the world they pay attention to safety and how to protect the environment. When we investigate our environment we need to think about being safe and also how to be respectful of everything we find in the environment.

Have students name rules or guidelines they think would make sense for safely learning outdoors. List these on a whiteboard or large paper where everyone can see them. Here are some examples:

- Stay on marked trails.
- Always think of safety for yourself and others.
- Throw away or pack out your trash.
- Don't carve or draw on trees.
- Build fires only with adults in safe areas.
- Don't break branches or limbs.
- Show respect and care for all living things.
- Leave an area in the same condition as, or better than, when you got there.

Doing the Activity

Step 1: Discuss what natural objects students would like to collect outdoors. Have them generate a list on the board. Go over the list with the students, discussing what might be all right to collect and what should be left in nature. Tell them that even picking flowers is usually not necessary because the flowers can be enjoyed right where they are. Explain how each fallen leaf and rock is a part of the habitat of living objects. And while one thing may not be missed, if everyone in the class took one, it could make a big difference.

Step 2a: Have each student choose and draw an area of the school yard or community. Explain that students can draw the area any way they like, with one exception: they must leave trees out of the picture. Have students label the various components of their drawings.

Step 2b: When students have finished their drawings, have them draw the same scene again, but this time using as many trees as they wish and with attention to where they place the trees.

Step 3: Read the story ***Your Own Best Secret Place***. Read it slowly, showing them the pictures in the book. After reading the story, ask the following questions:

- How did the story make you feel?
- Why do you think the girl likes this secret place so much?
- In what ways did William Cottonwood show that he respected and loved his secret place?
- How does the main character show respect for this same secret place?
- How do the other people in the story show respect for this same secret place?

Step 4: Have the group take a look at the rules they generated in Step 1, and ask them if there are any rules they would add or change.

Discussion/Application

Display the drawings where everyone can see them.

1. Ask students in which environment they would rather spend their time.
2. Ask why they chose the way they did, and if trees have anything to do with their preferences.
3. Discuss the benefits of trees in public places. Have the students brainstorm a list of benefits. For example:
   - They look nice
   - They are good places to play
   - They provide shade
   - They provide protection from wind
   - They provide habitat for wildlife
   - They help to improve air quality and create oxygen
   - They help to reduce noise
4. Ask your students to think about what the school yard might look like with more or less trees in it.
5. Ask your students why they think trees make our communities more beautiful.
6. Talk about how we can take care of nature.
7. Writing Component - After the discussion, ask the students to write about the benefits trees provide for us or add writing to their drawings about how trees improve the environment. This should be expository or informational writing with evidence if possible, not opinion. Alternatively, have students use their two pictures to write about their conversation/discussion using the prompts above. It's important for them to talk about their ideas first, as noted here with the discussion questions, and then add the writing. They could also write about #6 – or make posters they can put in their school or to share with younger students/siblings.

Neighborhood Forest Fun Page

Unscramble these words. Write the unscrambled words on the lines below.

dashe dwoo reets dofo sowfrel tsens troos

_____ _____ _____ _____ _____ _____ _____

Use your unscrambled words to complete the sentences below.

1) Some trees are harvested to give us the _____ we use to make picnic benches.

2) Trees can help _____ our homes and keep them cooler.

3) _____ are fun to climb.

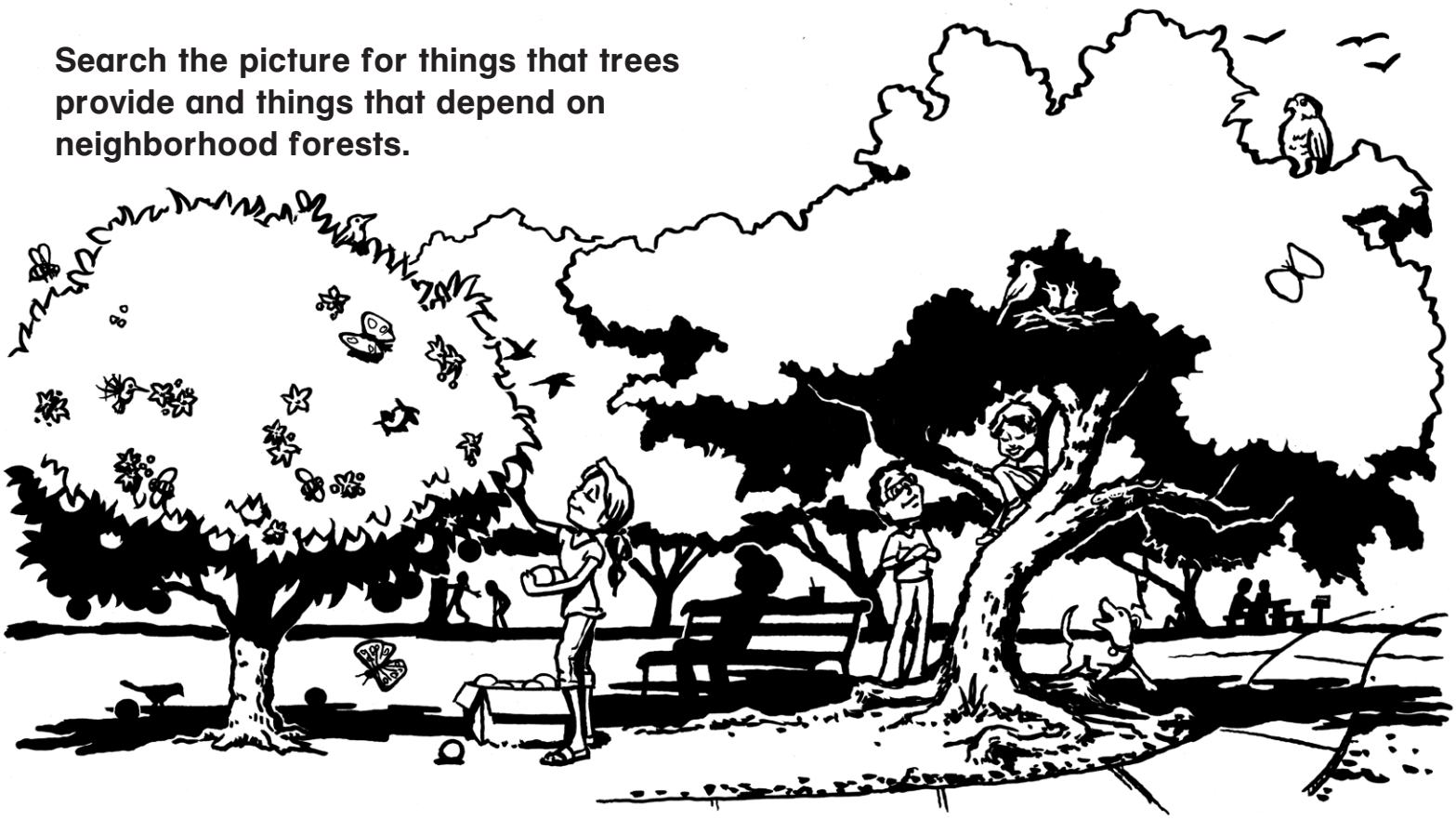
4) Fruit trees give us delicious _____ to eat.

5) Some trees have beautiful _____ in the spring.

6) Many birds make their _____ in trees.

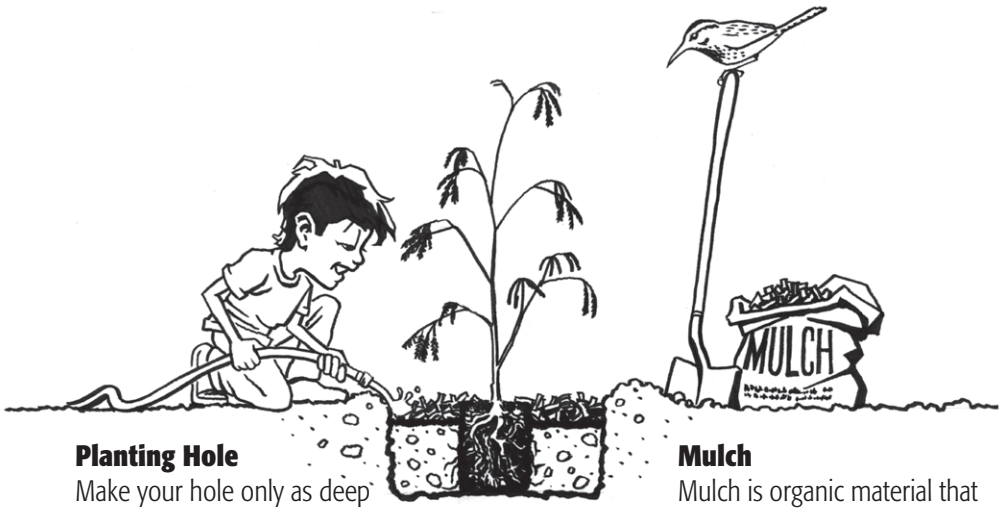
7) Tree _____ help hold water in the soil and reduce soil erosion.

Search the picture for things that trees provide and things that depend on neighborhood forests.



(Answer Key: shade, wood, trees, food, flowers, nests, roots)

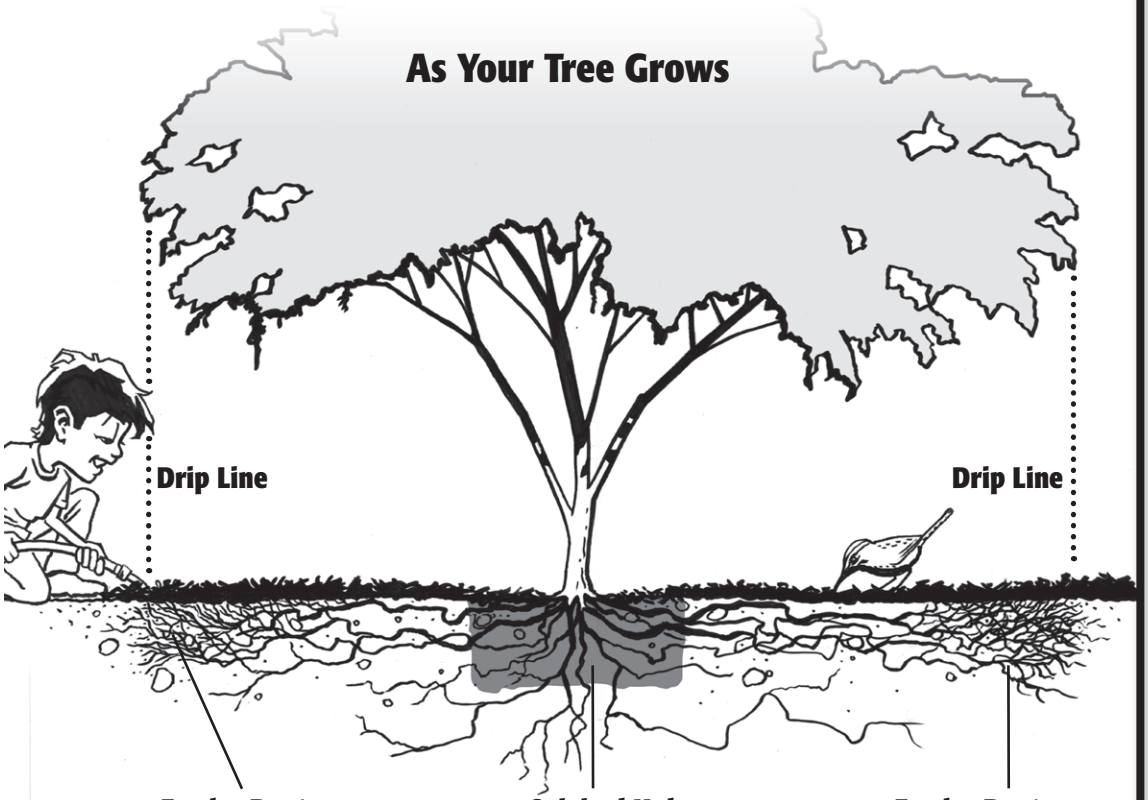
Desert Tree Planting Guide



Planting Hole
Make your hole only as deep as your tree's root ball. Fill the hole with the dirt from the hole making sure the base of the trunk is level with the ground surface. Leave room for several inches of mulch.

Mulch
Mulch is organic material that allows water to penetrate through and shades the soil beneath, protecting your tree from drying out too fast. Leaves from your yard can be used or you can purchase mulch or wood chips at a garden store.

As Your Tree Grows



Feeder Roots
As the tree grows the feeder roots reach out to the drip line. This is the area that needs to be watered to keep your tree growing.

Original Hole
Notice that the feeder roots have grown away from the original hole. Putting water here will have no benefit to your tree now.

Feeder Roots
Remember to deep water the feeder roots all the way around your tree.

1. Water your tree
Keep your tree's soil moist until you are ready to plant it.

2. Dig a planting hole
Dig your hole only as deep as your tree's root ball and twice the width.

3. Plant your tree
Remove tree from container. Gently loosen some of the roots around the edges of the root ball.

4. Fill your hole
Fill with the same soil you removed from the hole and adjust the base of the tree to be level with the surface. Do not add amendments.

5. Add mulch
Cover the surface of the area around your new tree with mulch to help hold in moisture.

6. Deep water your tree
Soak the ground around your tree immediately after planting for 1 hour at a trickle.

Deep water every 3 days for 1 year. Adjust watering to the drip line of the tree as it grows, as shown.

For More Information
AZ Nursery Association: www.azna.org

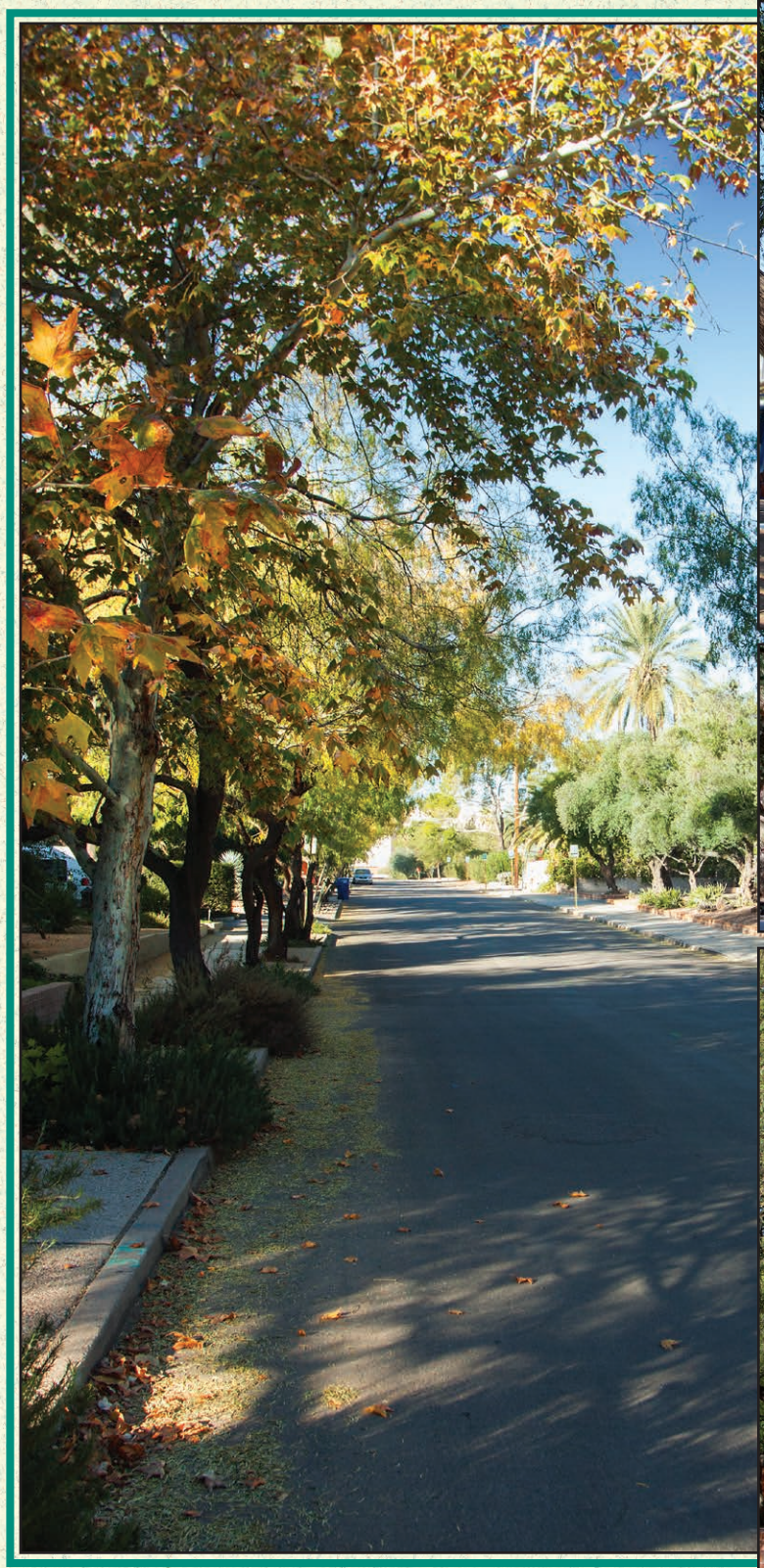
AZ Native Plants Society: www.aznps.com

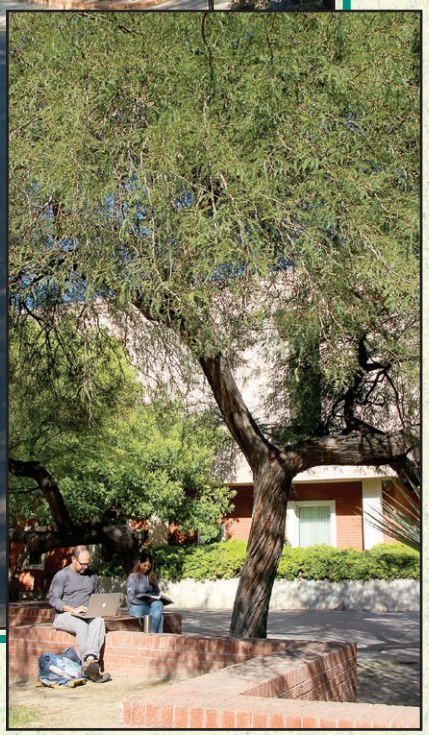
AZ Community Tree Council: www.aztrees.org

Trees for Tucson: tucsoncleanandbeautiful.org/trees-for-tucson

Community and Urban Forestry Program, AZ State Forestry: azsf.az.gov/forestry-community-forestry/urban-community-forestry

Valley Permaculture Alliance: www.vpaaz.org





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