

2013 Interdisciplinary Curriculum Guidebook



**Trees Are Terrific ...
In Cities and Towns!**



** Taken in part with permission by the Arbor Day Foundation.*

Step

1

Discover What Trees Do For You and Your Community

BASIC ACTIVITY

Classroom Activity:

⇒ Discover the Benefits of Your Community Trees

Objectives:

Students will be able to:

- ⇒ Identify ways trees “work” to protect our natural resources;
- ⇒ Estimate the economic value of urban trees to individuals and to a community;
- ⇒ Describe several ways trees enhance human environments and natural ecosystems; and
- ⇒ Recognize appropriate planting sites for urban trees in their community.

Time Recommended:

⇒ One 60 minute class period.

Materials needed:

- ⇒ Overhead transparency of page 9 (or one per student);
- ⇒ Copy of worksheets on page 6-8 and 10-12;
- ⇒ Pencil and paper; and
- ⇒ Calculator (optional).

National Science Education Standards Correlation:

Students will develop an understanding of:

- ◇ Populations and ecosystems;
- ◇ Populations, resources, and environments; and
- ◇ Diversity and adaptations of organisms.

National Social Studies Standard Correlation:

Students will be able to:

- ◇ Describe how people create places that reflect cultural values and ideals as they build neighborhoods, parks, and the like.

National Math Standard Correlation:

Students will be able to:

- ◇ Recognize and apply mathematics in contents outside of mathematics.

Background Information

In the early 1900s America was still a very rural nation where people had close ties to nature. Today nearly 80% of the United States population lives in urban/suburban areas. Often people think of forests only as distant, vast tree-covered tracts of land. They are unconscious of the urban forest that exists in their own cities and towns. Trees play a vital role in these urban environments.

Urban forests cover close to 70 million acres of land—an area larger than our National Forests. These community trees are working trees. They not only provide beauty, shade our streets and schoolyards, create habitat and food for wildlife; they also produce oxygen, improve air quality, muffle noise, moderate the temperature, filter runoff, protect the soil, and cool the air. More and more research is showing just how essential trees are to the quality of life and environmental health in our cities and towns.

Research shows that trees help reduce stress in the work place and speed recovery of hospital patients. Trees increase land values. Houses with trees often sell faster and for more money than those without trees. Commercial retail areas are more attractive to shoppers, apartments rent more quickly, tenants stay longer, and space in a wooded setting is more valuable to sell or rent.

Studies also show that young children benefit greatly from connecting with trees and nature. A connection with nature benefits children educationally, behaviorally, and developmentally. On-going research and field-testing confirms that regular connection with the natural world helps:

- Build children’s visual-spatial skills;
- Improve children’s ability to concentrate, including children with Attention Deficit Disorder (ADD); and
- Enhance children’s motor skills—such as coordination, balance, and agility.



Shade

Windbreak

Erosion Control

Absorb carbon dioxide

Homes for animals

Syrup

Clean air

Connection to history

Cools the air

Reduced stress

Make Oxygen

Fruits

Beauty

Nuts

Shelter

Food for wildlife

Prevent water runoff

Medicines

Mark the changing seasons

Reduced noise



Cities and towns benefit greatly from their urban trees. But trees within cities also have special challenges. There is not as much space for their roots to spread out and urban soils are often poor. Tall buildings can prevent trees from getting full amounts of sun. Pollution from cars, buses, and factories can affect the health of a tree and impact how well it grows. If the right tree is not planted in the right place, branches can grow and tangle in power lines creating a hazard tree. In spite of these challenges, many species of trees have adapted to urban life and grow well, providing numerous benefits to the people that live there.

It takes time, effort, and some funding to establish and maintain the urban forest, but recent studies of the urban forest have shown that city trees provide benefits to the community worth 2-3 times the cost of their planting and care. For many years trees were only valued for the wood products they could produce. Today, scientists have developed ways to measure the economic value of trees to the environment. In the following activity, students will have an opportunity to learn how trees impact the urban environment and calculate a rough estimate of a “working” tree’s value. They will explore the environmental, economic, and social benefits trees bring to our cities and towns.

Instructional Sequence

Anticipatory Set

Put up the overhead (or pass out handouts) of the World with Trees worksheet (page 9). Ask, “Which of these two worlds would you rather live in?” As students respond, ask why they chose as they did. Record responses on the board without comment.

Continue class discussion by asking, “why are trees important to our community?” Building off of students’ prior knowledge and information gathered from the handout, encourage students to generate a list of the products and contributions made by living trees. A possible list of responses is provided above.

“To exist as a nation, to prosper as a state, and to live as people, we must have trees.”

Theodore Roosevelt

Step

1

Discover What Trees Do For You and Your Community—BASIC ACTIVITY

BENEFITS OF TREES

Activity

Write the words TRUE and FALSE on the chalkboard. Tell students you are going to read some “Believe it or Not” statements about trees. They need to predict if each statement is true or false. If they believe the statement is true, they should stand. If they believe the statement is false, they should remain seated. To start, read **ONLY** the bolded statements #1—10 on pages 7 & 8 out loud.

Once you have gone through all 10 statements, tell students that all were true. Trees do all these amazing things for us and the environment we live in. Write “economic benefit” “environmental benefit,” and “social benefit” on the board. Pass out the Benefits of Trees Handout (pages 7—8) and go through the statements again with students, this time incorporating the background information and comments following each statement.

Discussion

As each benefit is discussed, ask students if they think that particular tree benefit results in more of an:

- **Environmental Benefit**—Does it help the ecosystem/environment in which people live?
- **Economic Benefit**—Does it provide an opportunity for people or the community to save money by lowered costs or increased value?
- **Social Benefit**—Does it improve the health or quality of life for individuals in some way?

After going through the handout, ask if planting trees in certain locations can have multiple benefits?

Tell students that even though research is proving the environmental, social, and economic benefits of trees, we’re losing urban trees every day. In some cities, as many as four trees die or are removed for each new one added. And nationwide, each day 2,400 acres of rural land is absorbed for urban use and most of the trees on that land are not preserved. Surveys indicate that about 66—100 million spaces exist along our city streets where trees could be planted. This translates to the potential to absorb 33 million more tons of CO₂ every year and at the same time save consumers \$4 billion in energy costs!

Be sure to explain that in a city, trees face



numerous challenges like tight spaces, poor soils, and city pollution. It’s always important to select the right tree for the right space, but in urban areas that is especially true if a tree is to grow and thrive.

Distribute the Vocabulary/Rubrics (page 6) as well as the Community Neighborhood Worksheet and the Benefits of Your Community Trees Worksheets (pages 10—12).

NOTE: For the activity you may choose to have students work in pairs or

on their own.

Student Directions

Tell students to imagine they each just received trees from the Arbor Day Foundation and are going to have an opportunity to plant them in a neighborhood that might be similar to the one where they live. Students are to draw in (plant) 8 trees in locations on the Community Neighborhood Worksheet where they feel the trees might be of the most value ... to themselves, to the community—or both. Ask them to please number each tree that they plant, #1—8. Then, on the Benefits of Your Community Trees Worksheets, they should list where they planted each of their trees, and what environmental, economic, or social benefit each tree might provide in the location they selected. Remind them to make sure the number of the tree on the Community Neighborhood Worksheet corresponds to the number of the tree location described on the Benefits of Your Community Trees Worksheet.

Mention to students that it is always important to plant the right kind of tree in the right location, but for this activity they should imagine that they have already selected the appropriate tree species for each location they might select.

Give the students the following example: If They planted Tree #1 by the stream it might have:

- An environmental benefit of holding the soil in place;
- An economic benefit of saving the city money by reduction of storm water runoff; and
- A social benefit of adding beauty to the area.

Then point out the “Tree A” example on the worksheets.

They explain that they should list what benefit

(social, economic, or environmental) was the main reason that they selected the location for the tree that they did. When they do their tree location totals at the end of the Benefits of Your Community Trees Worksheet they may have 3 trees in one location and no trees in another—that is fine. Encourage students to refer to the Benefits of Trees Handout or the list on the board for a reminder of some of the different benefits trees provide in different locations.

Assessment—Pulling It All Together

Allow students about 20 minutes to complete their worksheets. Then tell students they are going to jump 10 years into the future and try to determine the impact and the value of the trees they planted. Explain that they will be able to estimate the value of their community trees.

Refer students back to Benefit #10 on their Benefits of Trees Handout that says, “Nationally, the 60-plus million street trees have an average value of \$525 per tree each year.” Tell students to multiply the number of trees they planted times \$525 ($8 \times \$525 = \$4,200$). That will give them a rough idea of the economic value from the environmental benefits provided by the trees they planted in their community. Then, on the board, calculate the total value of the trees planted by the whole class (# of students \times \$4,200) to demonstrate the impact a group of people planting and caring for trees in a community can have on the economy of a community.

Tell students if they planted 3 trees around the little house they could give themselves \$10,000 for the increased

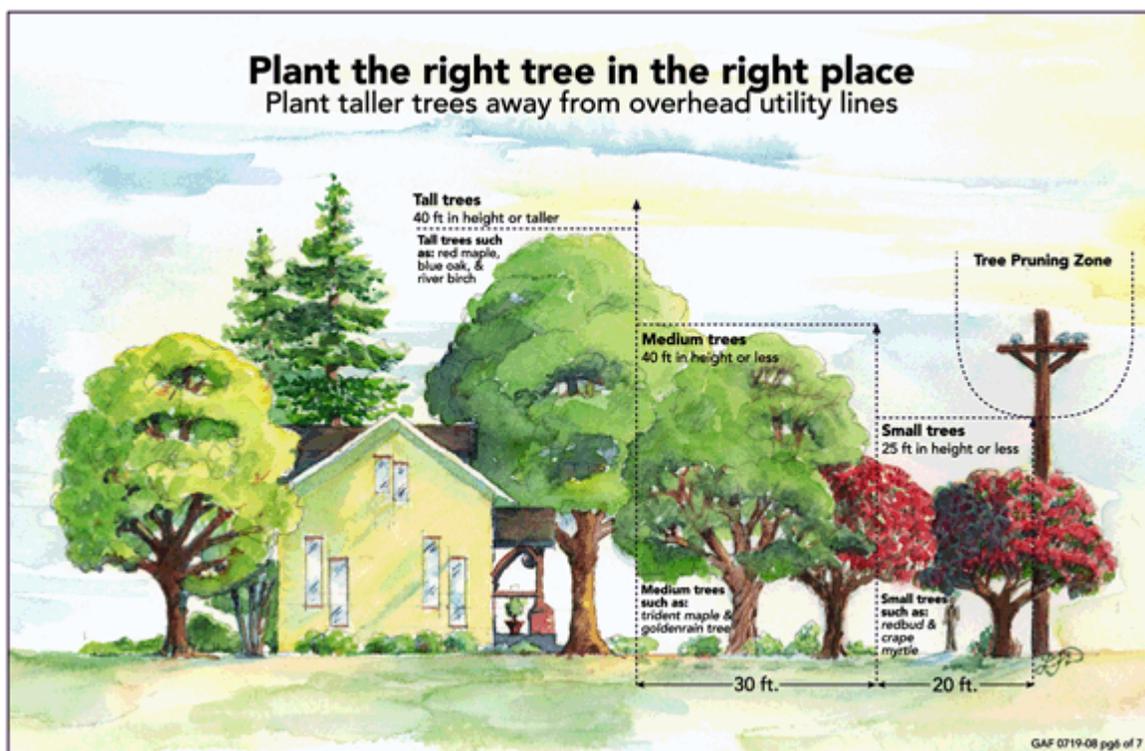
value of their property. If the 3 trees planted around the little house were on the west and south side of the house, they could give themselves an extra \$50 in energy savings.

Stress to students that although part of this activity was to estimate the economic value of the trees they planted, the object is not to see who totaled up the greatest amount of money. The objective of the activity is to help students recognize that trees provide benefits to our lives in many ways ... some values are easily measured in terms of dollars and cents ... some benefits (like the beauty of trees in a park) are subjective from one person to another and are more difficult to measure.

Post worksheets on the board so students can compare tree planting locations. Ask them to imagine each of their neighborhoods joined together, making up a large city. As time permits, allow students to share their community tree planting decisions and predict the social, environmental, and economic impact of the trees they planted.

Alternative Assessment

GET OUTSIDE! If time permits, take students on a walk around the neighborhood and look at community trees. Predict what benefit each tree might provide in the location in which it's planted. Have students imagine they get to plant a single tree. Have them draw a picture or write a story about what benefits that tree might provide to them and to their community in the future.



Vocabulary and Assessment Rubric

Vocabulary

- **Buffer Strip**—Rows of trees or grasses planted along a stream or waterway to help prevent soil erosion and filter pollutants from running into the waterway.
- **Carbon Dioxide**—A gas exhaled by animals and released from burning fossil fuels or in the process of decomposition. Trees clean the air by taking in carbon dioxide to use in photosynthesis. Often shown as CO₂.
- **Evergreen**—A tree that has leaves all year round.
- **Fossil Fuels**—Non-renewable fuels, like coal, oil, and natural gas, used to create energy. Once the supply of a fossil fuel has been depleted, it is gone forever.
- **Greenhouse Gases**—Gases, like carbon dioxide, that trap heat in the atmosphere.
- **Heat Island Effect**—A term used when city temperatures run higher than those in nearby suburban and rural areas, primarily due to large areas of unshaded buildings and pavement.
- **Oxygen**—Trees and other green plants produce oxygen, a gas needed by animals to survive. Often shown as O.
- **Runoff**—The flow of water, from rain, snowmelt, or other sources that carry soil or ground chemicals with it.
- **Shade Tree**—A tree planted chiefly to provide shade from the sun. Shade trees are often deciduous trees that lose their leaves in the winter months.
- **Street Trees**—Trees near the street, often located between the sidewalk and street, which are usually managed by the city or town.
- **Water Management Systems**—Underground systems that direct waste water and rain water through a system of sewers and drains.

Assessment Rubric			
1-2 POINTS SEED LEVEL	3-5 POINTS SEEDLING LEVEL	6-8 POINTS SAPLING LEVEL	9-10 POINTS TREE LEVEL
<input type="checkbox"/> 5 trees are drawn into the Community Neighborhood Worksheet <input type="checkbox"/> A few planting locations are identified <input type="checkbox"/> At least one benefit social, environmental, or economic is correctly identified for each tree drawn in	<input type="checkbox"/> More than ½ of the trees are drawn into the Community Neighborhood Worksheet <input type="checkbox"/> Over ½ the planting locations are identified <input type="checkbox"/> At least two benefits social, environmental, or economic are correctly identified for each tree drawn in	<input type="checkbox"/> All 8 trees are drawn into the Community Neighborhood Worksheet <input type="checkbox"/> Clear descriptions of the selected planting locations are shown <input type="checkbox"/> At least one social, environmental, and economic benefit is correctly identified for each tree drawn in <input type="checkbox"/> The tree totals are filled in on the Benefits of Your Community Trees Worksheet	<input type="checkbox"/> All 8 trees are drawn into the Community Neighborhood Worksheet <input type="checkbox"/> All 8 trees in your landscape plan fit the described site needs <input type="checkbox"/> Several social, environmental, and economic benefits are correctly identified for each tree drawn in <input type="checkbox"/> The tree totals are filled in on the Benefits of Your Community Trees Worksheet

Pass out the rubric or put on the board at the start of the activity so students clearly understand the measured objectives. (To be used with the Benefits of Your Community Trees Worksheet)

* Taken in part with permission by the Arbor Day Foundation.

Benefits of Trees Handout

Trees provide benefits to you and to your community in a variety of ways. Here are just a few examples. As you read through this list, consider if that tree benefit is more of an environmental, economic, or social benefit.

1. **Trees properly planted around a home can lower air conditioning AND heating costs.** TRUE. Shade trees



planted on the west and south sides of a home help shade and cool the air around the home during the summer reducing cost for air conditioning up to 30%. Evergreen trees placed on the north and west sides of a home or building block cold winter winds, reducing cost for

heating by 20—30%. For example, if you have two identical houses with the only difference being one has carefully planted trees and the other does not, the house with the trees might only spend \$70 a month for heating while the treeless home might have a \$100 heating bill. That savings also means less burning of fossil fuels, which is good for the environment!

2. **Trees help clean the air.** TRUE. Trees improve the quality of the air we breathe by capturing dust and pollution particles from dirty city air that can affect our health. These particles cling to the leaves rather than float in the air. When it rains, the dust and particles are simply washed to the ground. Trees also remove greenhouse gases, like carbon dioxide, from the air and replace it with oxygen for us to breathe.

3. **Healthy, mature trees around a house make the property more valuable.** TRUE. Trees



can add an average of 10—15% to a property's value. For example, a home or apartment building valued at \$100,000 might sell for \$110,000 (\$10,000 more!) because it has trees around it. Tree planting is one of the best investments a person can make in their home. And in business areas, too. Business areas with trees are more attractive to shoppers.

4. **Research studies suggest that housing areas with trees and other green plants have less violence and crime.** TRUE. Living in an area with trees helps reduce stresses that can be associated with living in a big city. Less stress can ease tensions that sometimes lead to violence. Even a small number of trees and other green plants in an area were associated with lower crime rates. Apartment buildings that had lots of trees and plants had 52% fewer total crimes than apartment buildings with few or no trees planted.



5. **Hospital patients have been shown to recover from surgery more quickly and require less pain medication when their room had a window that provided a view of trees.** TRUE. A study found that exposure to trees and nature lowered signs of stress ... like heart rate, blood pressure, and muscle tension.



"The best friend on earth of man is the tree. When we use the tree respectfully and economically, we have one of the greatest resources on earth."

Frank Lloyd Wright

Benefits of Trees Handout

- 6. Trees help slow the force of rain water, which helps control storm runoff. This results in improved water quality, protected soil, and money savings.** TRUE. The canopy (leafy top) of a tree softens and slows the force of raindrops. This gives water more time to absorb into the ground rather than eroding the soil and running off into storm sewers. Large water management systems are expensive. When trees are planted, smaller drainage systems can be used, saving money for a community and improving the environment.
- 7. Trees help prevent soil erosion, flooding, and landslides.** TRUE. Tree roots hold soil in place and increase the ability of water to soak into the soil. Trees planted as buffer strips along streams help prevent flooding ... and even filter out chemicals that might wash into the stream.



- 8. The overall cooling effect of a healthy, mature tree is equivalent to ten room-sized air conditioners operating 20 hours a day.** TRUE.—Amazing! Water from a tree's leaves evaporates in the hot weather. The evaporated moisture cools the air around the tree. Since cool air is heavier than hot air, this cool air moves toward the ground making us feel cooler. Cities, with stretches of concrete streets, sidewalks, and parking lots, are sometimes referred to as "heat islands" that are 5—9 degrees hotter than surrounding areas. Planting trees in cities helps alleviate the heat island effect—which saves both energy and money.



- 9. Getting outside and connecting with trees and nature has been shown to improve children's concentration and attention span.** TRUE. When children spend time in nature-rich spaces, their ability to concentrate improves. Even small areas of green space, with a few trees and plants, can make a difference for children.



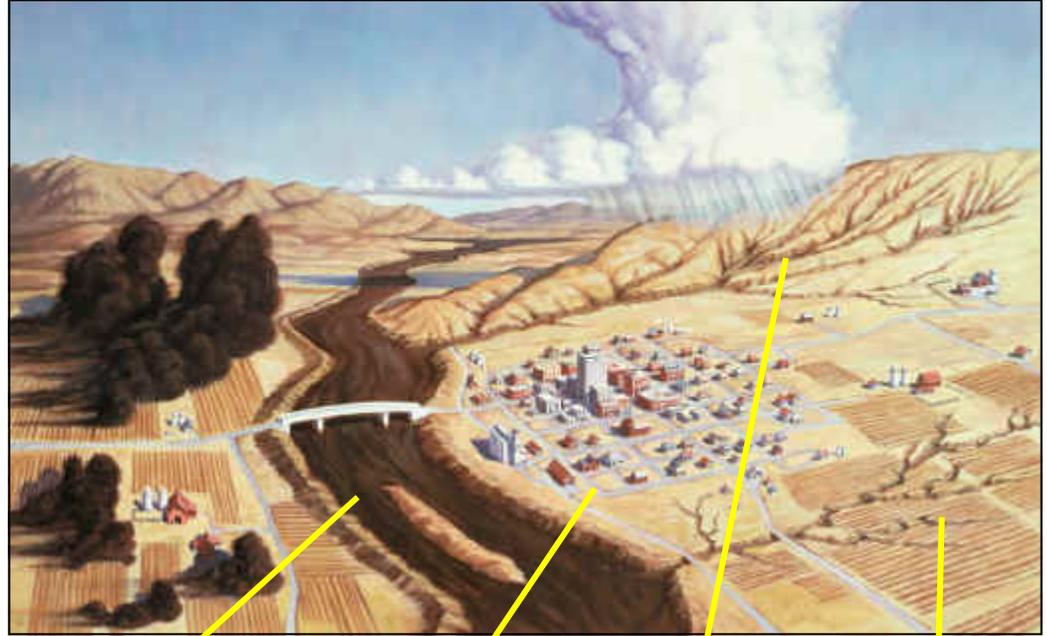
- 10. The city of New York determined that for every dollar spent on trees the city receives \$5.60 back in benefits the trees provide.** TRUE. Think of all the things a tree does for the environment. If a city had to find other ways to handle storm water, clean the air, remove carbon dioxide generated by industry, reduce energy costs, and beautify the community, it would be very costly. All the things a tree does naturally are of great benefit to a city or town.



It has been estimated that the nation's 60 million street trees (city-owned trees between the sidewalk and street) have an average value of \$525 per tree each year.

A World With Trees Worksheet

A World Without Trees



Silty, flood-prone rivers

Sun baked cities

Rapid runoff

Eroded farmland



Natural streams

Shaded homes and streets

Forested slopes for recreation

Productive farmland

A World With Trees

Benefits of Your Community Trees Worksheet

DIRECTIONS: You have been given 8 trees to plant in your community. On the **Community Neighborhood Worksheet** you should plant (draw in) 8 trees in areas where you feel they will provide the most benefit—to you, to the community, or both. Number each tree that you plant. Then, on this worksheet, list where you planted each of your trees and what environmental, economic, or social benefit each tree might provide in the location you selected. You may refer to the Benefits of Trees Handout for ideas.

- **Environmental benefit:** Does it benefit the ecosystem/environment in which people live?
- **Economic benefit:** Does it help people, or their town, save money by lowering expenses or increasing property value?
- **Social benefit:** Does it improve the health or quality of life for individuals in some way?

EXAMPLE

Tree A Planting Location On the North side of a house



Why did you select this location for this tree? The tree will help protect the house from cold winter winds

What environmental, economic, or social benefits might you get from this tree? Saving money for heating would be an economic benefit. Using less energy for heating would be a benefit for the environment.

Which benefit was most important to you when planting this particular tree? Economic

NAME _____

Tree 1 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 2 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 3 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Benefits of Your Community Trees Worksheet (cont.)

Tree 4 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 5 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 6 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 7 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

Tree 8 Planting Location _____



Why did you select this location for this tree? _____

What environmental, economic, or social benefits might you get from this tree? _____

Which benefit was most important to you when planting this particular tree? _____

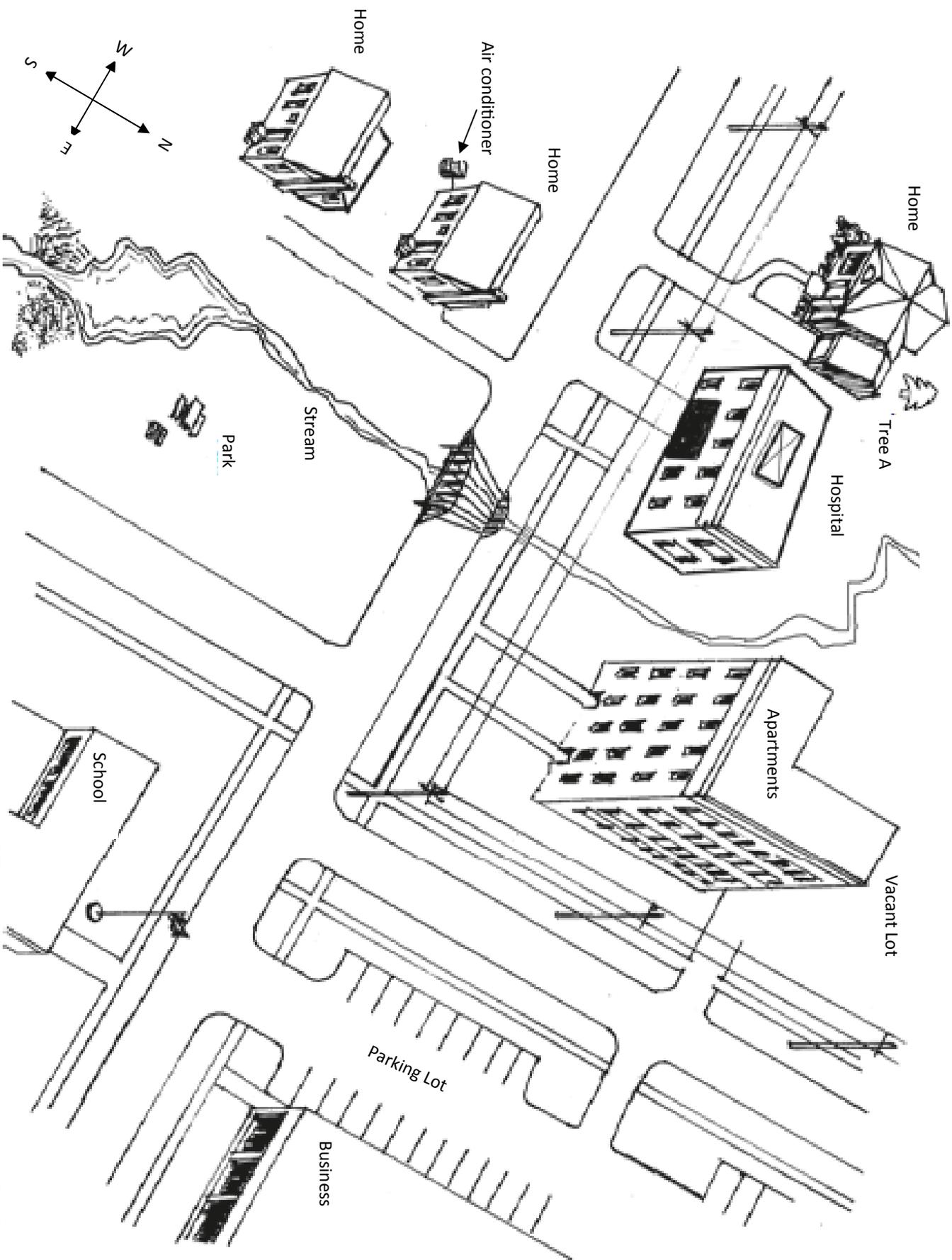
Totals: How many trees did you plant in these locations?

_____ by the stream, # _____ by the school, # _____ in the park, # _____ by a home, # _____ next to the hospital

_____ shading a parking lot, # _____ by the apartments, # _____ by the business district, # _____ in the vacant lot.

Which benefit (environmental, economic, or social) did you consider most when selecting locations for planting your trees?

Community Neighborhood Worksheet



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ADDITIONAL ACTIVITY 1—Tree Contest

Classroom Activity:

- ⇒ Tree-mendous Community Tree Contest

Objectives:

Students will be able to:

- ⇒ Learn techniques used by professionals to measure champion trees;
- ⇒ Practice tree identification skills;
- ⇒ Incorporate math skills; and
- ⇒ Recognize special trees in their community.

Time Recommended:

- ⇒ Two 60 minute class periods

Materials needed:

- ⇒ Leaf samples;
- ⇒ Measuring tape;
- ⇒ Yardstick;
- ⇒ Tree pictures from old calendars or magazines or leaf samples from broadleaves and conifers;
- ⇒ Pencil and paper;
- ⇒ Measuring Up a Champ Guidelines (page 17); and
- ⇒ Optional: Tree Identification Books.

National Science Education Standards Correlation:

Students will develop an understanding of:

- ⇒ Organisms;
- ⇒ Populations and ecosystems; and
- ⇒ Abilities necessary to do scientific inquiry.

Background Information

Tell students they are going to take part in a “Tree-mendous Trees” contest to find the biggest trees in town or in the neighborhood community. Ask students to think about the trees they see on their way to school. Where do they see the biggest trees ... in yards, in parks, around school? Record their comments. Then ask them how many different kinds of trees they see.

Help students understand that not all tree species grow to be the same height. Some trees, like the Redwoods in California, are giants towering more than 250 feet above the forest floor while flowering dogwood may only reach a height of 35 feet. Both could be considered champions if they were the largest of their kind.

Explain to students that trees are divided into two main groups: conifer and broadleaf.

Conifers are trees with cones that have needle-like or scale-like (awl-shaped) leaves. Most conifers are evergreen since they do not lose all their leaves at once. Pines, firs, cedars, and spruces are conifers.



Broadleaf trees are trees with leaves that are thin and flat. Leaves are generally shed annually. They bear flowers, fruits, or nuts. Oaks, maples, birches, and sycamores are just a few of the many different kinds of broadleaf trees. Broadleaf trees are sometimes referred to as deciduous trees. In warm climates, some broadleaf trees, like magnolias, do not shed all their leaves at the same time so they appear to remain evergreen.

Background Information

Holding a community tree contest is a great way to get children interested in the trees in their neighborhoods. Students will learn some of the techniques used to measure champion trees and have the opportunity to identify some community trees.

“He who plants a tree loves others besides himself.”

Thomas Fuller



For visual learners, it is helpful to have a leaf sample from a conifer with needle-like leaves, a conifer with scale-like leaves, and a broadleaf tree. An inexpensive acrylic picture frame works well to keep brittle leaf samples protected and in place while still offering students a clear view of actual leaves.

Cut tree pictures from old calendars or magazines and have the students group them as conifer or broadleaf. Take a walk around the school grounds and have the students distinguish between conifer and broadleaf trees, then have the students calculate the ratio of conifers to broadleaf trees in the area visited.

Activity

Ask students to think again about trees that they pass en route to school.

- Are there more conifers or broadleaf trees?
- Can any generalizations be made about where broadleaf and conifers are planted? (Often conifers are planted in parks or large, green spaces because of their pyramidal shape.)
- Where might you go to look for the biggest broadleaf trees? Where might you find the biggest conifers?

From the comments generated by the students, determine some of the best areas in the community in which to find large, mature trees.

Determine how large an area of the community is feasible to include in the contest. Is transportation available to your class or do you need to stay within walking distance of the school? Are there many sites in the community with large trees, or just a few? Designate an area and set the boundaries.

Your class may choose to simply search for the biggest tree in the designated area. They may wish to find the biggest broadleaf and the biggest conifer. Students might learn to identify a particular tree species, perhaps their state tree, and hunt for this kind in the community. In all cases, students should be able to make the distinction between conifer and broadleaf trees and understand how to properly measure a tree.

Measuring Trees

Foresters have a special formula to measure trees. This formula includes the tree's height, circumference, and crown spread. A tree receives one point for every foot of height, one point for every inch of circumference (taken at 4 ½ feet), and one—fourth of a point for every foot of average crown spread.

Explain to the students that they are going to practice measuring trees before looking for a “Tree-mendous Tree” winner. Divide students into groups of three or four. Each group will need a measuring tape, yardstick, and a pencil and paper to record their findings.

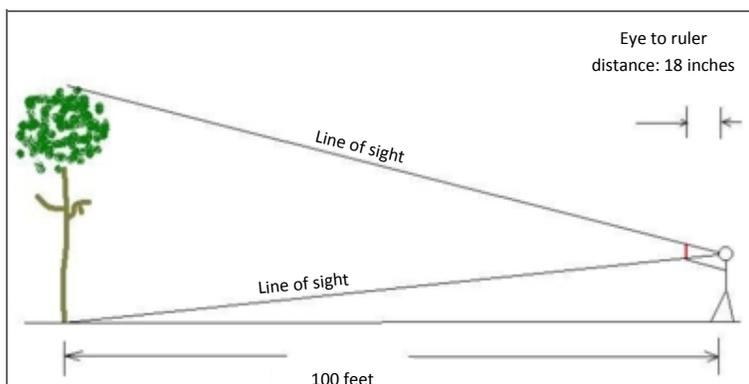
It may be helpful to assign roles to each student within a group. Group jobs include:

- **Recorder**—records measurements and tallies points
- **Investigator**—takes the measurements
- **Manager**—assists the investigator to make sure measurements are accurate and is responsible for the measuring tape and yardstick.

Take students to a nearby area with enough trees to allow each team to measure a tree. Explain that they are measuring these trees for practice and later they will search for the “Tree-mendous Trees” in their community.



Height



Example: if the distance from your eye to your fist is 18 inches make sure the distance from the top of your fist to the top of the ruler is also 18 inches. Be sure to hold your fist directly out at eye level and keep the ruler straight up and down.

- **Step 1**—Students should stand on level ground to take measurements.
- **Step 2**—The student investigator extends his/her arm out straight so that the top of his/her fist is at eye level. Carefully using the yardstick, the manager makes sure the top of the investigator's fist is level to the investigator's eye. The recorder writes down this measurement.
- **Step 3**—The investigator directly faces the tree to be measured holding the yardstick vertically in his/her extended fist so that the distance from the top of his/her fist to the top of the yardstick is the same eye-to-fist distance measured in the previous step. The manager checks the measurement then makes sure the investigator's arm is straight out, fist at eye level with the yardstick straight up and down.
- **Step 4**—The investigator slowly (and carefully) walks backward away from the tree until he/she can see the base of the tree by looking over the top of the fist and the top of the tree by looking over the top of the yardstick.
- **Step 5**—The manager measures the distance, in feet, from the investigator to the tree. This distance is the height of the tree.
- **Step 6**—The recorder writes down the height measurement and gives the tree one point for every foot of height.

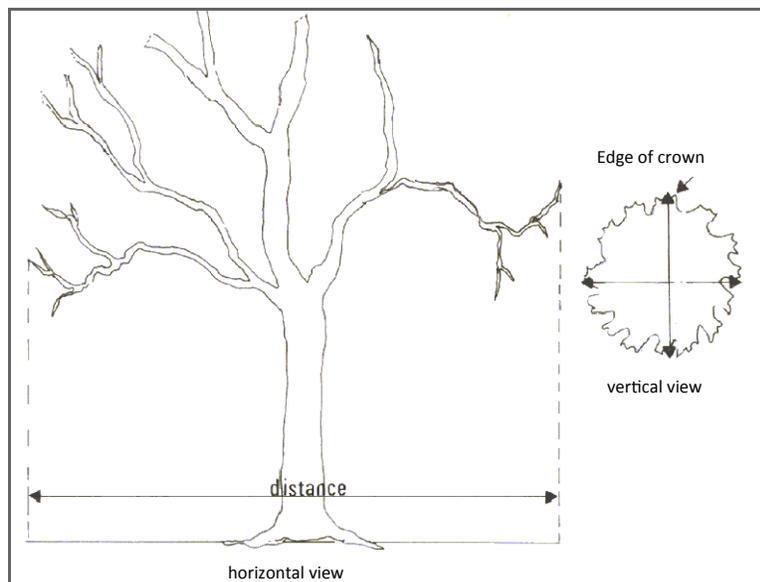


Crown Spread

The crown spread of a tree is the distance its branches spread away from its trunk. The crown spread is calculated by measuring the distance of the widest spread and the distance of the narrowest spread. Those two figures are then added together and divided by two to get an average.

A tree receives $\frac{1}{4}$ (.25) of a point for every foot of the average crown spread. Follow these steps to measure crown spread: (note: For a conifer with branches low to the ground, stand next to, rather than under the branch tip.)

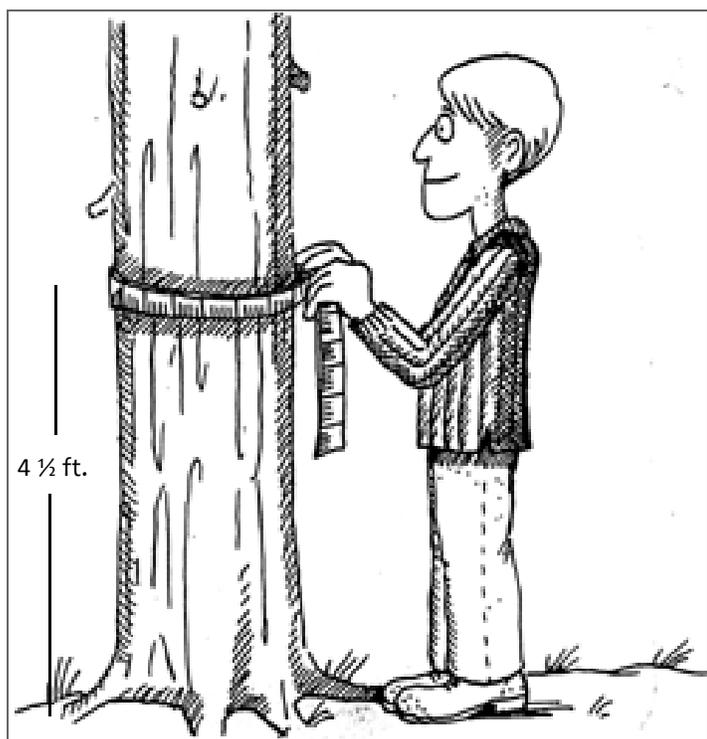
- **Step 1**—The investigator finds the branch that sticks out the farthest from the trunk and stands directly under or just next to its tip.
- **Step 2**—The recorder goes to the opposite side of the tree and stands under or just next to the tip of the branch extending farthest out on that side.
- **Step 3**—The manager measures the distance in feet between the investigator and the recorder. The recorder records this number. The distance is the widest point of the crown spread.
- **Step 4**—Next the investigator finds the branch nearest the trunk of the tree and stands directly under or just next to its tip.
- **Step 5**—The recorder goes to the opposite side of the tree and stands under or just next to the tip of the branch closest to the trunk on that side.
- **Step 6**—The manager measures the distance in feet between the investigator and the recorder. The recorder records this number. This distance is the narrowest point of the crown spread.
- **Step 7**—The recorder adds the two distances together and divides by two to get an average crown spread. The recorder then awards the tree $\frac{1}{4}$ of a point for every foot of average crown spread or the students may divide the average crown spread by 4.



Circumference

The circumference of a tree is the distance around its trunk. The circumference is measured 4 ½ feet from the ground. If the tree forks or if there are branches at the 4 ½ mark, the circumference is measured at the narrowest point below the 4 ½ foot level. Follow these steps to measure circumference:

- **Step 1**—The investigator holds one end of the tape against the tree trunk at a measured point 4 ½ feet above the ground.
- **Step 2**—The manager wraps the tape around the trunk until it reaches the starting point.
- **Step 3**—The investigator reads off the measurement in inches. This is the circumference of the tree.
- **Step 4**—The recorder writes down the circumference and gives the tree one point for every inch of distance around the trunk.



Measuring Up a Winner

Before starting the “Tree-mendous Tree” contest:

- Review conifer and broadleaf distinctions.
- Make sure students understand how to correctly measure a tree.
- Inform the community of the project so people will not be surprised to see the kids in their yards.
- Ask for parental volunteers to accompany the students.
- Have students create a form for the student recorders

to use in their record keeping. The form should include the formula for measuring tree size and room for students to describe the location of the tree. If measuring trees in neighborhood yards, the house address can be recorded. If measuring trees in parks, a brief description of each tree’s location along with some distinguishing characteristics of each tree works well. In all cases, students should differentiate whether the tree is a conifer or broadleaf.

- Ensure safety—make sure students recognize poison ivy.

When you are ready to begin, give each group a recording sheet and the Measuring a Champ Guidelines form. This handout will help students, but you will still need to introduce and support them in the measurement process. Make sure they have something firm to write on and pencils to record their results. Check with each group manager to see that they have a tape measure and yard stick.

Establish an organized system for groups to explore the designated area or community. When students return to the classroom, have each group reporter report their findings to the class and compile results.

Have students put together a list of the community’s biggest trees. Interested students may wish to do research to learn more about winning tree species and share their results with the class.

After determining the “Tree-mendous Trees” contest winner(s), your class may wish to present an award certificate to the owner of the tree if it is on private property. Or, make a presentation to the mayor or city council if the tree is on public property. Announce the tree winners on Arbor Day. Include a visit to the winning tree(s) as part of your school’s Arbor Day celebration.

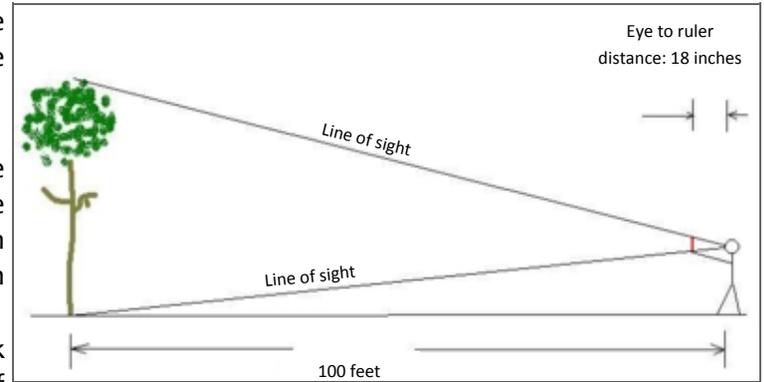


Authentic Assessment: Demonstration of proficiency in tree measurement skills.

MEASURING UP A CHAMP GUIDELINES

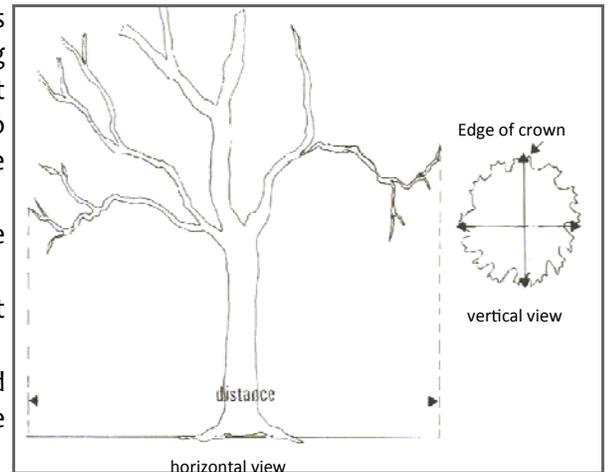
Height: The height of a tree is measured from the top of the tree to the ground. Follow these steps to measure tree height:

1. Team, stand on level ground to take measurements.
2. Investigator, extend your arm out straight so that the top of your fist is at eye level. Manager, make sure the top of the investigator's fist is at eye level and then measure the eye-to-fist distance. Recorder, write down that measurement.
3. Investigator, directly face the tree holding the yardstick vertically in your fist so that the distance from the top of your fist to the top of the yardstick is the same eye-to-fist distance measured in the previous step. Team members, help make sure the investigator's arm is straight out, at eye level with the yardstick straight up and down.
4. Investigator, walk slowly and carefully backwards away from the tree until you can see the base of the tree by looking over the top of your fist and the very top of the tree by looking over the top of the yardstick.
5. Manager, measure the distance, in feet, from the investigator to the tree. This distance is the height of the tree. Recorder, write down the height measurement. Give the tree one point for every foot of height.



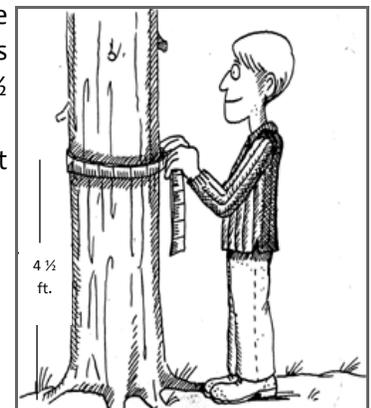
Crown Spread: The crown spread of a tree is the distance its branches spread away from its trunk. The crown spread is calculated by measuring the distance of the widest spread and the distance of the narrowest spread. These two figures are then added together and divided by two to get an average. A tree receives $\frac{1}{4}$ of a point for every foot of the average crown spread. Follow these steps to measure crown spread:

1. Investigator, find the branch that sticks out the farthest from the trunk and stand directly under or just next to its tip.
2. Recorder, go to the opposite side of the tree and stand under or just next to the tip of the branch extending farthest out on that side.
3. Manager, measure the distance in feet between the investigator and the recorder. Recorder, write down this number. This distance is the widest point of the crown spread.
4. Next, Investigator, find the branch nearest the trunk of the tree and stand directly under or just next to its tip.
5. Recorder, go to the opposite side of the tree and stand under or just next to the tip closest to the trunk on that side.
6. Manager, with tape measure, measure the distance in feet between the investigator and the recorder. Recorder, write down this number. This distance is the narrowest point of the crown spread. Recorder, add the two distances together and divide by two to get an average crown spread. Then award the tree $\frac{1}{4}$ of a point for every foot of average crown spread.



Circumference: The circumference of a tree is the distance around its trunk. The circumference is measured 4 $\frac{1}{2}$ feet from the ground. If the tree forks or if there are branches at the 4 $\frac{1}{2}$ foot mark, the circumference is measured at the narrowest point below the 4 $\frac{1}{2}$ foot level. Follow these steps to measure circumference:

1. Investigator, hold one end of the tape against the tree trunk at a measured point 4 $\frac{1}{2}$ feet above the ground.
2. Manager, wrap the tape around the trunk until it reaches the starting point.
3. Investigator, read off the measurement in inches. This is the circumference of the tree.
4. Recorder, write down the circumference and give the tree one point for every inch.



TOTALS: Height _____ Crown Spread _____ Circumference _____

Step

2

Create a Poster

Tree are Terrific ... In Cities and Towns!

Objectives:

⇒ Students will create a poster that reflects their understanding of a healthy diverse forest.

Deadline:

⇒ Make certain that your school winner meets the entry deadline as stated in the enclosed cover letter or contact your state coordinator listed on page 19.

Time Recommended:

⇒ A minimum of one class period is recommended.

Materials needed:

⇒ Paper no smaller than 8 ½" x 11" and no larger than 14" x 18"

⇒ Markers, crayons, colored pencils, paint pens, watercolor, ink, acrylic, and/or tempera paint.

National Art Education Achievement Standards:

⇒ Students generalize about the effects of visual structures and functions and reflect upon these effects in their own work.

⇒ Students employ organizational structures and analyze what makes them effective or not effective in the communication of their ideas.

⇒ Students select and use the qualities of structures and functions of art to improve communication of their ideas.

⇒ Students integrate visual, spatial, and temporal concepts with content to communicate intended meaning in their artworks.

Instructional Sequence:

Ask each student to create a poster that reflects his or her understanding how the oaks have affected the development of the United States. Before they create their poster, encourage students to think about the many reasons the oak is our national tree.

Students should make sure their poster follows the contest rules by using the checklist on page 16. You may select the winner or have a judging panel for the classroom and school contest. Judges could include other students, garden club members, nursery personnel, arborists, the city forester, teachers, PTA members, or individuals with an interest in trees who are willing to volunteer some time.

Poster Contest State Prizes

First Place

- ❖ \$100 cash prize
- ❖ Certificate of Achievement
- ❖ Special recognition and poster distributed across the state
- ❖ Poster featured in the annual South Dakota Arbor Day Poster Contest Calendar
- ❖ Winning student's teacher gets \$100 for supplies for the classroom

Second Place

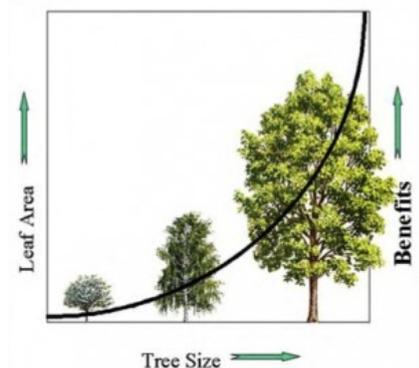
- ❖ \$75 cash prize
- ❖ Certificate of Achievement
- ❖ Poster featured in the annual South Dakota Arbor Day Poster Contest Calendar

Third Place

- ❖ \$50 cash prize
- ❖ Certificate of Achievement
- ❖ Poster featured in the annual South Dakota Arbor Day Poster Contest Calendar

Fourth—Twelfth Places

- ❖ Certificates of Achievement
- ❖ Posters featured in the annual South Dakota Arbor Day Poster Contest Calendar

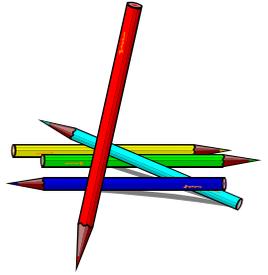


Poster Contest Rules



Use this checklist to make certain all entries are eligible for judging. Entries not meeting these guidelines will be disqualified.

- 1. **Eligibility:** All South Dakota 5th grade students are eligible to enter their schools' poster contests. **Each school may submit only one poster to the State Arbor Day Poster Contest.**
- 2. **Originality:** Posters must be original. Copyrighted cartoon characters, TV figures, and photographs are not acceptable.
- 3. **Medium:** Posters may be drawn in marker, crayon, colored pencil, paint pens, watercolor, ink, acrylic or tempera paint. Bright colors that reproduce well are best.
- 4. **Presentation:** Posters may be on poster paper or drawing paper. The posters will not be accepted for judging if they are matted, framed, or laminated. Posters must be flat and it is preferred that the posters not be folded or rolled.
- 5. **Size:** Posters cannot be smaller than 8½" x 11" and cannot be larger than 11" x 17". Oversized or undersized posters will not be accepted.
- 6. **Theme:** Include the theme, "Trees are Terrific . . . In Cities and Towns!" in the poster design. The theme must be free drawn and spelled correctly. Stencils, computer-generated text, clipart, collages, and press-on letters are not acceptable.
- 7. **Signatures:** Posters must be signed by the student in the lower right-hand corner on the front of the poster with the Student's first and last name.
- 8. **Entry Forms:** Complete one School Report Form (**page 20**) and attach it to the back of the poster.
- 9. **Posters will not be returned because of mailing costs.** If you would like your school's posters back, they will have to be picked up or other arrangements made. Posters will be discarded on June 30, 2013.



Posters Are Due: March 22, 2013



Please Mail Posters To:

Tiffany Arp
Department of Agriculture
523 E. Capitol Avenue
Pierre, SD 57501-3182



School Winner Report Form

After selecting a school winner, copy and complete this form, **attach it to the back of the poster**, and send it to your contest coordinator (Tiffany Arp, Department of Agriculture, 523 E. Capitol Ave., Pierre, SD 57501).

2013 School Winner Report Form

(All information should be complete to expedite contact of winners.)

Winner's Name: _____

Winner's Home Address: _____

City: _____ State: _____ Zip: _____

Winner's Parent or guardian name: _____

Teacher's Name: _____

Teacher's e-mail address: _____

School Name: _____

School Address: _____

City: _____ State: _____ Zip: _____

School Phone: (_____) _____

Important:

Please indicate the number of posters entered or drawn in the school contest in the box to the left.

Number of teachers in school who participated.

*** All artwork becomes the property of contest sponsors.**

Arbor Day Poster Contest

2013

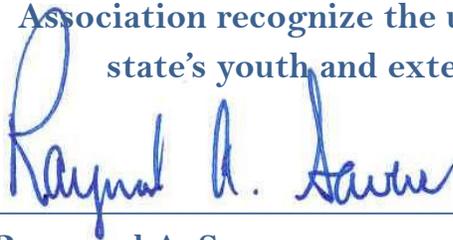
Certificate of Participation

This certifies that

Has successfully presented an understanding of environmental stewardship practices and the importance of trees.

Through artistic expression, the above named individual has communicated a message of hope for the future of our planet.

Let it be known that the South Dakota Department of Agriculture, Division of Resource Conservation and Forestry, along with the Dakota's Chapter of the Society of American Foresters and the South Dakota Arborist Association recognize the unique and creative contribution offered by our state's youth and extends special appreciation for these efforts.



Raymond A. Sowers
State Forester/Division Director

Teacher



Arbor Day Poster Contest

2013

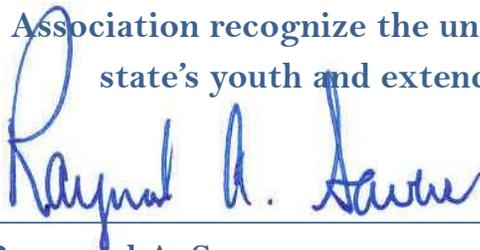
School Winner

This certifies that

Has successfully presented an understanding of environmental stewardship practices and the importance of trees.

Through artistic expression, the above named individual has communicated a message of hope for the future of our planet.

Let it be known that the South Dakota Department of Agriculture, Division of Resource Conservation and Forestry, along with the Dakota's Chapter of the Society of American Foresters and the South Dakota Arborist Association recognize the unique and creative contribution offered by our state's youth and extends special appreciation for these efforts.



Raymond A. Sowers
State Forester/Division Director

Teacher



Step

3

Celebrate Arbor Day

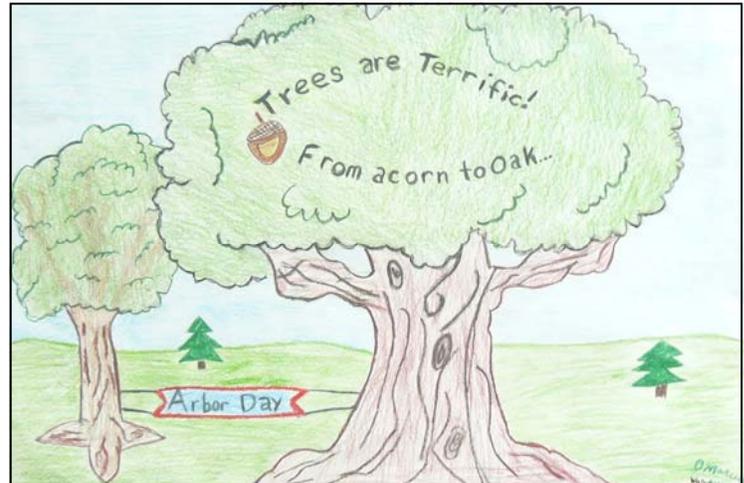
Get your students outside and celebrate Arbor Day!

Since 1872, Arbor Day has been celebrated throughout the United States and Arbor Day celebrations in schools have always played an important role.

An Arbor Day celebration can be:

- **Simple**—Plant a tree in honor of your school poster contest winner or to recognize an outstanding volunteer.
- **Inspiring**—Have your graduating class plant a tree with the younger students. This is a tradition that honors the students leaving and gives new students something to enjoy throughout their years.
- **Entertaining**—Students could compose poems about trees or perform an Arbor Day play (a sample play is available at www.arborday.org/arbordayplay). This could be performed for fellow students, families, or senior citizens.

Whatever you choose for your celebration—go outside and enjoy the trees and environment that surround you!



The 2012 South Dakota Arbor Day Poster Contest winning art by D'Marcus Waterbury who attends Robert Bennis Elementary school in Brandon.

State Tree

Black Hills spruce

(*Picea glauca*)



Black Hills spruce is a naturally occurring variety of white spruce native to South Dakota. It is more compact and slower growing than its eastern cousin, white spruce. Also, its needles are more dense and are darker in color, varying from bright green to bluish green. It was first seen by French explorers in 1743.

Black Hills spruce ranges from 30-60 feet in height and 15-25 feet in width. The tree is fairly drought resistant and prefers full sun exposure. It makes a good yard or ornamental tree and is good winter cover for birds and other wildlife.

Black Hills spruce was adopted as the official State Tree of South Dakota by the State Legislature on March 10, 1947.

