

Step 1

BASIC ACTIVITY

Classroom Activity:

- Discover the Value 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.
- recognize appropriate planting sites for urban trees in their community.

Time Recommended:

- One 60 minute class period

Materials Needed:

- Overhead transparency of page 11 (or one copy per child)
- Copy of worksheets on page 10, 12-14 (one per student)
- Pencil and paper
- Calculator (optional)

National Science Standard Correlation:

Students will develop an understanding of:

- populations and ecosystems
- populations, resources, and environments
- 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

“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

Background Information:

In the early 1900s America was still a very rural nation where people had close ties to nature. Today nearly 80 percent 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.

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

Shade

Windbreak

Erosion control

Absorbs 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

Craft products

Medicines

Mark the changing

seasons

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.

Instructional Sequence:

Anticipatory Set: _____

Put up the overhead (or pass out handouts) of the World with Trees worksheet (page 11). 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/overhead, encourage students to generate a list of the products and contributions made by living trees. A possible list of responses is provided above.

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 page 10 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 value,” “environmental value,” and “social value” on the board. Pass out the Benefits of Trees handout (page 10) and go through the statements again with students, this time incorporating the background information and comments following each statement.

If you have an extra class period, you may wish to have students go online to research other values trees provide to communities.

Step 1

Discover What Trees Do For You and Your Community

BENEFITS OF TREES

Discussion:

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

- **Environmental value** – Does it help the ecosystem/ environment in which people live?
- **Economic value** – Does it provide an opportunity for people or the community to save money by lowered costs or increased value?
- **Social value** – 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 values?

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 Benefits of Trees Information sheet, Community Neighborhood Worksheet and the Value of Your Community Trees Worksheets (pages 10, 12-14).

NOTE: For the activity you may choose to have students work in pairs or on their own.

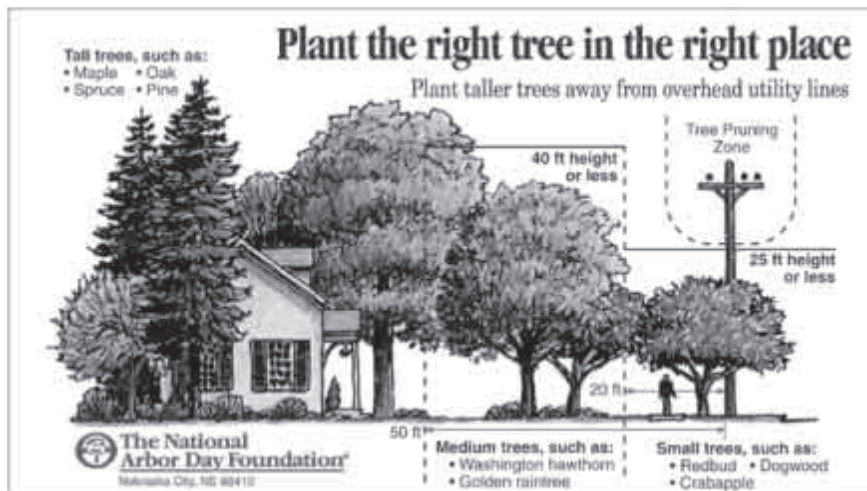
STUDENT DIRECTIONS: Tell students to imagine they each just received ten free trees from The National Arbor Day Foundation and are going to have an opportunity to plant them in a neighborhood that might be similar to the one where they live. Students are to draw in (plant) 10 trees in locations on the 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, #1-10. Then, on the Value of Your Community Trees Worksheets, they should list where they planted each of their trees, and what environmental, economic, or social value 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 Value of Your Community Trees Worksheets.

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 value of holding the soil in place;
- an economic value of saving the city money by



- reduction of storm water runoff;
- and a social value of adding beauty to the area.

Then explain that they should list what value (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 tally 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.

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 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 (10 x \$525). 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 x \$5250) 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 that 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 tallied up the greatest amount of money. The object of the activity is to help students recognize that trees provide value to our lives in many ways...some values are easily measured in terms of dollars and cents...some values (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.

Assessment Rubric: (To be used with the Value of Your Community Worksheets)

Put the rubric on the board at the start of the activity so students clearly understand the measured objectives.

1- 2 Points SEED LEVEL	3-5 points SEEDLING LEVEL	6-8 Points SAPLING LEVEL	9-10 points TREE LEVEL
<ul style="list-style-type: none"> Five trees are drawn into the Community Neighborhood Worksheet. A few planting locations are identified. At least one value (social, environmental, or economic) is correctly identified for each tree drawn in. 	<ul style="list-style-type: none"> More than half of the trees are drawn into the Community Neighborhood Worksheet Over half the planting locations are identified. At least two values (social, environmental, or economic value) are correctly identified for each tree drawn in. 	<ul style="list-style-type: none"> All 10 trees are drawn neatly into the Community Neighborhood Worksheet. Clear descriptions of the selected planting locations are shown. At least one social, environmental, <u>and</u> economic value is correctly identified for each tree drawn in. The tree totals are filled in on the Value of Your Community Trees Worksheet. 	<ul style="list-style-type: none"> All 10 trees are drawn neatly into the Community Neighborhood Worksheet. Clear descriptions of the selected planting locations are shown. Several social, environmental, <u>and</u> economic values are correctly identified for each tree drawn in. The tree totals are filled in on the Value of Your Community Trees Worksheet.

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BENEFITS OF TREES

- 1. Trees properly placed around a home can reduce air conditioning needs by 30% and save 20-30% in energy used for heating. TRUE.** Trees planted on the west and south sides of a home help shade and cool the air around the home during the summer. Trees placed on the north and west sides of a home or building block cold winter winds. As a result of well-placed trees, there is less demand for air conditioning and heating. Less fossil fuels are burned, which is good for the environment...and you save money.
- 2. One acre of trees absorbs six tons of carbon dioxide and puts out four tons of oxygen. This is enough to meet the annual needs of 18 people. TRUE.** Trees remove greenhouse gases, like carbon dioxide, from the air and replenish it with oxygen for us to breathe. Trees also improve air quality by capturing dust and pollution particles from dirty city air that can affect human health. These particles cling to the leaves rather than float in the air. When it rains, the dust and particles are washed to the ground.
- 3. Healthy, mature trees add an average of 10 – 15 percent to a property’s value. TRUE.** For example, a \$100,000 home or apartment building might sell for \$110,000 (\$10,000 more!) if it has trees around it. Tree planting is one of the best investments a person can make in their home.
- 4. Compared with apartment buildings that had little or no trees or vegetation, buildings with high levels of greenery had 52% fewer total crimes, including 48% fewer property crimes and 56% fewer violent crimes. Even a small amount of greenery was associated with lower crime rates. TRUE.** Studies have shown living in an area with trees reduces the stresses that can be associated with living in a big city. Less stress can ease tensions that sometimes lead to violence.
- 5. One shade tree can intercept 760-4,000 gallons of rainfall in its crown (leafy top) annually, depending on species. This reduces runoff of polluted storm water and can affect the size of drainpipes and retention ponds needed in new developments saving money for the community. TRUE.** The canopy of a tree softens and slows the impact of raindrops and absorbs water, reducing the amount of water that hits the streets or sidewalks and runs immediately to a storm water drainage system. Large water management systems are expensive. Trees help control runoff, which also improves water quality, protects the soil, and saves money.
- 6. 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.** It is hard to measure the impact a beautiful tree or natural setting can have.
- 7. Living in a home surrounded by woods, meadows, or other natural settings can increase the attention capacities of children and generally improve their mental health. TRUE.** Even small efforts to improve green space – such as preserving existing trees or planting new ones and maintaining grassy areas – are likely to influence the welfare of children.
- 8. The more trees and grass in the common spaces of inner-city neighborhoods, the more those spaces are used by residents. TRUE.** Social scientists have found that this adds up to more social activities - such as visiting, more knowledge about the neighbors, stronger feelings of belonging, and the kind of positive social ties that are the very fabric of a healthy neighborhood.
- 9. The net cooling effect of a young, healthy 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 and parking lots, are sometimes referred to as “heat islands” that are 5-9 degrees hotter than surrounding area. Planting trees in these areas helps lessen the heat island effect – which saves both energy and money.
- 10. Nationally, the 60+ million street trees have an average value of \$525 per tree each year. TRUE.** Think of all the things a tree does for the environment. One survey estimated the value of community trees at \$1,700 per tree.

A World With Trees Worksheet

A World Without Trees

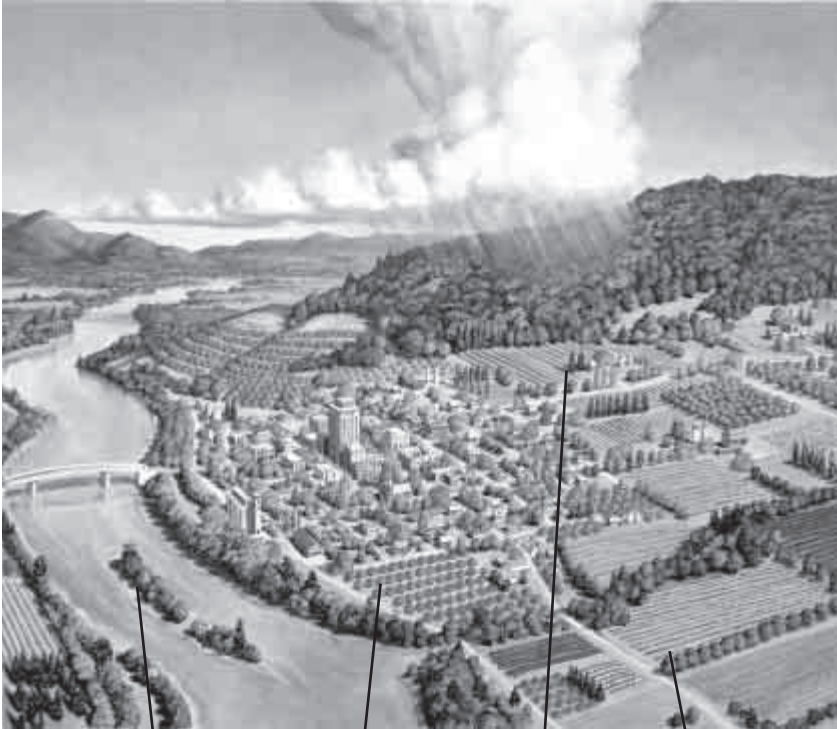


Silty, flood-prone rivers

Sun baked cities

Rapid runoff

Gullied farmland



Natural streams

Shaded homes and streets

Forested slopes

Productive farmland

A World With Trees

Estimate the Value of Your Community Trees

DIRECTIONS: You have been given 10 trees to plant in your community. On the *Community Neighborhood Worksheet* you should plant (draw in) 10 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 value each tree might provide in the location you selected.



Tree 1 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 2 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 3 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 4 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 5 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____

Estimate the Value of Your Community Trees (cont.)



Tree 6 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 7 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 8 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 9 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____



Tree 10 Planting Location _____
Environmental Value _____
Economic Value _____
Social Value _____
Which of the above values was most important to you when planting this particular tree? _____

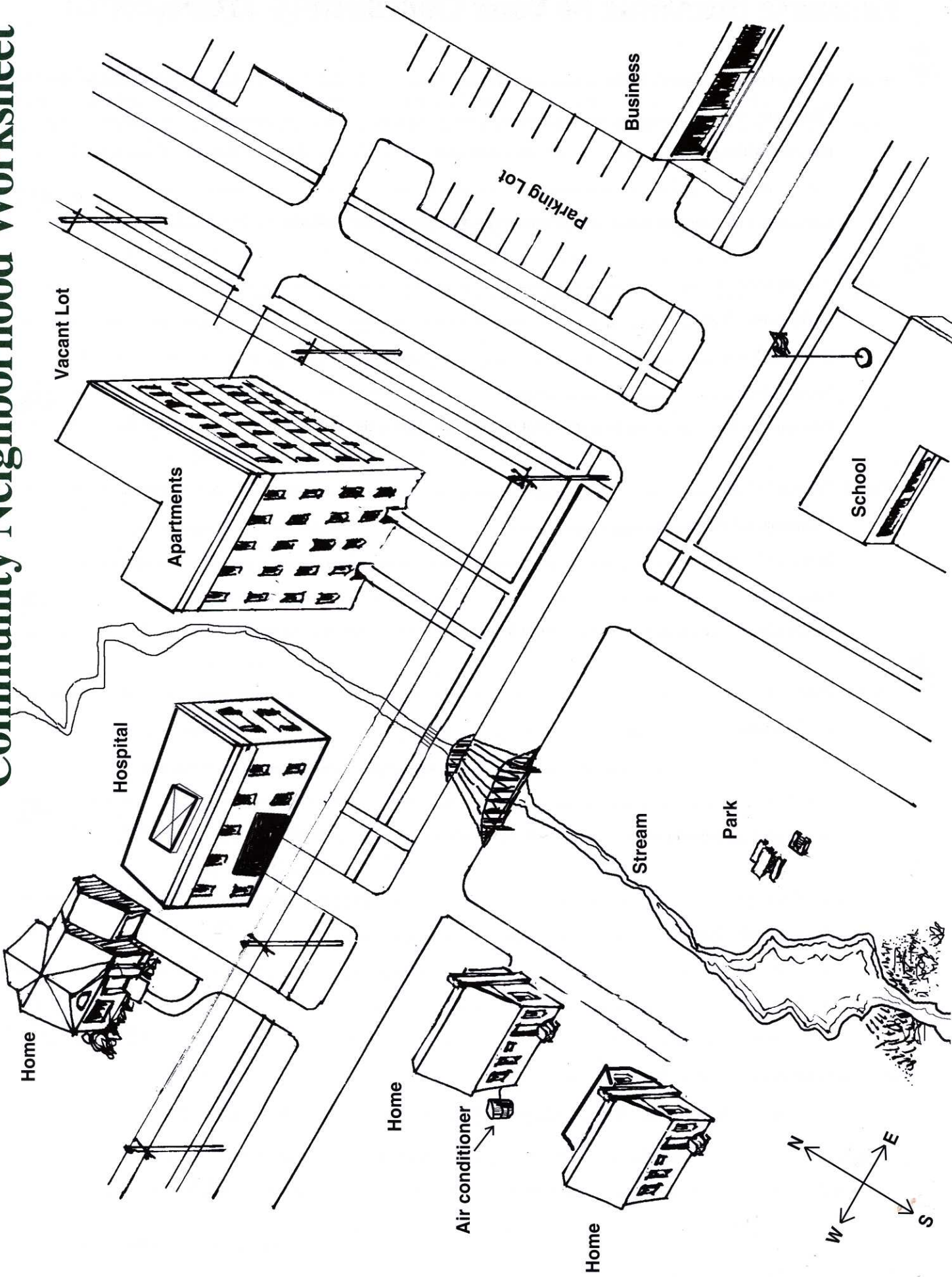
Totals: How many trees did you plant in these locations?

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

_____ by the apartment # _____ by the business district # _____ in the vacant lot # _____ shading a parking lot

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

Community Neighborhood Worksheet



Vacant Lot

Apartments

Hospital

Home

Home

Air conditioner

Home

Business

Parking Lot

School

Stream

Park

