



Tree Diversity Activity



A Classroom Activity from The National Arbor Day Foundation



You and your class may have participated recently in the Vote for America's National Tree, an historic opportunity for the people of the United States to choose a national symbol.

While the national tree should represent the history and diversity of our country, the tree that may come to represent our nation may not be the best trees to plant in your backyard or at your school. Selecting the right tree for the right place is an important part of ensuring a tree's survival for years to come.

In this activity you will have an opportunity to design a community forest and discover the importance of tree diversity.

Step 1

Discover the importance of tree diversity in a community

BASIC ACTIVITY

Design a healthy, diverse community forest

Classroom Activity:

- Using available worksheets, students will design a diverse community forest landscape plan.

Objective:

- Students will apply knowledge of specific trees' growth characteristics, landscape functions, and site requirements as they design a diverse community forest landscape plan.

Time Recommended:

- One 50-60 minute class period.

Materials Needed:

- Copies of worksheets provided
- Scissors
- Glue or glue sticks
- Ruler

National Science Standard Correlation:

- Design a solution or product in light of the information at hand.

Instructional Sequence:

Assess your students' prior knowledge and awareness of trees by asking how many different types of trees each student sees when coming to school. Record the responses, without comment, on the board. Ask students how they can tell the different trees apart. Responses will vary. Some leading questions to ask could include:

Does the tree have special fruits or seeds?

Does the tree have a unique shape?

Are the leaves broad and flat or needle-like?

Does the tree shed its leaves annually (deciduous)?

What does the bark look like?

Hand out copies of the Tree Information Worksheets to each student. Explain to students that they are going to create a community forest landscape plan by selecting trees to "plant" in designated locations. Knowing how to properly plant a tree is important, but planting the right tree in the right place is essential if you wish to enjoy that tree for decades to come. Explain that in selecting the appropriate tree for a location there are several important things to consider.

Concept #1: Without variation, one disease or insect could destroy all the trees in a community.

Explain that insect pests and disease organisms can affect almost any tree, but usually these are not life threatening. Occasionally, a disease or pest will appear and almost completely destroy a particular tree species.

For instance, the American elm was once the most commonly planted street tree in North America. A fungus called Dutch Elm Disease found its way to the United States and spread across the nation killing millions of elm trees and leaving many cities almost treeless. Planting a variety of trees prevents one disease from destroying all the trees in a community.

Common Tree Shapes



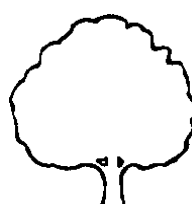
Columnar



Pyramidal



V-Shaped



Round



Oval



Weeping

Ask students to identify a tree species on their worksheet that has problems with pests or disease.
Answer: Lombardy poplar.

Lombardy poplars were once commonly planted because of their unique columnar shape and rapid growth rate. Today, they are affected by a canker that causes trees to die within the first ten years. Because of their disease problems, Lombardy poplars are not recommended for planting.

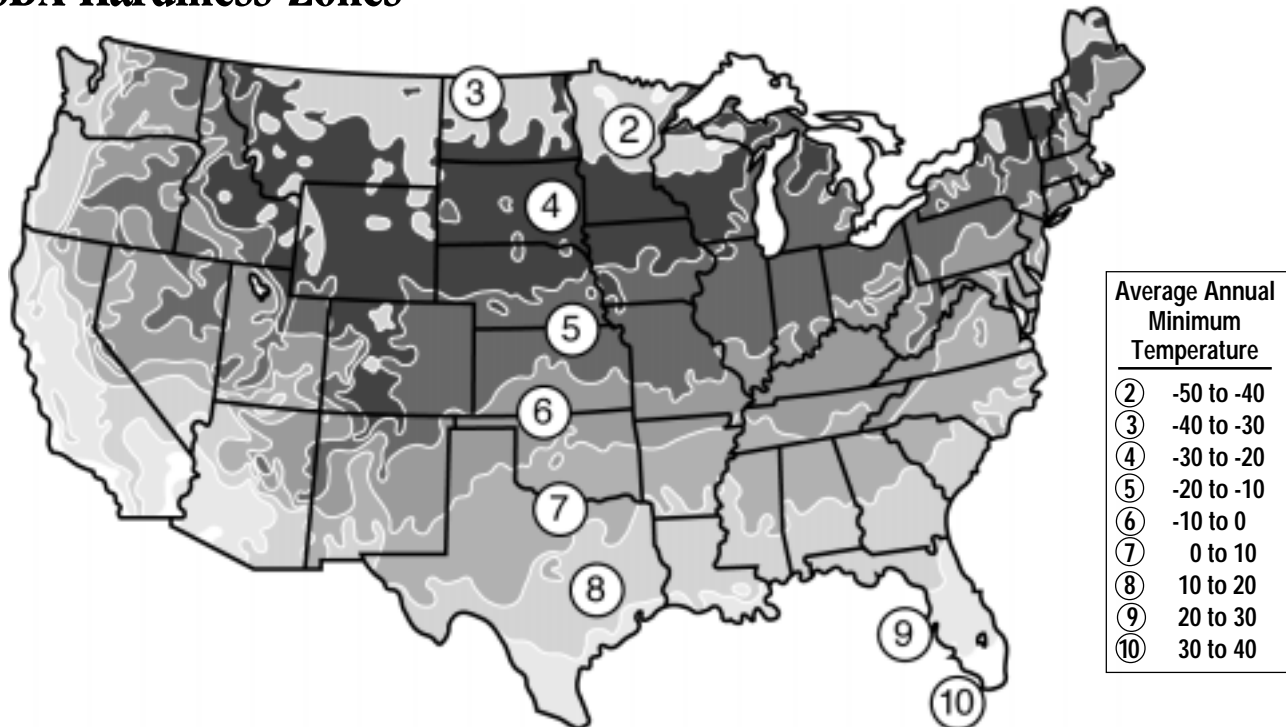
Concept #2: Trees come in different shapes and sizes.

If given enough space to grow, trees have characteristic shapes. Some shapes fit better in a space than others. Because of their v-shape, when hackberries are planted across the street from each other, their crowns form a cathedral-like arch over the street. A tree with a rounded crown will shade your backyard.

Pyramidal-shaped trees with dense persistent leaves provide less shade, but are better at breaking the wind nearer the ground. A pyramidal-shaped tree also takes up more space near the ground. This means less lawn to mow, but also less space to play.

Ask students to look at the "Key to Shapes" on the bottom of their worksheet. Have them identify the shapes of the trees listed.

USDA Hardiness Zones



Size is also important in tree selection. Knowledge of whether a two-foot seedling will grow into a 30' tree with a 20' spread or a 100' tree with a 70' spread is critical in deciding where to plant that seedling. Trees too large for a particular site can quickly crowd a house, block a view, or get tangled in power lines.

Ask students to identify which trees on the worksheet will grow to be the largest?...the smallest?

Concept #3: Some trees are suited to certain locations, temperatures, and soils.

Discuss with students that it is important not only to determine if the tree fits the location, but if the location provides what the tree needs to survive. Do the environmental factors of the location provide conditions that the tree needs to grow.

Ask students to think what some of these environmental conditions could be.

Environmental factors include:

Temperature: The average lowest temperature of the year limits the range of many trees. The USDA has a "hardiness map" with the country zoned into regions based on temperature. Using this map, you can determine if a particular tree will survive the climate where you live. *If time permits, determine what zone your community is in.*

Step 1: Discover the importance of tree diversity in a community- BASIC ACTIVITY

Soil and Moisture: Each tree species can tolerate wet or dry growing conditions to a different degree. Some species do better in sandy soils. Some grow better in rocky or clay-like soils. The soil in parking lots often contains a great deal of salt from winter de-icing. The salt can affect growing conditions for many kinds of trees. Honeylocust is a tree that is very tolerant of many soil conditions, as well as salt.

Light: Another important environmental factor to consider is the amount of light the tree needs to grow. Some tree species, like white birch and most pines, require full sunlight to grow. Other species are more shade tolerant. Do not make the mistake of planting a tree where it is mismatched with its need for light.

Air pollution: Chemicals in the air vary from location to location. Some trees are more tolerant than others of air pollution.

Have students look at the "Key To Ideal Site Conditions" at the bottom of their worksheet.

Ask students to identify a tree that requires full sun... one that is shade tolerant. Select a tree that requires a wet soil to grow... one that is tolerant of many different soil conditions.

Concept #4: A greater diversity of trees means a greater diversity of wildlife.

Trees play an important role in the web of life that exists in a rural or urban forest. They provide food and shelter to a variety of wildlife. Certain tree species can determine the insect, bird, and even some

mammal populations that exist in an area. Without that tree, the dependent organism would not be present.

Proper selection of trees and plants can provide beauty and shade and, at the same time, provide a haven for wildlife. The presence of wildlife can make a backyard or woodlot a special place for your family. As urban and suburban development displaces many birds and animals from their natural habitat, it becomes increasingly important for landowners to provide mini-sanctuaries for wild birds and other wildlife. Some of the basics to consider when planting for wildlife include:

Provide food: a wide variety of trees with high food value is the single best way to increase your wildlife viewing pleasure. Students should be reminded that when planting for wildlife, think about a variety of trees that will offer food for the animal year round.

- Summer Fruit - Cherries, Dogwoods, Plums, Apricots
- Fall and Winter Fruit - Apples, crabapples, Dogwoods, Hackberry, Hawthorn, Mountain ash
- Seeds - Ashes, Birches, Firs, Hemlock, Maples, Spruces, Sweetgum
- Nuts and Acorns - Butternut, Walnut, Chestnut, Hazelnut, Hickory, Oaks, Pecan

Provide cover: Birds and small animals need concealed spaces for nesting and hiding to protect them from the eyes of predators. Planting conifers in groups, growing hedges with low branches, or using prickly or thorny plants in a few areas are all ways to provide wildlife cover.

Using their worksheet, have students identify some of the tree species that are beneficial to wildlife.

Ask students what kinds of wildlife they would like to attract. What are some benefits and disadvantages of attracting wildlife.?

An example could include the fun of bringing many bird species to your backyard versus attracting large numbers of birds to city streets where bird droppings get on parked cars and business signs.



Step 1: Discover the importance of tree diversity in a community- BASIC ACTIVITY



Concept #5: Diversity provides aesthetic value and stimulation.

Trees provide beauty and add value to a landscape. Trees simply make our lives more pleasant. They line our streets, cool our air, trap dust, muffle noise, shield us from wind, shade our parks, screen unattractive sites and bring wildlife to our backyard. Trees provide social benefits. Hospital patients have been shown to recover from surgery more quickly when their room offered a view of trees.

Some tree species have showy spring flowers. Others have spectacular fall color. Certain trees have tasty fruit, while others have fragrant needles or leaves. Planting different kinds of trees enhances the community landscape throughout the year.

Ask students to describe the benefits we receive from trees. Record the responses on the board. If not mentioned by the students, included the benefits listed above.

Have the students once again refer to their worksheet. Have them look at the diversity among the leaf shapes and the fruit produced.

Ask them to identify which trees are broadleaf (deciduous-shedding all leaves annually) and which trees are conifers (cone bearing and usually evergreen). Ask them to describe the leaf shapes on the various trees.

The Activity:

Provide the opportunity for students to apply the information learned by designing a community forest landscape plan.

Pass out the Tree Selection and Community Landscape Plan Worksheets. Using data from the Tree Information Worksheet and recalling the previously discussed concepts, students are to determine what tree to plant in each lettered location. Students cut the selected trees from the Tree Selection Sheet and glue them at the tree planting site they have chosen.

Some trees are suitable for several locations. Some trees, like the Lombardy poplar, should not be planted because of the current problems it has with disease.

When the landscaping projects are complete, ask students to explain their landscaping plans and their reasoning behind their selections. Provide the opportunity for peer review and redesign.

Authentic Assessment:

Ask students to look at tree plantings around the school building. Determine if these trees were good choices for the sites in which they were planted.

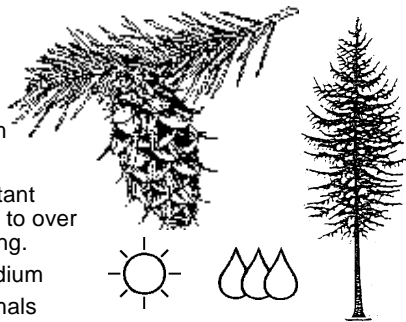
Worksheets to copy:

- Tree Information Sheet - Side A & B
- Tree Selection Sheet
- Community Landscape Plan Worksheet

Tree Information Sheet — Side A

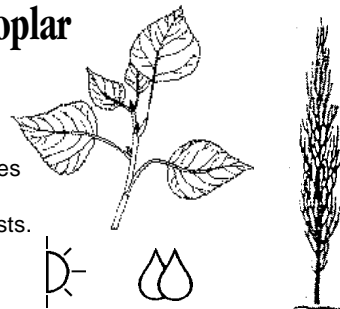
1 Douglasfir

Height: 50 to 100 ft.
 Spread: 20 feet
 Growth Rate: medium
 Fruit: cone
 Comments: an important timber tree; can grow to over 200' in a natural setting.
 Value to Wildlife: medium
 Attracts: birds, mammals



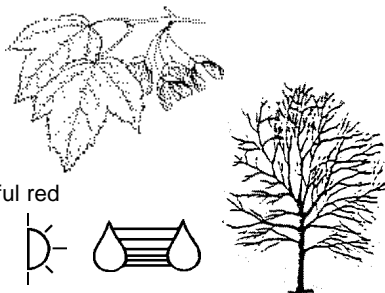
2 Lombardy Poplar

Height: 70 to 90 ft.
 Spread: 10 to 15 ft.
 Growth Rate: fast
 Fruit: no fruit, male clones
 Comments: has serious problems with insect pests.
 Value to Wildlife: low



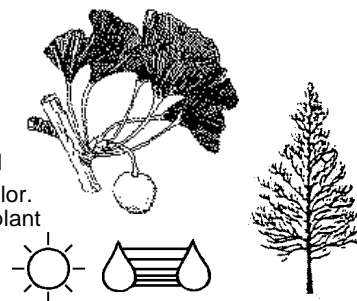
3 Red Maple

Height: 50 to 60 ft.
 Spread: 40 feet
 Growth Rate: medium
 Fruit: winged seed
 Comments: has beautiful red fall color.
 Value to Wildlife: low



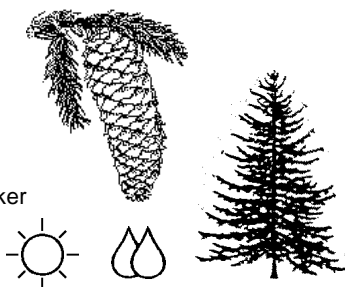
4 Ginkgo

Height: 50 to 80 ft.
 Spread: 30 to 40 ft
 Growth Rate: medium
 Fruit: naked, smelly seed
 Comments: yellow fall color. Because of smelly fruit, plant male trees.
 Value to Wildlife: low



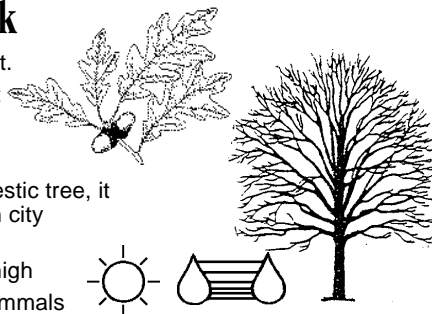
5 Norway Spruce

Height: 60 feet
 Spread: 25 feet
 Growth Rate: medium
 Fruit: cone
 Comments: ideal windbreaker
 Value to Wildlife: low



6 White Oak

Height: 80 to 100 ft.
 Spread: 60 to 80 ft
 Growth Rate: slow
 Fruit: acorn
 Comments: a majestic tree, it does not do well in city conditions.
 Value to Wildlife: high
 Attracts: birds, mammals



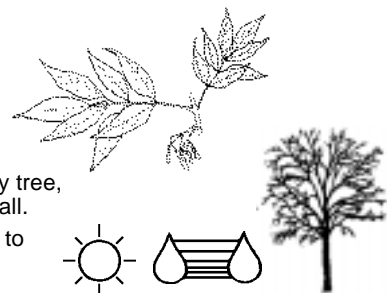
7 Weeping Willow

Height: 30 to 40 ft.
 Spread: 35 feet
 Growth Rate: medium
 Fruit: small capsule
 Comments: graceful tree with ground sweeping branches.
 Value to Wildlife: low

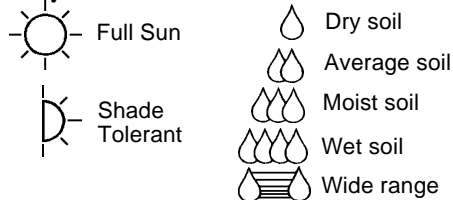


8 Green Ash

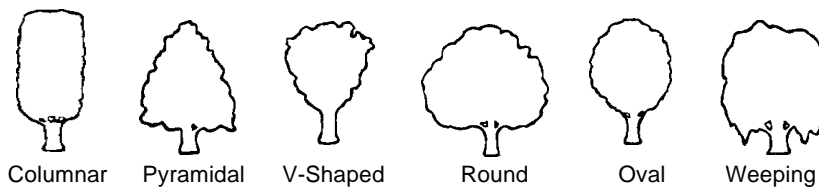
Height: 50 to 60 ft.
 Spread: 25 feet
 Growth Rate: Fast
 Fruit: winged seed
 Comments: very hardy tree, leaves turn yellow in fall.
 Value to Wildlife: Low to medium
 Attracts: birds



Key to Ideal Site Conditions:



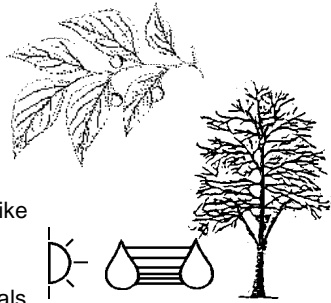
Key to Tree Shapes:



Tree Information Sheet — Side B

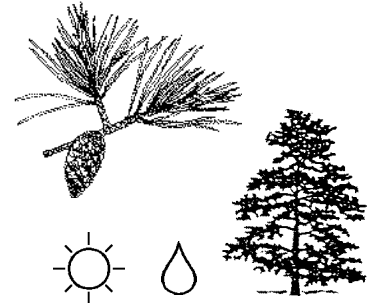
9 Hackberry

Height: 40 to 70 ft.
 Spread: 50 feet
 Growth Rate: fast
 Fruit: hard, berry-like seed
 Comments: grows easily, leaves sometimes get wart-like galls.
 Value to Wildlife: high
 Attracts: birds, small mammals



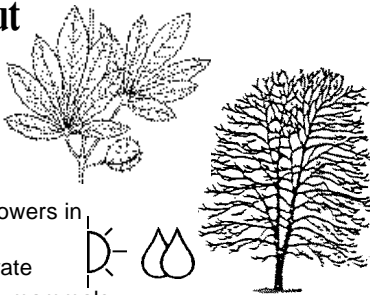
10 Scotch Pine

Height: 60 feet
 Spread: 40 feet
 Growth rate: medium
 Fruit: cone
 Comments: a commonly planted Christmas tree.
 Value to Wildlife: low



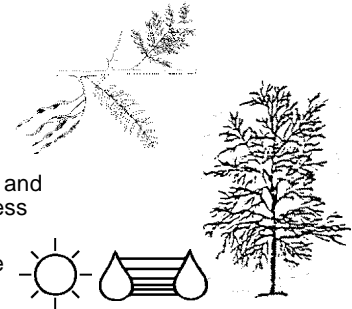
11 Horsechestnut

Height: 50 to 75 ft.
 Spread: 40 to 70 ft.
 Growth Rate: medium
 Fruit: spiny capsules with nuts
 Comments: has white flowers in the spring.
 Value to Wildlife: moderate
 Attracts: small and large mammals



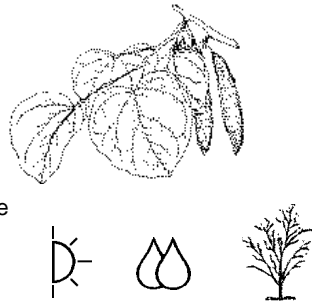
12 Honeylocust

Height: 40 to 70 ft.
 Spread: 50 feet
 Growth Rate: fast
 Fruit: pod
 Comments: tolerant of salt and most soils. Select a thornless variety for planting.
 Value to Wildlife: moderate
 Attracts: large mammals



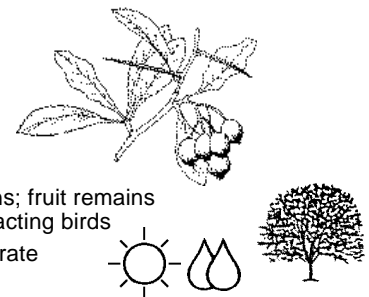
13 Redbud

Height: 20 to 30 ft.
 Spread: 20 to 30 ft.
 Growth Rate: medium
 Fruit: pod
 Comments: has pretty purple blooms in spring.
 Value to Wildlife: low



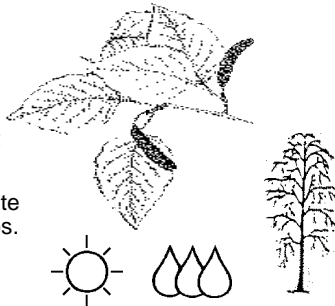
14 Hawthorn

Height: 25 to 30 ft.
 Spread: 25 feet
 Growth Rate: slow
 Fruit: berry
 Comments: sharp thorns; fruit remains on tree into winter, attracting birds
 Value to Wildlife: moderate
 Attracts: birds



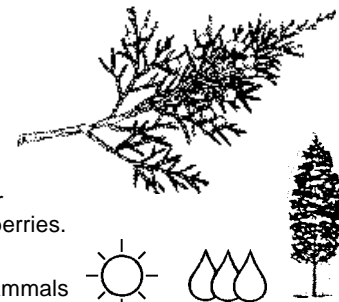
15 White Birch

Height: 40 to 50 ft.
 Spread: 25 feet
 Growth Rate: medium/fast
 Fruit: catkin
 Comments: has lovely white bark; often grown in groups.
 Value to Wildlife: medium
 Attracts: birds

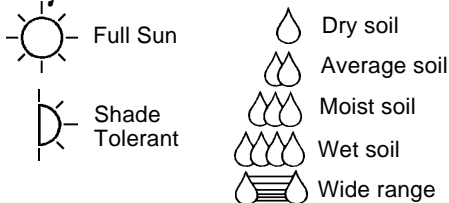


16 Redcedar

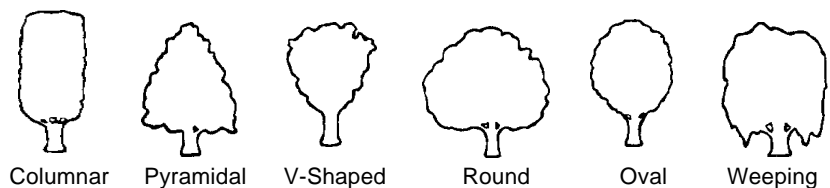
Height: 40 to 50 ft.
 Spread: 20 feet
 Growth Rate: medium
 Fruit: berry-like cone
 Comments: excellent for windbreaks; birds love berries.
 Value to Wildlife: high
 Attracts: birds, small mammals



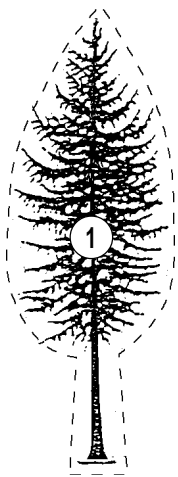
Key to Ideal Site Conditions:



Key to Tree Shapes:



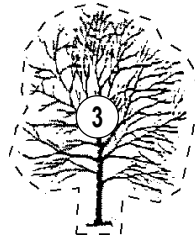
Tree Selection Sheet



1-DOUGLASFIR



2-LOMBARDY
POPLAR



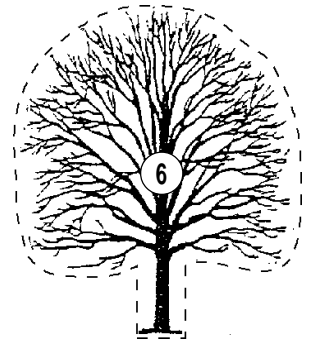
3-RED MAPLE



4-GINKGO



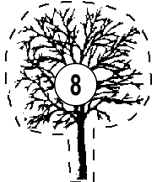
5-NORWAY
SPRUCE



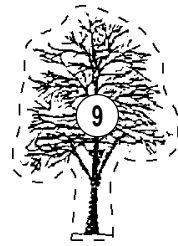
6-WHITE OAK



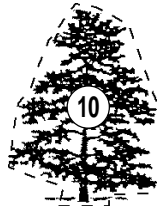
7-WEeping
WILLOW



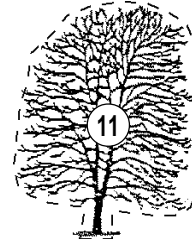
8-GREEN ASH



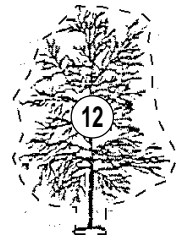
9-HACKBERRY



10-SCOTCH
PINE



11-HORSE-
CHESTNUT



12-HONEY-
LOCUST



13-REDBUD



14-HAWTHORN



15-WHITE BIRCH



16-REDCEDAR



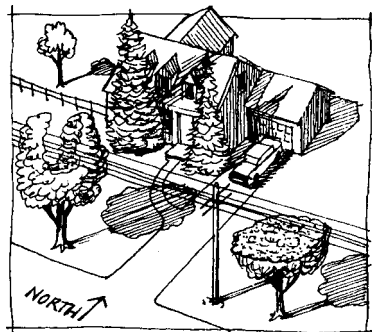
Assignment:

Beautify a community. Using what you have learned as well as data from the Tree Information Sheet, select the best tree to plant in each site on the Community Landscape Plan Worksheet.

- Site A — Needs a medium-sized tree that will grow well in a sunny front yard.
- Site B — Needs a tree that will provide shade and leave room near the ground for kids to play in a backyard.
- Site C — Needs a street-side tree that will fit under a power line.
- Site D — Needs a tree that will be attractive through all seasons.
- Site E — Needs a tree that can tolerate poor soil and salt from winter de-icing in a parking lot.
- Site F — Needs a tree that can help break the wind just west of a farmhouse.
- Site G — Needs a large shade tree under which people can picnic and relax that will also benefit wildlife.
- Site H — Needs a tree that will grow in wet soil near a wetlands area.
- Site I — Needs a medium-sized tree that will grow in a variety of soil conditions.
- Site J — Needs a tree that will attract birds to a narrow space outside a classroom window.

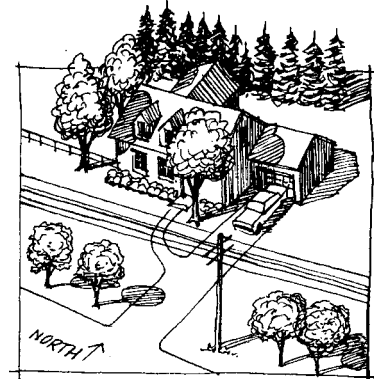
Planting Trees Around Your House

Wrong



Large trees planted under utility lines can interfere with lines. Evergreens planted too close to the house can block warming winter sunlight and restrict views. Also, avoid planting large trees near gardens or chimneys.

Better



Short flowering trees don't clash with overhead lines. Large deciduous trees on the southeast, southwest, and west provide cooling shade in summer and don't obstruct the low winter sun. An evergreen windbreak on the north blocks cold winter winds and provides a home for wildlife.

Community Landscape Plan Worksheet

