



P=Piedmont and C=Coastal plain
 U=upland and L=lowland
 W=wet and D=dry
 S=salt tolerant
 N=no and Y=yes
 X=flowering
 C=good fall color
 T=tolerant

LG. DECIDUOUS TREE	Tree Name	Height (ft)	Width (ft)	Native	Riparian	Soil Moisture	Salt tolerant	Use under power lines	Flowering tree	Fall color	Urban conditions	USDA hardiness zones	Notes	Botanical name
	Red Maple	60	40-60	PC	L	WD	N		C	T	3 to 9		dense, rounded	<i>Acer rubrum</i>
	Sugar Maple	60-75	40-50	P		W	N		C		3 to 7		upright-oval to rounded	<i>Acer saccharum</i>
	River Birch	70	40-60	PC	L	WD	N		C	T	4 to 9		pyramidal	<i>Betula nigra</i>
	European Hornbeam	40-60	30-40			WD	Y		C	T	4 to 8		pyramidal to oval-rounded	<i>Carpinus betulus 'Fastigiata'</i>
	Hackberry	75-100	75-100	PC	UL	W	S	N	C	T	3 to 7		globular	<i>Celtis occidentalis</i>
	Katsura	40-60	20-30			W	N		C		4 to 8		pyramidal	<i>Cercidiphyllum japonicum</i>
	Yellowwood	30-50	40-55		L	W	Y	X	C		4 to 8		globular	<i>Cladrastis kentukea</i>
	Turkish Filbert	40-50	20-25			D	N		C	T	4 to 7		broad pyramidal	<i>Corylus colurna</i>
	American Beech	50-70	50-70	PC			N	X	C		4 to 9		wide-spreading crown	<i>Fagus grandifolia</i>
	White Ash	50-80	50-80	PC	UL	W	S	N	C		4 to 9		irregular ovoid	<i>Fraxinus americana</i>
	Green Ash	60	40-50	PC	UL	WD	S	N	C	T	2 to 9		pyramidal	<i>Fraxinus pennsylvanica</i>
	Maidenhair Tree	50-80	30-40			WD	S	N	C	T	4 to 9		pyramidal (use male only)	<i>Ginkgo biloba</i>
	Honey Locust	30-70	30-70			WD	S	N	C	T	4 to 9		open crown	<i>Gleditsia tricanthos inermis</i>
	Kentucky Coffeetree	60-76	40-50			D	S	N	C	T	3 to 9		narrow obovate crown (males only)	<i>Gymnocladus dioica</i>
	Black Walnut	50-75	50-60	PC	L	WD	N		C	T	4 to 9		irregular	<i>Juglans nigra</i>
	American Sweetgum	60	40	PC	UL		N		C	T	5 to 9		pyramidal	<i>Liquidambar styraciflua</i>
	Tulip Tree	80	30-50	P	U		N	X	C		4 to 9		upright-oval	<i>Liriodendron tulipifera</i>
	Dawn Redwood	70-100	25			W	N		C	T	5 to 8		pyramidal, conical	<i>Metasequoia glyptostroboides</i>
	Black Tupelo	30-50	25-35	PC	L	WD	S	N	C	T	4 to 9		irregular (difficult to transplant)	<i>Nyssa sylvatica</i>
	American Sycamore	75-100	60-80	PC	L	WD	N		T		4 to 9		globular (susceptible to anthracnose)	<i>Platanus occidentalis</i>
	London Plane	70-100		PC	L		S	N	C	T	4 to 9		(not susceptible to anthracnose)	<i>Platanus x acerifolia</i>
	Sargent Cherry	40-50	40-50		UL	WD	S	Y	X	C	4 to 8			<i>Prunus sargentii</i>
	Sawtooth Oak	35-45	35-45		UL	WD	S	N	C	T	5 to 9		oval rounded	<i>Quercus acutissima</i>
	White Oak	75-100	75-100	PC	U	D	S	N	C		4 to 8		wide globular	<i>Quercus alba</i>
	Swamp White Oak	50-60		P	UL	WD	S	N	C	T	4 to 7		rounded	<i>Quercus bicolor</i>
	Scarlet Oak	50-75	50-75	PC	U	D	S	N	C	T	5 to 7		globular	<i>Quercus coccinea</i>
	Shingle Oak	30-45	30-45	P	UL	WD	S	N	C	T	5 to 8		conical	<i>Quercus imbricaria</i>
	Bur Oak	70-80	70-80	PC	UL	WD	N		T		3 to 8		broad crown (difficult to transplant)	<i>Quercus macrocarpa</i>
	Swamp Chestnut Oak	80-100	80-100		L	W	N		C		5 to 8		pyramidal	<i>Quercus michauxii</i>
	Pin Oak	60-70	25-40	PC	UL	WD	S	N	T		4 to 8		pyramidal	<i>Quercus palustris</i>
	Willow Oak	50	40	PC	UL	WD	S	N	C	T	5 to 9		oblong (transplant only in spring)	<i>Quercus phellos</i>
	Chesnut Oak	60-70	60-70	P		WD	N		C	T	4 to 8		pyramidal	<i>Quercus prinus</i>
	Red Oak	60-75	40-50	PC	UL	WD	S	N	C	T	4 to 8			<i>Quercus rubra</i>
	Shumard Oak	40-60	40-60	PC	U	D	N		C	T	5 to 9		pyramidal to spreading	<i>Quercus shumardii</i>
	Japanese Pagodatree	45-70	50		UL	WD	S	N	X	T	4 to 7		broad-rounded	<i>Sophora japonica</i>
	Bald Cypress	75-100	20-30	PC	L	WD	S	N	T		4 to 11			<i>Taxodium distichum</i>
	American Linden	60-80	40-60	P	UL		N		C		3 to 8		ovoid	<i>Tilia americana</i>
	Littleleaf Linden	60-70	40				N	X	C	T	3 to 7		dense-pyramidal (pollution tolerant)	<i>Tilia cordata</i>
	Silver Linden	50-70	30-40				N	X	C	T	4 to 7		upright-oval	<i>Tilia tomentosa</i>
	Chinese (Lace-bark) Elm	40-50	35-45				N		C	T	4 to 9		rounded	<i>Ulmus parvifolia</i>
	Japanese Zelkova	50-80	50-80			WD	N		C	T	4 to 8		vase-shaped	<i>Zelkova serrata</i>

SM/MD, DECIDUOUS	Tree Name	Height (ft)	Width (ft)	Native	Riparian	Soil Moisture	Salt tolerant	Use under power lines	Flowering tree	Fall color	Urban conditions	USDA hardiness zones	Notes	Botanical name	
															PC
	Trident Maple	20-30	30-35					D	Y		C	T	5 to 8	oval-rounded	<i>Acer buergerianum</i>
	Hedge Maple	25-35	25-35				D	S	Y		C	T	4 to 8	rounded and dense	<i>Acer campestre</i>
	Amur Maple	15-25	15-25						Y	X	C	T	3 to 8	rounded	<i>Acer ginnala</i>
	Japanese Maple	15-25	15-25						Y		C	T	5 to 8	broad	<i>Acer palmatum</i>
	Shadbowl	6-20		C	L	W			Y	X	C		3 to 8	shrubs w/ erect stems spreading by suckers	<i>Amelanchier canadensis</i>
	Downy Serviceberry	15-25	10-20	PC	U				Y	X	C		4 to 9	upright-narrow	<i>Amelanchier arborea</i>
	Ironwood	20-30	20-30	PC	L	W			Y		C		3 to 9	flat or round-topped irreg.crown	<i>Carpinus caroliniana</i>
	Eastern Redbud	20-35	20-35	PC	UL	WD			Y	X	C		4 to 9	broad globular	<i>Cercis canadensis</i>
	White Fringetree	25	25	PC	UL				Y	X	C	T	4 to 9	spreading	<i>Chionanthus virginicus</i>
	East. Flowering Dogwood	20-35	20-35	PC	U	D			Y	X	C		5 to 9	broad globular (urban intolerant)	<i>Cornus florida</i>
	Kousa Dogwood	20-30	20-30						Y	X	C	T	5 to 8	vase-shaped	<i>Cornus kousa</i>
	Washington Hawthorn	25	20	P	U				Y	X	C	T	4 to 8	oval-upright	<i>Crataegus phaenopyrum</i>
	Golden-rain Tree	25-35	25-35						Y	X	C	T	5 to 8	rounded	<i>Koeleruteria paniculata</i>
	Amur Maackia	20-30	20-25						Y	X		T	4 to 6	round-headed	<i>Maackia amurensis</i>
	Southern Magnolia	40-80	25-40				N	X				7 to 10	dense-pyramidal	<i>Magnolia grandiflora</i>	
	Saucer Magnolia	20-30	20-30						Y	X	C	T	4 to 9	pyramidal to rounded	<i>Magnolia x soulangiana</i>
	Star Magnolia	10-20	10-15						Y	X			4 to 9	dense-rounded	<i>Magnolia stellata</i>
	Sweetbay Magnolia	20-50	15-30	PC	L	W	S	Y	X	C			5 to 9	pyramidal	<i>Magnolia virginiana</i>
	Crabapple	10-40		PC	U				Y	X		T	4 to 7	select disease resistant cultivars	<i>Malus sp.</i>
	Hophornbeam	35-50	20-35	P	U				Y		C		3 to 8	conical	<i>Ostrya virginiana</i>
	Sourwood	25-30	20	P	U	D			Y	X	C		4 to 9	pyramidal	<i>Oxydendrum arboreum</i>
	Sargent Cherry	25-35	10-15						Y	X	C		4 to 7	upright columnar to narrow vase-shaped	<i>Prunus sargentii 'Columnaris'</i>
	Higan Cherry	20-40	15-30						Y	X			5 to 8	forked trunk with erect twiggy branches	<i>Prunus subhirtella v. autumnalis</i>
	Flowering Cherry	40-50							N	X	C		5 to 8	rounded, spreading	<i>Prunus x yedoensis</i>
	Flowering Pear	30-50	20-35			D			N	X	C	T	5 to 8	avoid 'Bradford'	<i>Pyrus calleryana</i>
	Japanese Stewartia	30-40							N	X	C		5 to 7	pyramidal oval	<i>Stewartia pseudocamellia</i>
	Japanese Snowbell	20-30	20-30						Y	X	C		5 to 8	low-branched, broad crown	<i>Styrax japonicus</i>
	Japanese Tree Lilac	20-30	15-25						Y	X		T	3 to 7	stiff oval to rounded crown	<i>Syringa reticulata</i>
EVERGREEN TREE	Blue Atlas Cedar	40-60	30-40						N				6 to 9	pyramidal	<i>Cedrus atlantica 'Glauca'</i>
	Yoshino Japanese Cedar	40-50	15-20				D		N			T	5 to 9	pyramidal	<i>Cryptomeria japonica 'Yoshino'</i>
	American Holly	15-30	10-20	PC	U				N				5 to 9	pyramidal	<i>Ilex opaca</i>
	Eastern Red Cedar	50-60	25-35	PC	U	D	S	Y			T		3 to 8	broadly conical to columnar	<i>Juniperus virginiana</i>
	Norway Spruce	40-60	25-30						N				3 to 7	pyramidal with pendulous branches	<i>Picea abies</i>
	Serbian Spruce	50-60	20-25						N			T	4 to 7	narrow, pyramidal	<i>Picea omorika</i>
	Colorado Blue Spruce	90-135	20-30						N				3 to 7	pyramidal to columnar	<i>Picea pungens glauca</i>
	Swiss Stone Pine	30-40	15-25						N				3 to 7	columnar pyramid	<i>Pinus cembra</i>
	Limber Pine	30-50	15-35						N				4 to 7	broad pyramid	<i>Pinus flexilis</i>
	Austrian Pine	50-60	20-40				S	N				T	3 to 7	pyramidal	<i>Pinus nigra</i>
	White Pine	70	50						N				3 to 7	pyramidal	<i>Pinus strobus</i>
	Loblolly Pine	60-90	40-60	C	L	W			N				6 to 9	loosely pyramidal	<i>Pinus taeda</i>
	Japanese Black Pine	40-80	20-40				S	N					6 to 8	broad-pyramidal	<i>Pinus thunbergii</i>
	Douglasfir	40-80	12-20						N				4 to 6	open pyramid	<i>Pseudotsuga menziesii</i>
	American Arborvitae	50	8-20						N				3 to 7	columnar	<i>Thuja occidentalis</i>
Giant Arborvitae	50-60	15-20						N			T	5 to 7	broadly columnar	<i>Thuja plicata</i>	
Canadian Hemlock	40-70	25-35	C	L				N				3 to 7	gracefully pyramidal	<i>Tsuga canadensis</i>	

teasing the roots apart or by washing the media away with a hose.

Cut and remove all twine from the tree trunk. Once the ball is in the hole, gently slide the burlap out or cut away as much as possible. Treated or synthetic burlap and tree bags must be removed completely. For trees in wire baskets, cut and remove wire (at least top two circles).

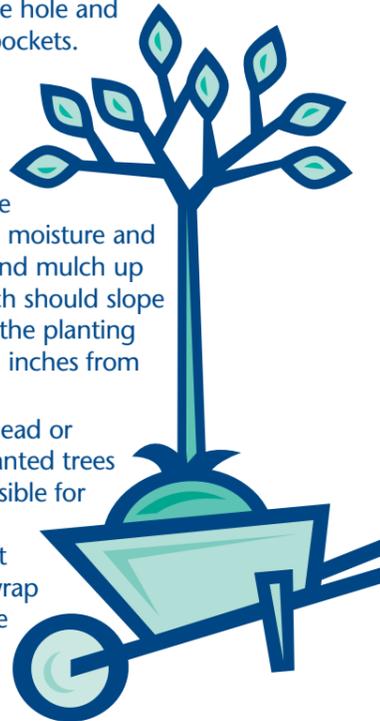
Backfill with the soil you removed from the hole. If the soil is too poor or full of debris, use soil that is as similar as possible to the surrounding soil. Backfill two-thirds of the hole and add water to eliminate air pockets. Continue backfilling and watering until the hole is filled.

Spread a 2- to 3-inch mulch layer around the base of the tree to help conserve moisture and reduce weeds. Do not mound mulch up against the tree trunk. Mulch should slope gradually from the edge of the planting space to the soil line several inches from the trunk.

At planting, prune only dead or injured branches. Newly planted trees need as many leaves as possible for photosynthesis required to provide energy for new root growth. Remove any tree wrap that was used to protect the tree trunk during transit. Once planted, tree wrap only harbors insects and undesirable moisture that may rot tree bark. Don't fertilize trees at planting. Wait until the second year to avoid burning young roots.

Most trees do not need staking. Trees are often planted and forgotten. When no one removes the stakes, staking straps can girdle the tree. If trees are large, top heavy, planted in a very windy area or require protection in a tough urban environment, staking may be necessary. Stake trees properly by hammering two tall stakes or three short stakes into the ground beyond the root ball area. Secure the tree with flexible strapping and allow 1 inch of play in the straps to help the tree develop a strong trunk and root system. Remove the stakes and strapping after 4 to 6 months. (Do not use wire and hose!)

- Plant in the early spring or fall
- Handle balled-and-burlapped trees gently
- Remove artificial media and loosen circling roots on container trees
- Cut and remove all twine
- Remove as much burlap as possible and all synthetic burlap



- Cut the top two rings of wire baskets
- Backfill with soil from the planting hole and settle the soil by watering
- Spread a 2- to 3-inch deep layer of mulch around the tree
- Keep all mulch 2 to 3 inches away from contact with the trunk
- Prune only dead or injured branches
- Remove tree wrap
- Don't fertilize at planting
- Stake only trees that require staking; use flexible straps and allow about 1 inch of movement. (Do not use wire and hose!)

MAINTAINING YOUR TREES

Planting a tree is satisfying, yet too many people forget the next step—long-term care.

WATERING

To ensure the establishment and growth of a new tree, water it correctly during the first year. Water new trees at least once a week to a depth of 1 foot. Water more frequently during dry weather.

- When using a hose, allow the water to trickle out for at least an hour, and move the hose several times during that time. Watering bags are effective tools for applying water slowly.
- If you are watering from a container, apply at least 5 gallons, pouring it slowly over a board or shovel blade to spread the water.
- Keep trees well watered throughout entire establishment period (one year or more) with deep, slow watering

FERTILIZING

Do not apply fertilizer during the first year after planting. Fertilizer may burn tender roots and promote top growth before the root system becomes well established. Fertilize the next year after planting, but first take a soil test to determine how much phosphorous, and potassium are present in the soil. Nitrogen (N), phosphorous (P), and potassium (K) are primary tree growth elements. A bag of fertilizer lists three numbers; for example, 10-8-6. The first number is the percentage of nitrogen; second is the percentage of phosphorous; and the third is the percentage



Large trees (60-100 feet tall)	40-75 feet
Medium trees (30-50 feet tall)	30-50 feet
Small trees (less than 30 feet tall)	20-40 feet

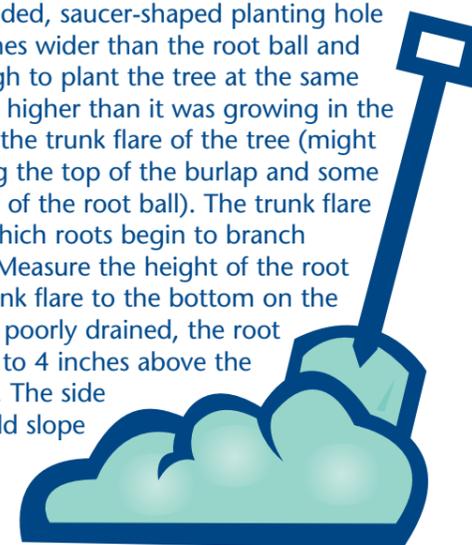
Try planting some trees together in a cluster. The shared root space will improve tree survival and the effect will be more natural. Select trees whose mature size and shape is in the proper scale to fit the site and surrounding buildings.

- Select trees that perform the desired function
- Look for special ornamental attribute (i.e., flower, fruit, bark and fall color)
- Space trees properly as individuals or in natural-looking clusters
- Select trees with the proper scale for the site

SITE PREPARATION

The single most common cause of tree failure in urban environments is compacted soil. Before planting, do whatever you can to loosen the soil, except in the bottom of the planting hole. If you are planting a large bed with several trees, shrubs and groundcovers, work up the soil and mix in organic matter, such as compost. The time and money you spend in proper preparation will result in much greater tree survival and be well worth the effort. If you are planting a single tree, work up the soil in as large an area as possible. Work up a space 2 to 3 times the diameter of the root ball. It is very difficult to modify the soil once the tree is planted. Check the soil pH. If it is too low, add lime to the planting area. If it is too high, add granular sulfur. High pH is often a problem in urban soils. Building materials buried in the soil elevate pH and make essential nutrients such as iron unavailable.

Dig a rough-sided, saucer-shaped planting hole that is 2 to 3 times wider than the root ball and only deep enough to plant the tree at the same depth or slightly higher than it was growing in the nursery. Look at the trunk flare of the tree (might require removing the top of the burlap and some loose soil on top of the root ball). The trunk flare is the point at which roots begin to branch from the trunk. Measure the height of the root ball from the trunk flare to the bottom on the ball. If the site is poorly drained, the root ball should be 2 to 4 inches above the surrounding soil. The side of the hole should slope gradually up to the surrounding grade.



Do not dig a deep hole and backfill because the soil underneath the ball will settle and your tree will be planted too deeply.

- Loosen compacted soil as much as possible
- Test and modify pH if indicated (lime to raise pH and sulfur to lower pH)
- Locate trunk flare to measure depth of root ball
- Dig a hole that is 2 to 3 times wider than the root ball and as deep or shallower than the root ball
- Dig a saucer-shaped hole with rough sides
- Leave the soil undisturbed at the level the root ball will rest

PLANTING PROCESS

The best times to plant trees are the spring and early fall. If you plant early in the fall, the tree becomes settled and will begin root growth immediately. If you wait until spring, plant early enough so tree roots grow into the surrounding soil before the hot, dry summer arrives. However, certain species that produce little root growth in the fall should be planted in the spring. These species include magnolia, tulip poplar, most evergreens, oaks and dogwood.

You can plant in late spring or summer, but you will need to provide extra water for the entire growing season as the tree attempts to support its leaves with a limited root system. Trees take about one year per inch of trunk caliper (trunk diameter at 6 inches above the ground) to become established in a site. A large, 3-inch caliper tree will require three years of extra care before it is established in its new location. Many people care for their trees for the first month after planting, but trees require much longer care to become well established.

Gently place a balled-and-burlapped tree into the planting hole to avoid breaking the root ball, because if the root ball falls apart, many minute root hairs are ripped away and the root cannot adequately absorb water and nutrients. Always handle balled-and-burlapped trees by the root ball—not the tree trunk. A balled-and-burlapped tree has less than 10 percent of its original root system, so you must be careful with what is left!

Container trees are usually planted in lightweight artificial media and are often pot-bound. Since container trees have 100 percent of their original root system, you can damage a few roots without harming the tree. Break up circling roots to promote root growth into the surrounding soil and remove as much of the artificial media as possible, either by