

# Tree Planting Diagrams



## TREE PLANTING DIAGRAMS

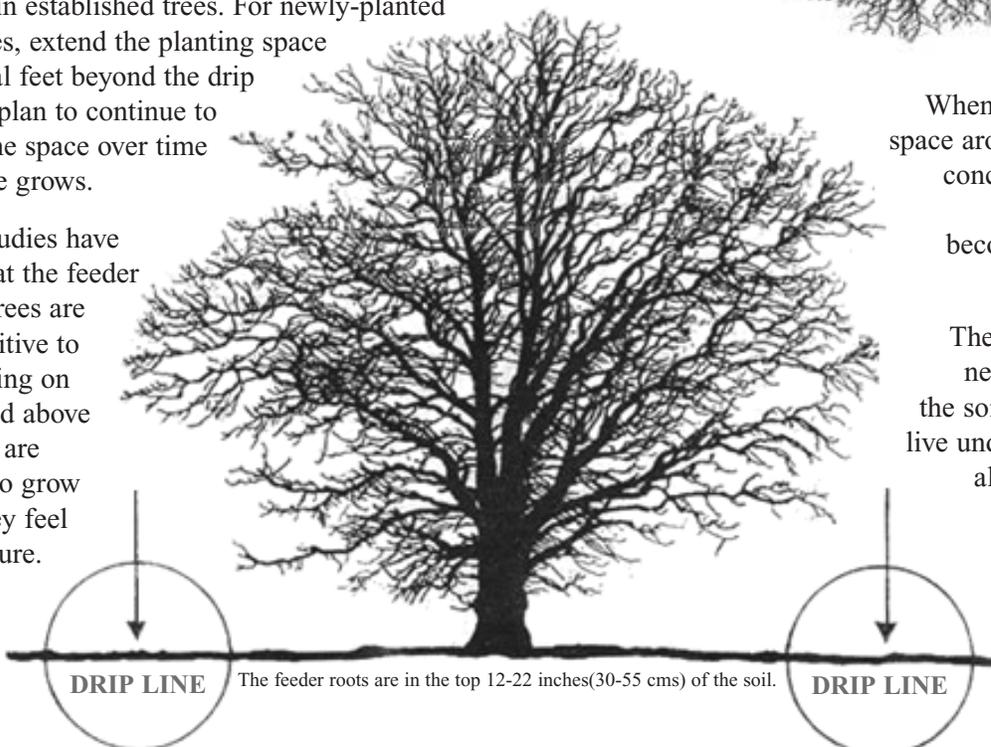
- a. The tree above and below the ground
- b. Root growth and feeding
- c. Preparing the planting site
- d. Planting single trees
- e. Planting groves of trees
- f. Planting on a slope
- g. Stakes and tree guards

### b. Root growth and feeding

The feeder roots of a tree live in the top 12 to 22 inches (30-55 cms) of the soil. The most intensive feeding takes place in the top 12 to 22 inches of soil at the drip line (see diagram below).

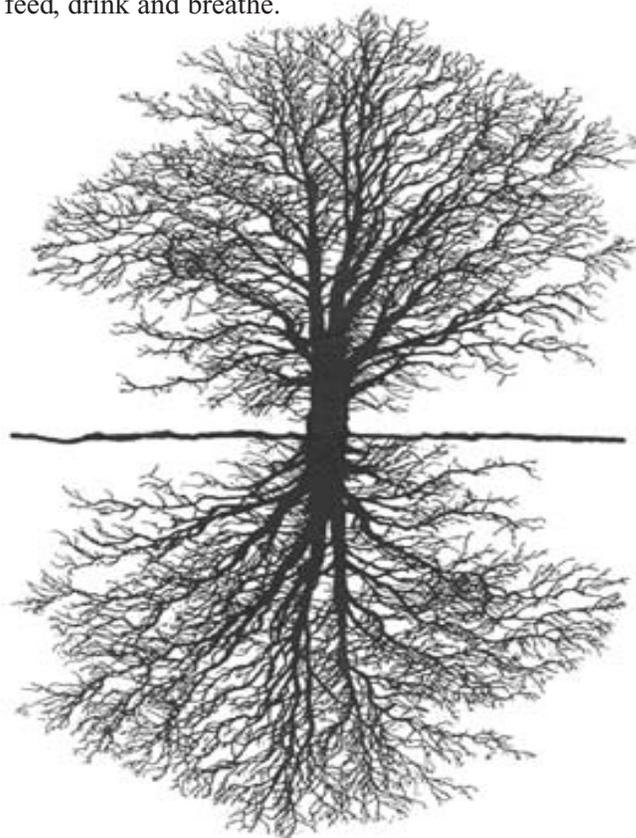
Make sure that the feeder roots of your trees have the best possible home to live in by protecting the soil from compaction and erosion from the trunk of the tree to the drip line in established trees. For newly-planted small trees, extend the planting space for several feet beyond the drip line, and plan to continue to enlarge the space over time as the tree grows.

Recent studies have shown that the feeder roots of trees are very sensitive to feet walking on the ground above them and are unlikely to grow where they feel this pressure.



### a. The tree above and below the ground

Remember when drawing up your tree planting plan that there is at least as much tree under the ground as above it and that the roots spread out beyond the drip line. For healthy tree growth above ground, the underground parts of the tree need enough space to feed, drink and breathe.



When the soil in the growing space around a tree is as hard as concrete or is smothered by non-porous material, it becomes deprived of water, air and nutrients.

The soil organisms that are necessary for maintaining the soil in good health cannot live under paving because they also depend on water, air and food for survival.

### c. Preparing the planting site

#### Step One

As shown in the diagram, remove the sod and break up the ground to a depth of about two feet particularly in compacted soil and where clay or a mixture of clay and shale is encountered.

The sod can be mixed in with the broken up soil or placed upside down on the surface of the broken up area. In heavy, stoney or poor soils it may be necessary to mix the existing soil with about one-third organic matter (compost).

The mounded planting space for a single tree should measure approximately 10 X 10 feet (4m X 4m). This will provide plenty of room for the tree to develop a good root system, and give you space for planting some ground cover.

#### Step Two

Make a mound on top of the broken up area with some indigenous soil mixed with compost. This mixture should be mounded about one foot (30 cms) high in the centre and tapered towards the edges of the planting space.

#### Step Three

Dig a planting hole in the mound and plant the tree. Build up a ring of soil around the edge of the root ball to make a bowl-shaped space for catching water. The ring of soil will need to be attended to every year as it may become flattened out by rain and the weight of snow, and possibly by a few little feet as well.

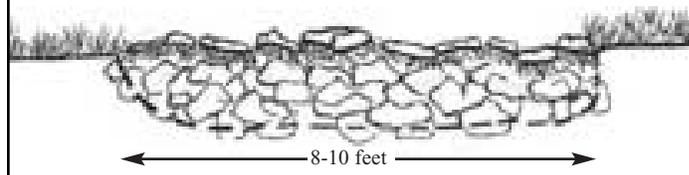
#### Step Four

Cover the entire area with a four-inch layer of mulch, such as wood chips, to help retain moisture in the soil, protect it from trampling, and prevent the soil from being eroded around the roots.

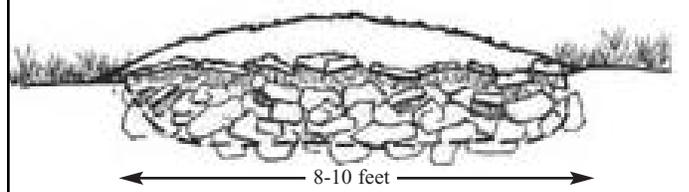
The wood chip mulch will rot on the underside where it touches the soil so it needs to be topped up every year. This is an annual job that should be included in your maintenance schedule.

The planting method shown in the four diagrams below, which we developed especially for the harsh conditions of the typical schoolyard, has been tried and tested in many schools. It will help you avoid the pitfalls associated with planting trees at grade level, and help to ensure the survival of your trees.

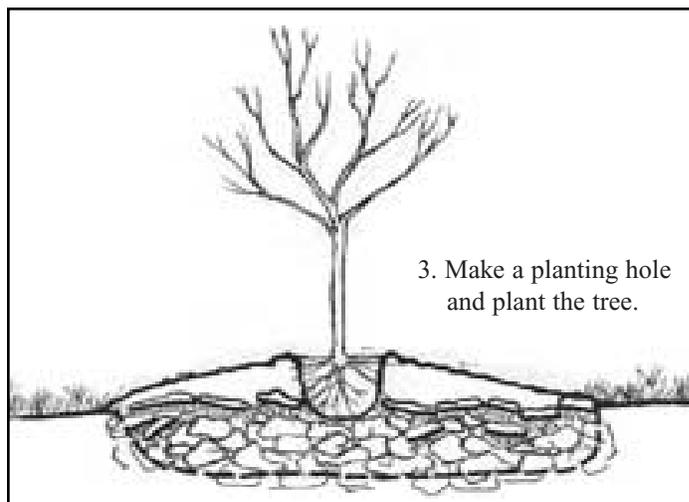
1. Remove the sod and break up the soil.



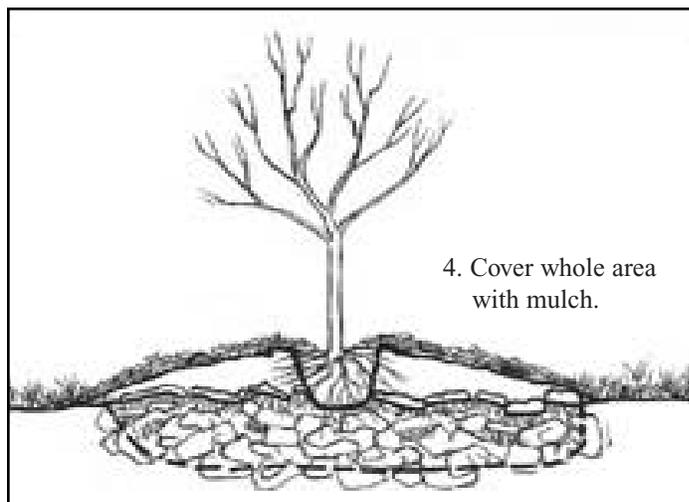
2. Make a mound of indigenous soil and compost.



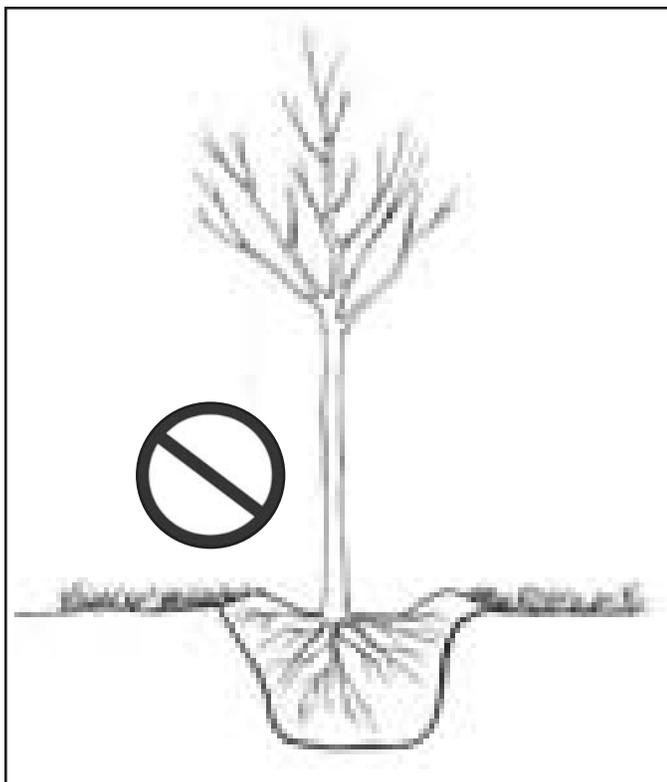
3. Make a planting hole and plant the tree.



4. Cover whole area with mulch.



### d. Planting single trees



The survival rate is very low for single trees planted at grade level in schoolyards, particularly in open areas such as sports fields and in other active or exposed spaces. A school in Ottawa planted 50 deciduous trees along the edge of an active area – two years later only three had survived!

The planting method shown in diagram d. (Planting single trees), is fine for residential front yards or for sheltered spaces on school grounds away from children at play; however, it is not recommended for most schoolyards.

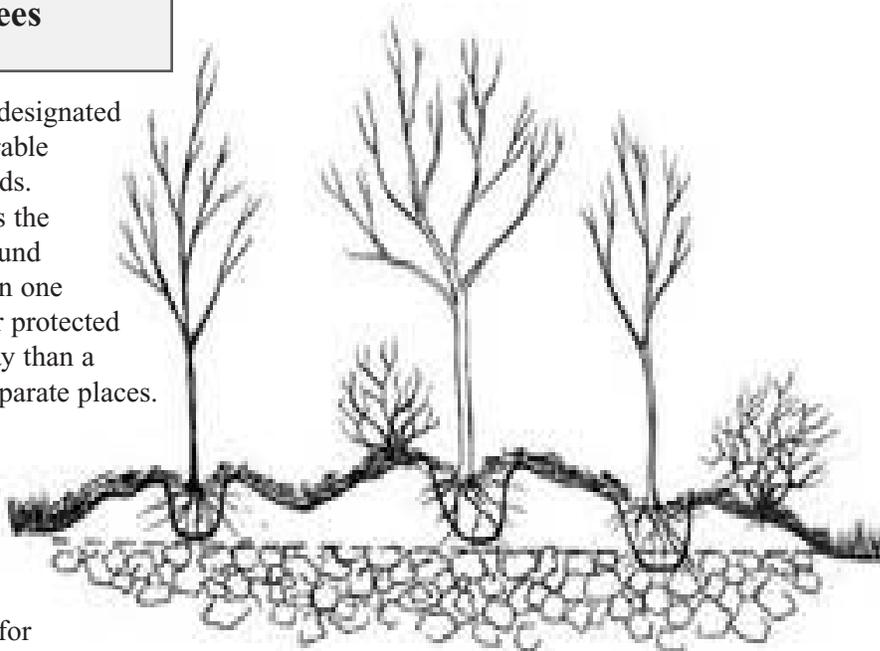
When there is no grade separation to constantly serve as a reminder about the need to protect trees from physical damage, children often lean bicycles against the tree, swing around the stem, and hang bags and jackets on the branches while playing in the yard.

Where trees are planted directly in the grass, mowers attempt to mow as close to the stem as possible, which places the trees at risk from both mechanical injury and soil compaction.

### e. Planting groves of trees

Creating tree spaces or groves of trees as designated quiet areas helps trees survive the unfavorable growing conditions of many school grounds. Planting large groupings of trees improves the general growing conditions in the soil around them. Also, several smaller trees planted in one area are more visible and, therefore, better protected from accidental damage by children at play than a number of small trees planted singly in separate places.

The preparation of the planting site for a grove of trees is very similar to that of planting a single tree in a mound (see previous page), the main difference being that it will be on a much larger scale and with the addition of pathways and spaces for seating between the mounds.



The soil within the entire grove should be broken up and mixed with organic matter before shaping the mound. As shown in the diagram, swales or shallow depressions in the mounds of soil around the trees catch rainwater and help prevent it from running off the mounds before it can soak into the soil. A four-inch (10 cm) layer of mulch, such as wood chips, can be spread over the entire area to help retain moisture in the soil, discourage weeds, and protect the soil from erosion. The mulch can be raked off as new plants such as shrubs, perennials and ground covers are added.

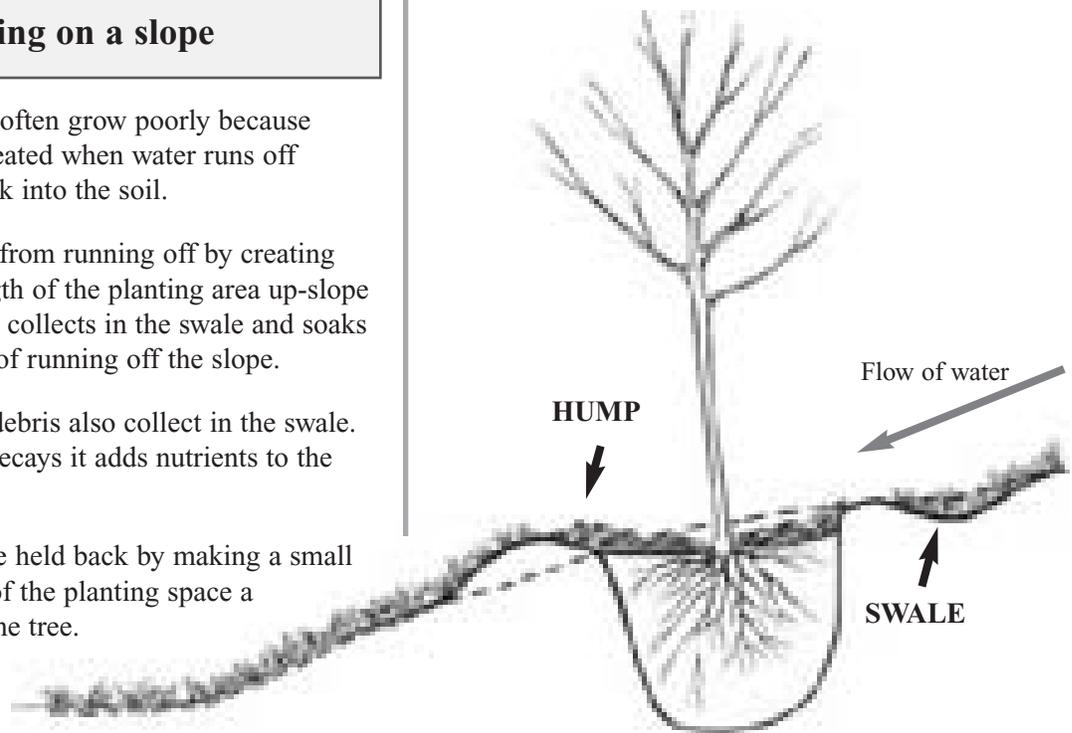
### f. Planting on a slope

Trees planted on slopes often grow poorly because of the dry conditions created when water runs off before it has time to soak into the soil.

Water can be prevented from running off by creating a shallow swale the length of the planting area up-slope from the tree. The water collects in the swale and soaks into the ground instead of running off the slope.

Leaves and other plant debris also collect in the swale. As this organic matter decays it adds nutrients to the soil.

In addition, water can be held back by making a small hump along the length of the planting space a little down-slope from the tree.

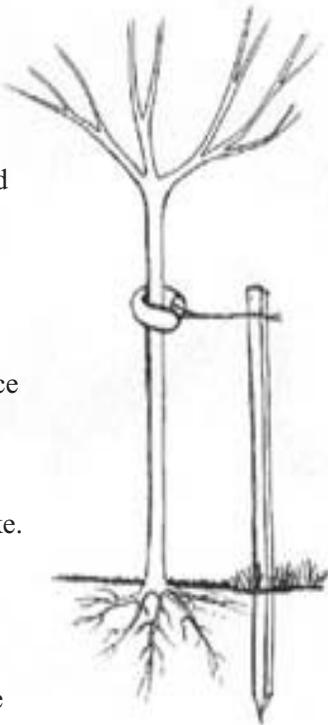


### g. Stakes and tree guards

Stakes should both act as a support and allow for growth. They should permit a certain amount of trunk movement rather than attempting to hold the tree in one position.

For larger trees, with a trunk diameter of 2-3 inches (45-75 mm), use two to three stakes per tree until the roots have become established and can support the tree against strong winds.

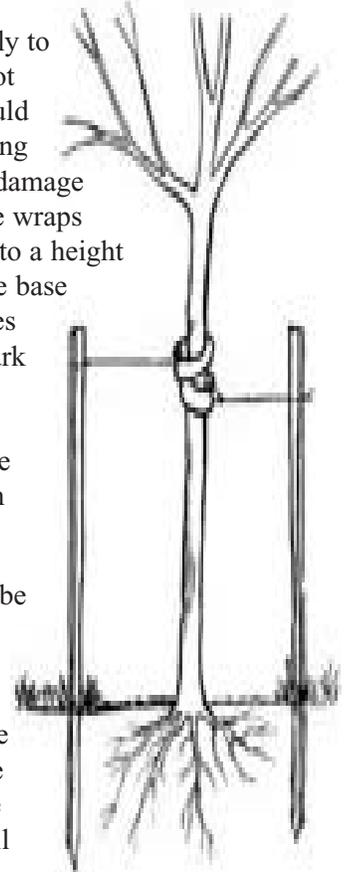
For smaller trees with a trunk diameter of 1-2 inches (25-45 mm), place one stake downwind from the tree so that the prevailing winds blow the tree towards the stake. If the stake is placed on the upwind side of the tree, strong winds blowing the tree in the opposite direction to the stake could snap the tree.



The movement of the trunk by the wind stimulates the root system to form in a way that anchors the tree so that it can grow to withstand the wind. Over-staking the tree so that it can barely move may retard the development of the tree's own self-support system.

Check the stakes periodically to make sure that the tree is not held too tightly. Stakes should be removed after two growing seasons. To prevent rodent damage over the winter months, tree wraps or guards should be placed to a height of about two feet around the base of the stems of younger trees until the thicker, rougher bark has developed. Make sure that the wrap has sufficient air holes to prevent moisture from being trapped between the wrap and the stem.

The wrap or guards should be removed in the spring and replaced in the autumn. As an alternative, you can wrap metal mesh around the base of the tree (about three feet high). The mesh can be left in place year round until the bark has developed.



## PLANTING TREES IN MOUNDS



The four suffering trees indicated by the arrows were planted on sloping ground in small planting holes. They did not have enough space to grow, the soil was poor, and water ran down the slope and flooded the paved schoolyard (as shown by the red arrow) before it had a chance to soak into the ground. Five years later, the trees had barely grown due to these conditions.



The four suffering trees in the two top photos were incorporated into the design of these mounded plantings. They doubled in size in just one season due to improved conditions.



Here three trees were planted at grade level in small holes. One is almost dead, one is dying back, and the other has been removed. The reason? – they were starved of food and water.



Only four years previously, this schoolyard (bottom right) was 100% asphalt. Mounded growing spaces help children remember where places for people end, and where places for plants begin. Trees' roots must have room to grow and feed, otherwise the canopy will not grow. The bottom left photo shows the “suffering trees” (in the top and middle left photos) two years following the planting.