Energy Manufacturers

The main function of leaves is to carry out photosynthesis. Their shape is specialized to capture light energy and transform it into chemical energy. Their thinness minimizes their volume and maximizes their surface area that is exposed to the Sun. However, there are a great many variations on this basic theme, which have evolved in association with different types of weather conditions.

EDGES (MARGINS)
Species are distinguished by a wide variety of edges: smooth, jagged, and wavy.

PRIMARY VEINS
The products of photosynthesis circulate through the veins from the leaves to the rest of the body.

VEINS
Flowering plants (division Angiosperma) are often distinguished by the type of veins they have: parallel veins in monocots and branching veins in dicots.

RACHIS

LEAF STEM (PETIOLE)

***ACER* SP.**
This genus includes trees and bushes easily distinguishable by their opposite and lobed leaves.

LEAF SURFACE
Colorful, usually green, with darker shades on the upper, or adaxial, side. The veins can be readily seen.

Simple Leaves

In most monocotyledon plants the leaf is undivided. In some cases it may have lobes or notches in its side, but these divisions do not reach all the way to the primary vein of the leaf.

Compound Leaves

When the leaf is divided from the primary vein, it forms separate leaflets. A compound leaf is called palmate when the leaflets are arranged like the fingers on a hand and pinnate when they grow from the sides of the leaf stem like the barbs of a feather.

CROSS-SECTION
In general, upon sectioning a leaf, one can observe that it possesses the same tissues as the rest of the body of the plant. The distribution of tissues varies with each species.

CONDUCTING TISSUE
is made of live cells (phloem) and dead cells (xylem).

BASIC TISSUE
is formed by live cells that give structure to the leaf and usually contain some chloroplasts.

EPIDERMAL TISSUE
is composed of live cells. It surrounds all the parts of the leaf and the plant. It produces a substance that forms the cuticle.

1 The stomatic apparatus is closed. No air can enter or leave the leaf. This prevents excessive transpiration, which could damage the plant.

Thickened cell walls in the area of the pore

Cellulose Microfibers

2 The stomatic apparatus is open. The stomatic cells are swollen. As tension increases, the cellular form is modified and is able to exchange gases.

PLANTS AND THE ENVIRONMENT
The flow of carbon dioxide and water vapor between the plant and the environment is essential for the photosynthetic process. This exchange can be affected by internal or external factors, such as changes in light, temperature, or humidity. In response to these stimuli the stomas can open or close.

Change and Its Advantages

Conifers possess an interesting modification in their leaves. In these gymnosperms evolution directed the abrupt reduction of surface foliage area. This gave them an adaptive advantage over plants whose leaves have a large surface area: less resistance to wind and less transpiration in arid climates. In addition, they are able to avoid the excessive weight that would result from the accumulation of snow on large leaves.

VASCULAR BUNDLE
Formed by phloem and xylem

RESIN
functions to prevent freezing. It circulates through the resin ducts.

EPIDERMIS
Cells with thick walls and a thick cuticle

CONIFERS
Needle-shaped leaves are characteristic of conifers. They are usually oval or triangular. A hypodermis, which is enclosed by the epidermis, is broken only in the stomas.

TENDRILS
The leaves of climbing plants, such as the grapevine, have these adaptive modifications.