6 AN ANNUAL RING - x.s. - Stained (76x)

The greatest growth of xylem with the largest cells occurs during the wet spring when conditions are most favorable. During the hot weather of summer the cells do not grow as large. As winter approaches, growth slows down and finally stops entirely. Next spring the cycle starts once again.

This Microslide shows one complete year's growth of xylem (A to B). Which point, (A) or (B), is closer to the cambium?

7 COLEUS BUD - l.s. - Stained (55x)

A stem or branch becomes longer by growing from the bud at its tip. The growing tip moves forward, leaving behind new, young cells that elongate, mature and specialize. This microslide shows a bud from a Coleus stem with two young leaves (V) folded over the growing tip. The point of forward growth is marked by an arrow.

The ZONE OF GROWTH (G) is made up of very small, rapidly dividing cells. As the tip grows forward (arrow) the cells left behind begin to grow as you can see in the ZONE OF ELONGATION (E). How many times larger are the oldest (largest) cells of the elongation zone as compared with the youngest (smallest) cells of the growth zone?

Farther back in the bud (not visible in this Microslide) is the ZONE OF MATURATION where the cells take on special shape and structure in accordance with their specialized functions.

SUMMARY:

From what you have learned so far about how plants grow, can you explain this fact? Both monocot and dicot stems can grow longer, but the adult monocot stem cannot increase in diameter, while the adult woody, dicot stem can.

8 LENTICEL IN ELDERBERRY STEM - x.s. - Stained (55x)

As a tree grows older, the epidermis is replaced by a tough covering of CORK. This outer cork, the cortex, and the phloem taken together make up the BARK. (See the diagram on the preceding page).

In certain spots, rupture of the bark leaves a small horizontal slit called a LENTICEL, which allows air to reach the cortex cells.

One of these is visible at L in Microslide 4. Another is shown enlarged in this Microslide.

Some of the things you see in these Microslides may raise questions in your mind. Perhaps you can find the answers in your textbook. If not, continue your inquiry in the library, in the laboratory, or in discussions with your teacher or your friends.

SET 78

THE STEM OF A FLOWERING PLANT

INTRODUCTION

A flowering plant carries on its life activities with the aid of specialized organs called roots, stems, leaves and reproductive parts. This Microslide set deals with STEMS.

Stems perform five general functions in the life of the plant:

1. Stems support the leaves and expose them to the light.
2. Stems support the reproductive parts of the plant.
3. Stems conduct materials between the roots and the leaves.
4. In some plants (potato, sugar cane, celery), stems serve as storage depots for extra food.
5. In many plants (strawberry, snake-plant, willow), stems reproduce the plant.

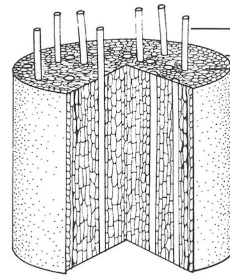
The large class of flowering plants *(Angiosperms)* is subdivided into two classes according to whether the seed has a single leaf *(monocots)* or two seed leaves *(dicots)*. The stems of monocots (Microslide 1 and 2) and dicots (Microslides 3 through 8) show certain basic differences in structure.

The magnification given, for example, Microslide 1 - (8x) means that the microscope was set at that power when the photograph was taken.

1 CORN STEM - x.s. - Stained (8x)

Corn is a typical *monocot* plant. It's stem is characterized by a thin rind, or EPIDERMIS (E), surrounding a mass of loosely packed cells called the PITH (H). Scattered about in the pith are bundles of veins known as FIBROVASCULAR BUNDLES (F).

Of course, the cross section can show only the *cut end* of the veins. Actually, veins are long tubes running the length of the stem. Study the drawing together with Microslides 1 and 2.



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