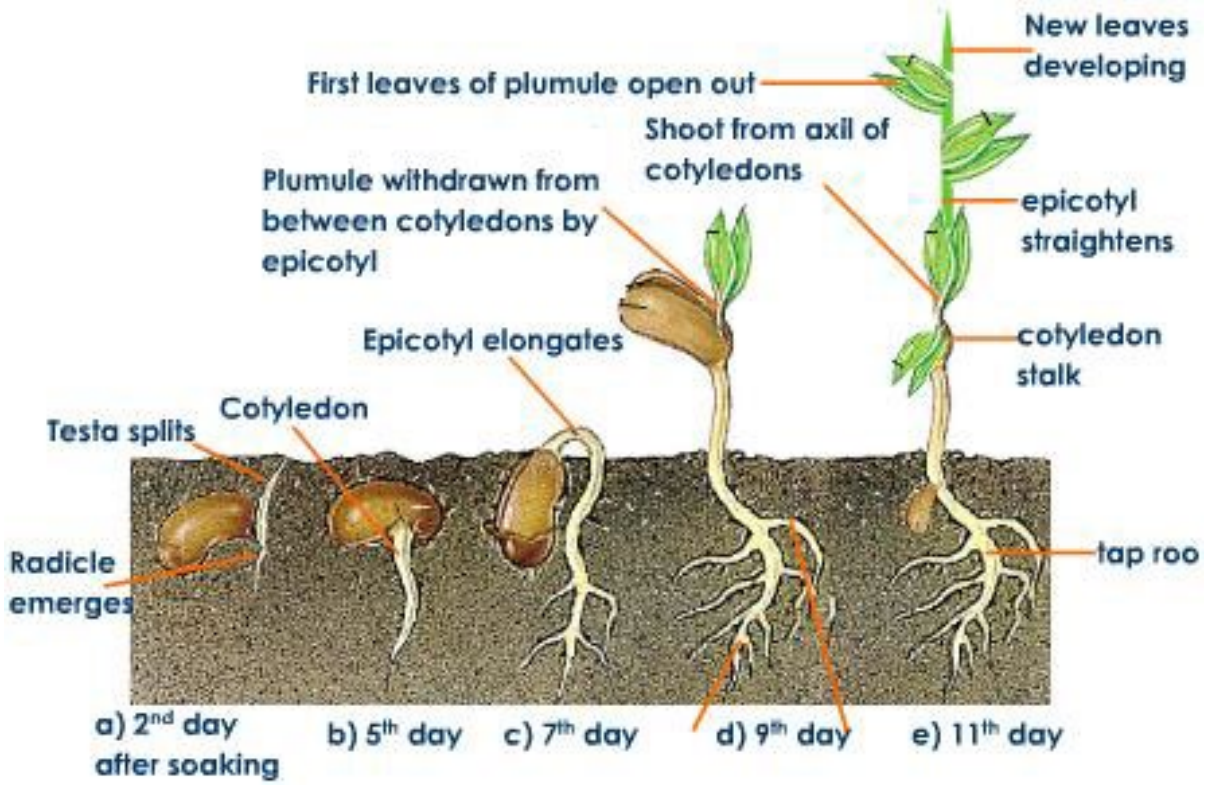
Plant Growth and Development



Key Points:

1. Understand what factors influence the growth of plants.
2. Learn what hormones are responsible for growth and development in plants.
3. Understand the plant shape is not fixed but is a result of the interaction of environmental factors and growth responses.

Control of Plant Growth and Development

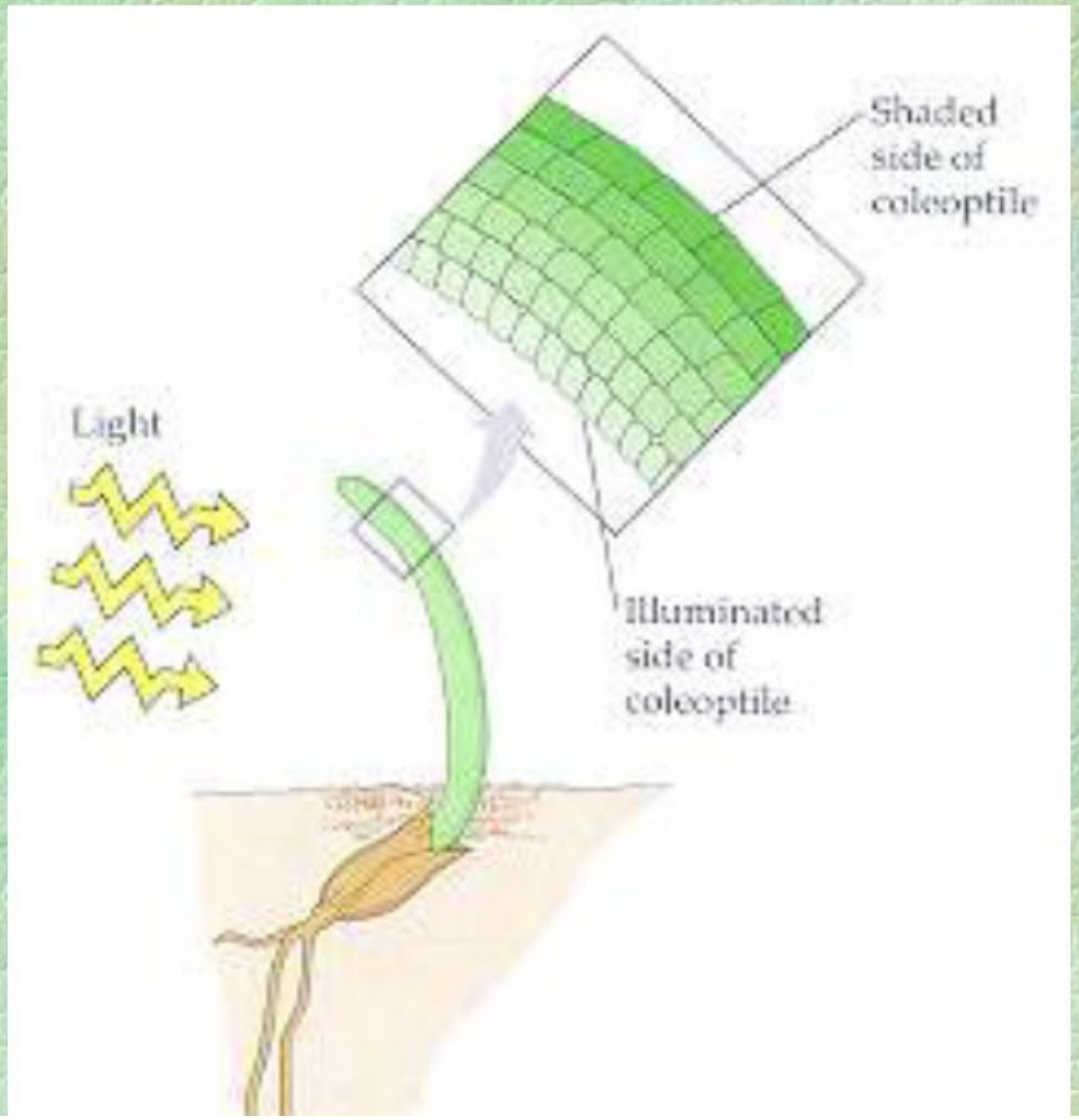
- Rooted to one location for life, a plant generally responds to environmental cues by adjusting its pattern of growth and development. Because the program for development of the plant remains somewhat plastic, plants of the same species vary in body form much more than do animals of the same species.

Growth Patterns: Tropisms

Tropisms are growth responses that result in curvatures of whole plant organs toward or away from stimuli. The mechanism for a tropism is a differential rate of growth of cells on opposite sides of the organ. There are three stimuli that initiate tropisms.

Phototropism

Phototropism caused by location of light sources.



Control of Plant Growth and Development

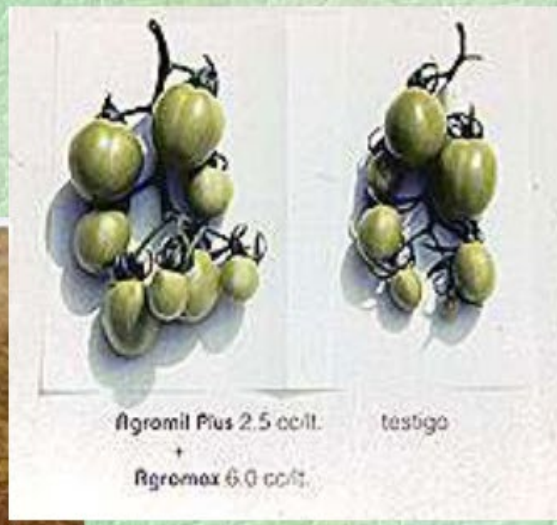
A houseplant on a windowsill grows toward light. If you rotate the plant, it will soon reorient its growth until its leaves once again face the window. The growth of a shoot toward light is called positive **phototropism**.

In a forest or other natural ecosystem where plants may be crowded, phototropism directs growing seedlings toward the sunlight that powers photosynthesis. This and other types of plant growth are controlled by plant **hormones**.

Auxins

The term auxin is actually used to describe any chemical substance that promotes the elongation of a plant. The single most important function of auxin is to stimulate the elongation of cells in young developing shoots.

Auxin can be used to make plants develop fruit without being pollinated; thus we can get seedless watermelon because no seeds are produced if a plant is not pollinated. Another very common use of auxins is as herbicides, too much of a good thing can be bad and this is the case with auxins. The herbicide 2,4-D is an auxin, it causes weeds to grow out of control, this increased growth becomes lethal quickly and the weed dies.



Gravitropism

- **Gravitropism is caused by gravity and can be seen in trees that grow on steep hillsides**

Thigmotropism

Finally **thigmotropism** is stimulated by touch, in vines tendrils grow until they touch something and then coil around it allowing them to climb the sides of buildings.