

# COORDINATION AND RESPONSE

*sensitivity* is the ability to detect or sense changes in the environment (stimuli) and to make responses.

# Types of responses

- ◎ **Tropic** : **growth** movement towards or away from a stimulus.

*Example:* a plant grows towards the light.

- ◎ **Tactic**: movement of part or whole organism towards or away from a stimulus.

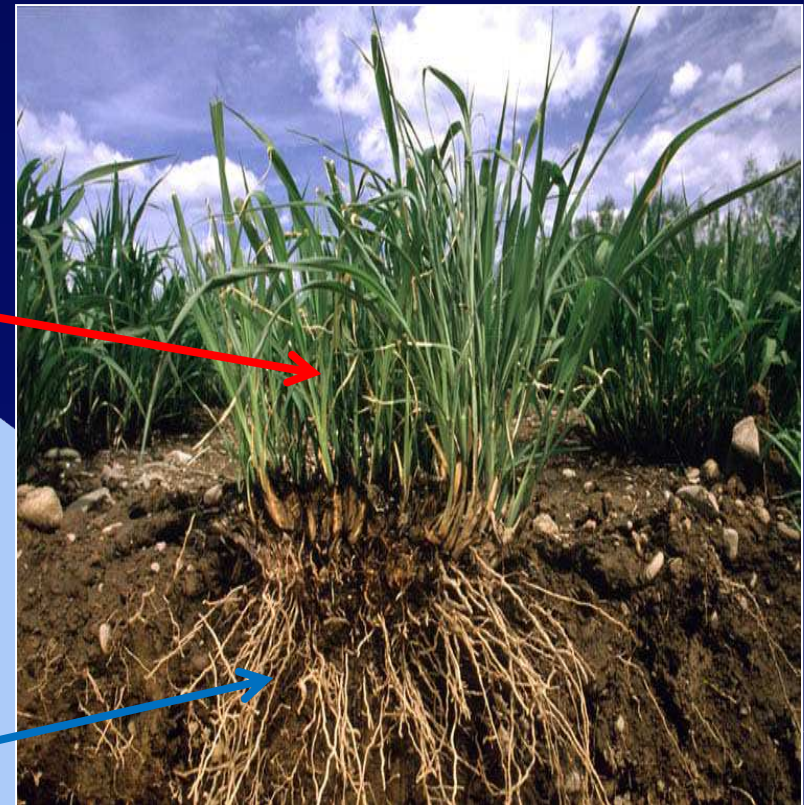
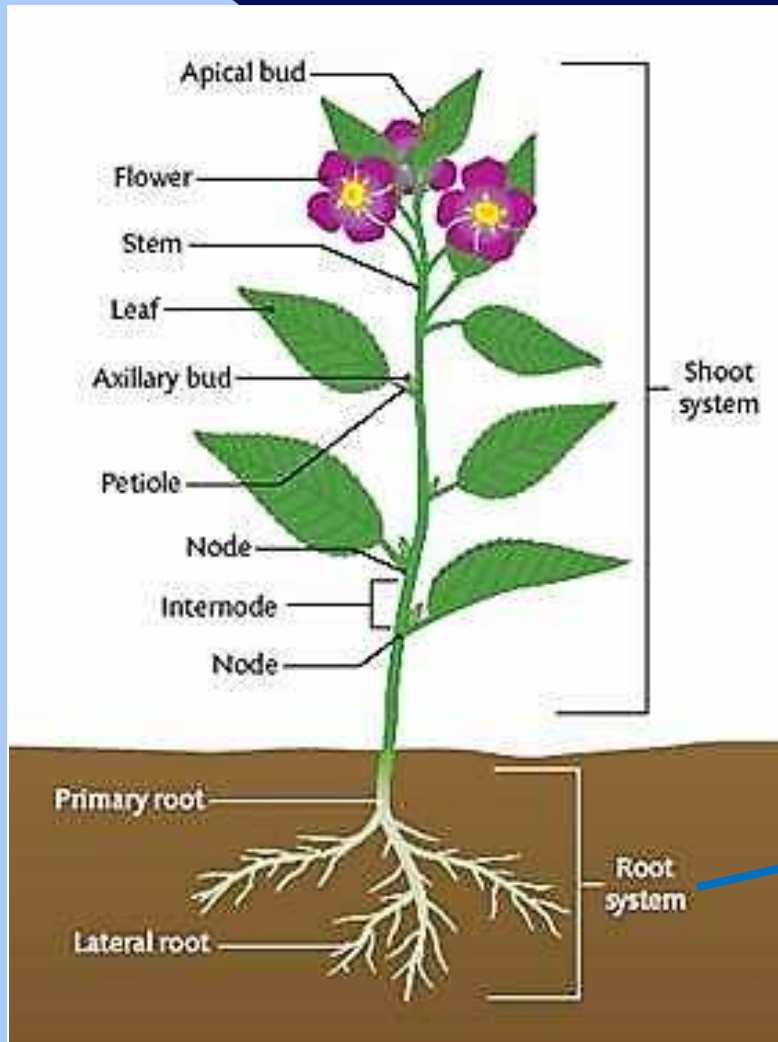
*Example:* a woodlouse moves away from a dry area.

**STIMULUS** (*plural stimuli*): a change in the environment.

# COORDINATION IN PLANTS

- Plants grow towards or away from several stimuli such as water, light and gravity.
- They can do this by means of plant hormones called auxins.
- The growth towards the stimulus is called **positive tropism** and the growth away from the stimulus is called **negative tropism**.

# Shoot and root



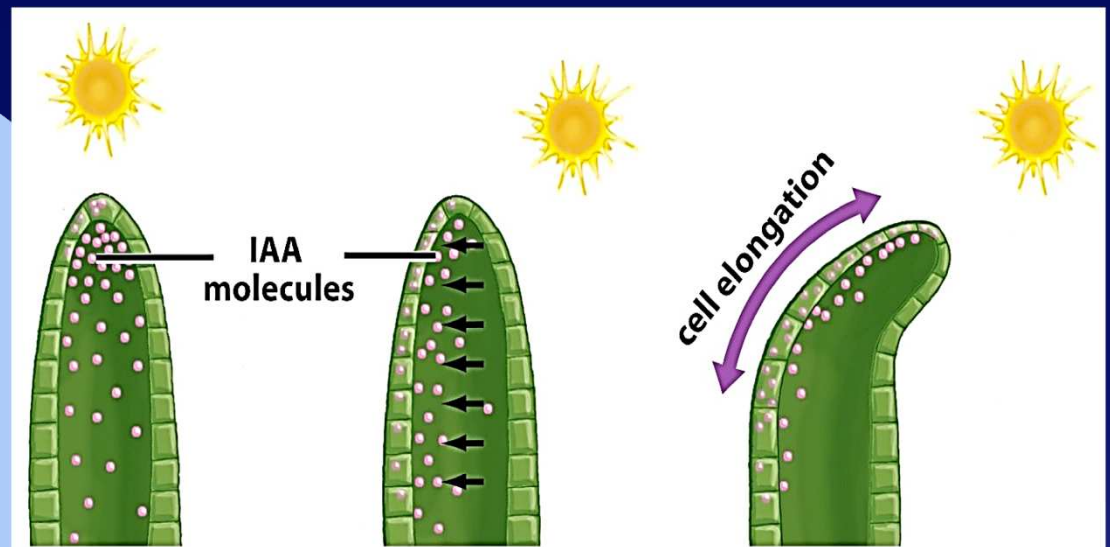
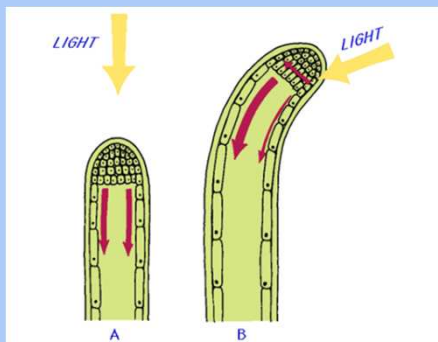
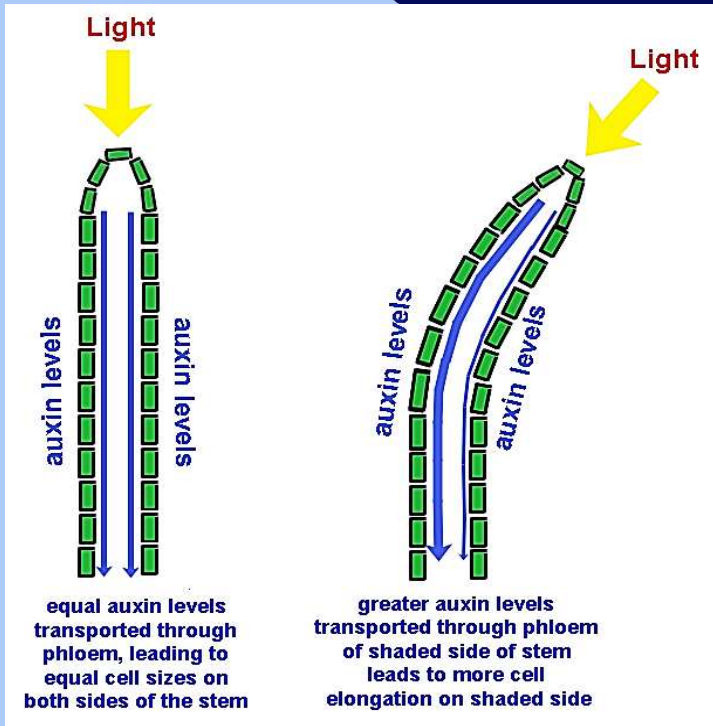
# Phototropism



- Stimulus: light direction
- Tissue that detects light direction: tip cells
- Hormone released: auxin (IAA)
- Response: these cells will elongate so the stem grows towards the light.
- Tissue that responds: cells which are in the stem well below.
- Two cases: light from above or light from one side



# Phototropism



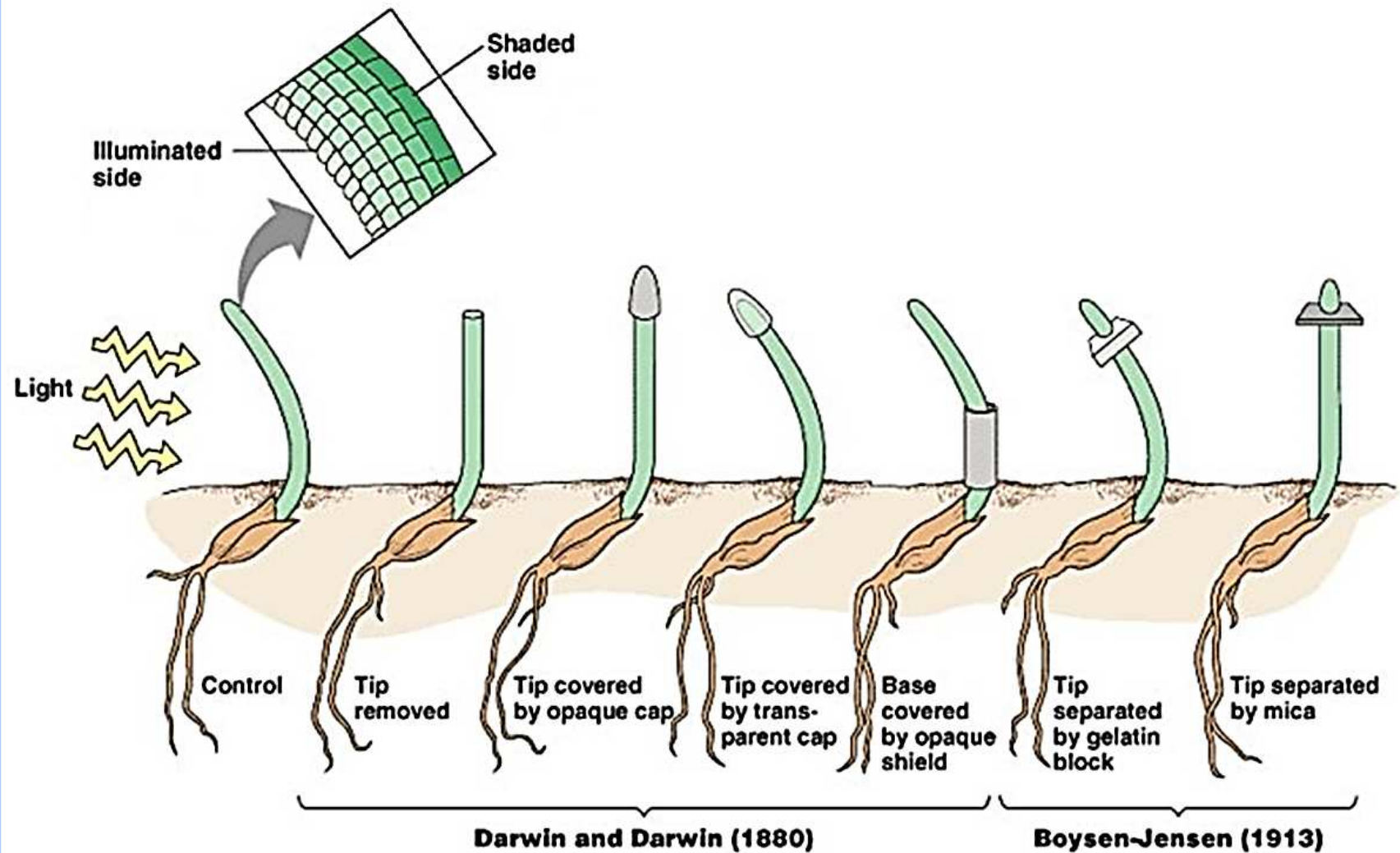
(a) When sunlight is overhead, the IAA molecules produced by the apical meristem are distributed evenly in the shoot.

(b) Once the sunlight shines on the shoot at an angle, the IAA molecules move to the far side and induce the elongation of cells on that side.

(c) Cell elongation results in the bending of the shoot toward the light.

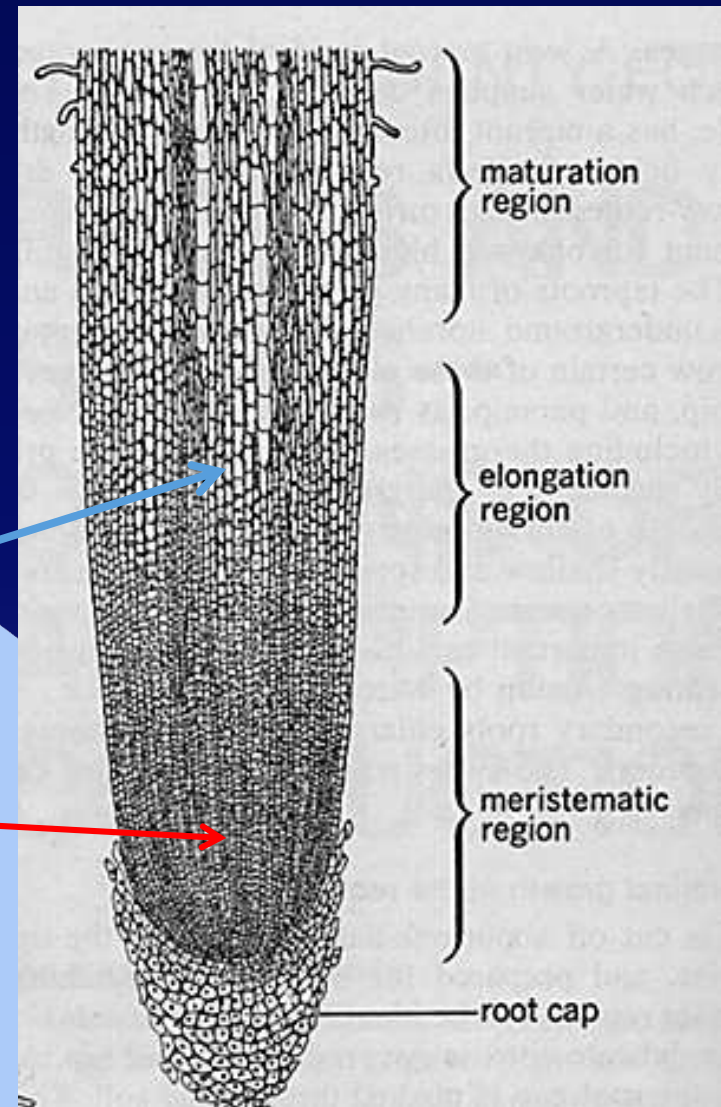


# Experiments to study phototropism



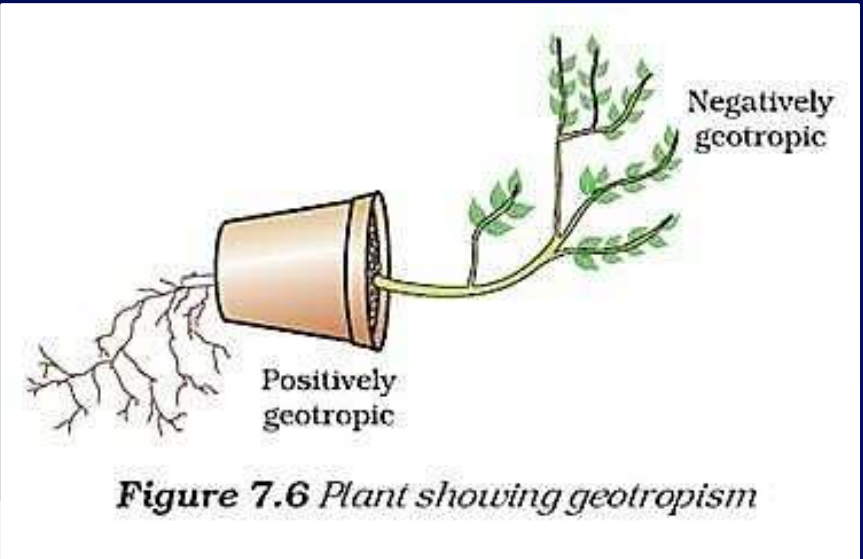
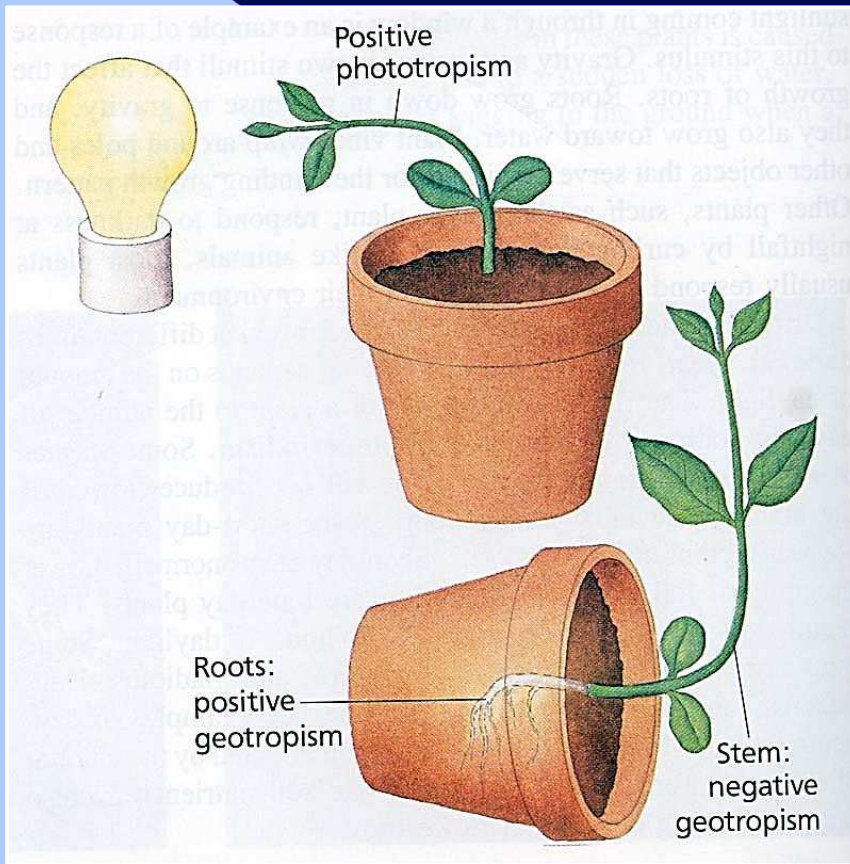
# Geotropism

- Stimulus: gravity
- Tissue that detects gravity: root tip
- Hormone released: auxin (another type)
- Tissue that responds: root cells which are in the elongation region, above the cell division or merismatic region.
- Response: auxin inhibits growth in the tip cells (merismatic region).
- This makes the cells in the elongation region elongate so the root grows towards the gravity.





# summary



**Figure 7.6** Plant showing geotropism

The **shoot** shows:  
(+) phototropism  
(-) geotropism

The **root** shows:  
(-) phototropism  
(+) geotropism