



Plant Processes

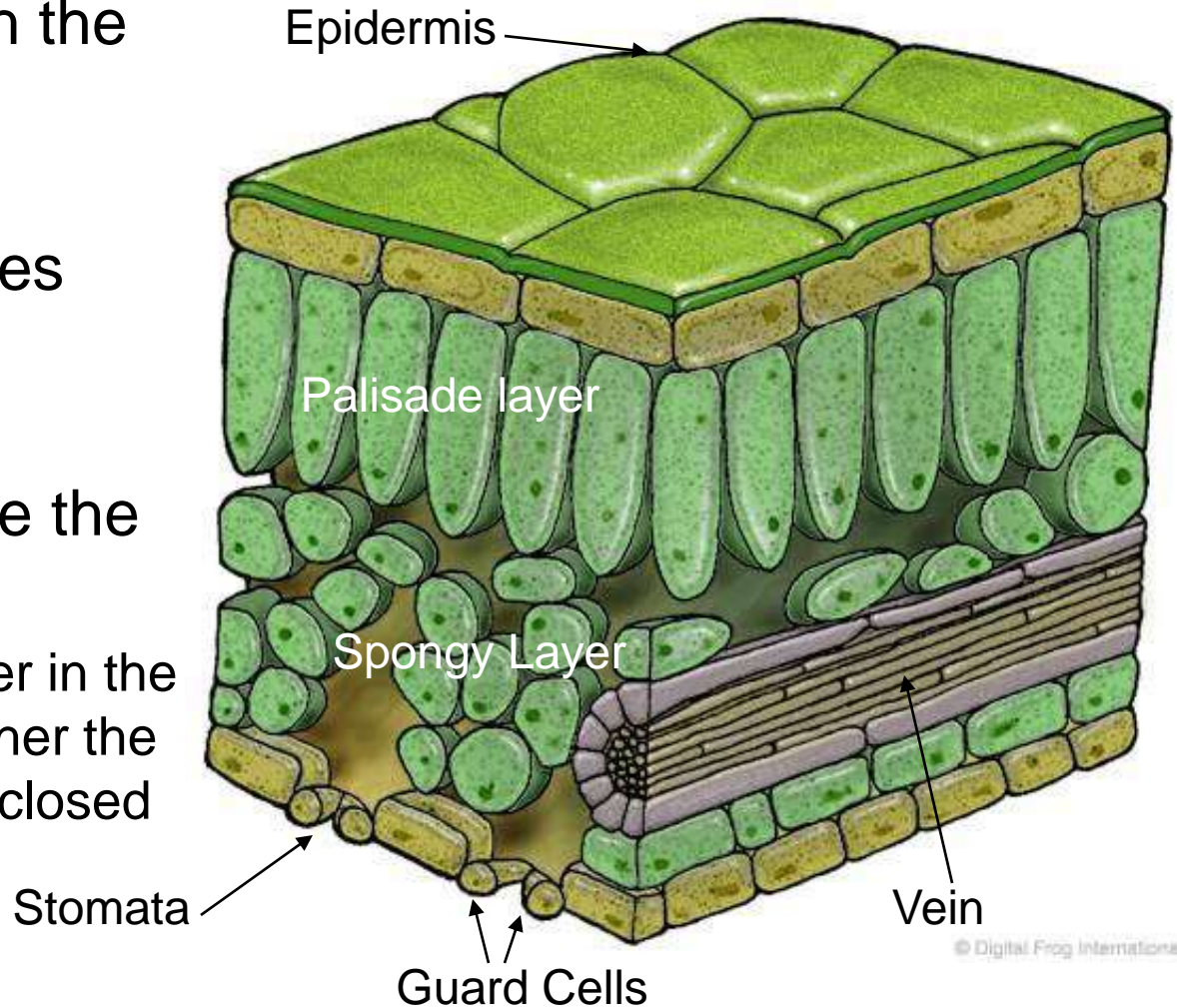


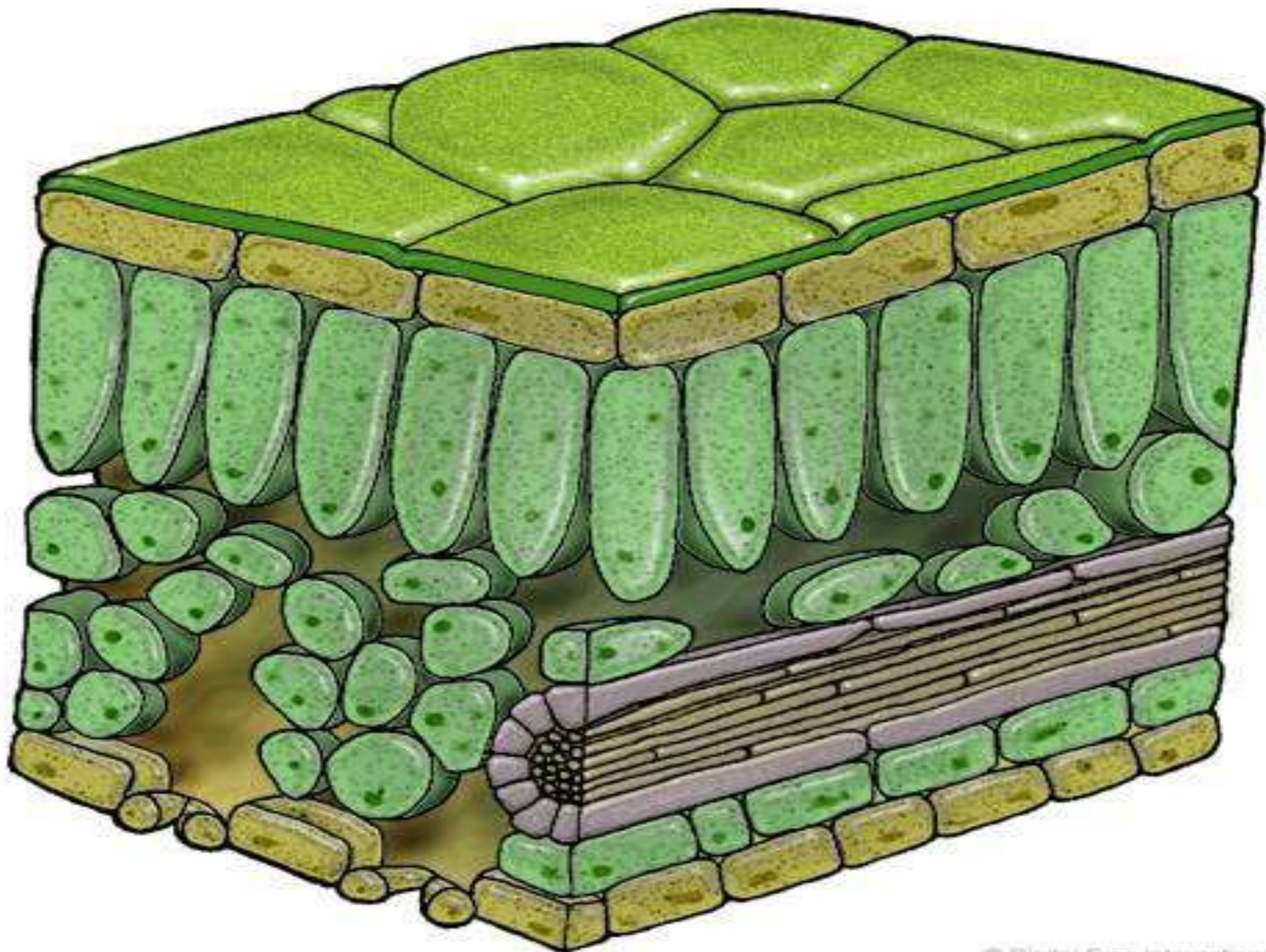
Gas Exchange

- The air is made up of nitrogen, oxygen, and Carbon dioxide and water
- photosynthesis and respiration keep the oxygen/carbon dioxide balance
- Photosynthesis takes place in stems and leaves
- Respiration takes place in roots stems and leaves

Leaves

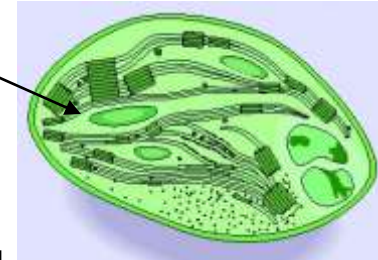
- CO_2 gets in through the stoma and O_2 exits through the stoma*
- Water vapor escapes through the stoma (transpiration)*
- Guard cells regulate the size of the stomata
 - The amount of water in the leaf regulates whether the stomata is open or closed



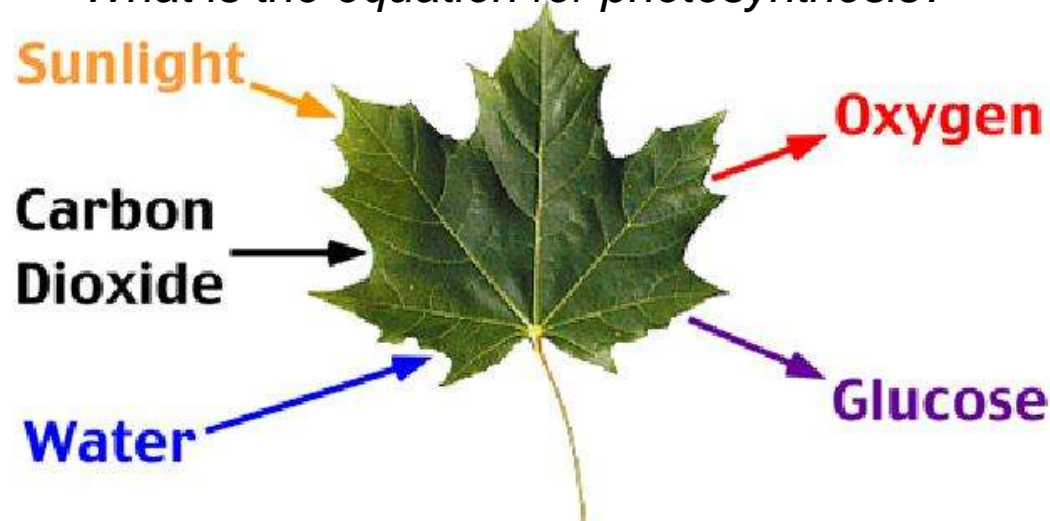


Photosynthesis

- Photosynthesis is a food making process in plants*
 - This process takes place in the *chloroplasts**
- Pigments needed for photosynthesis
 1. *Chlorophyll**
 2. *Caratenoids** give leaves their fall colors
- Photosynthesis reaction: $6 \text{CO}_2 + 6\text{H}_2\text{O} + \text{sunlight \& chlorophyll} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$ * (Carbon dioxide + Water & Sunlight & Chlorophyll results in Sugar & Oxygen)
- Photosynthesis is the process that makes food for almost all living things



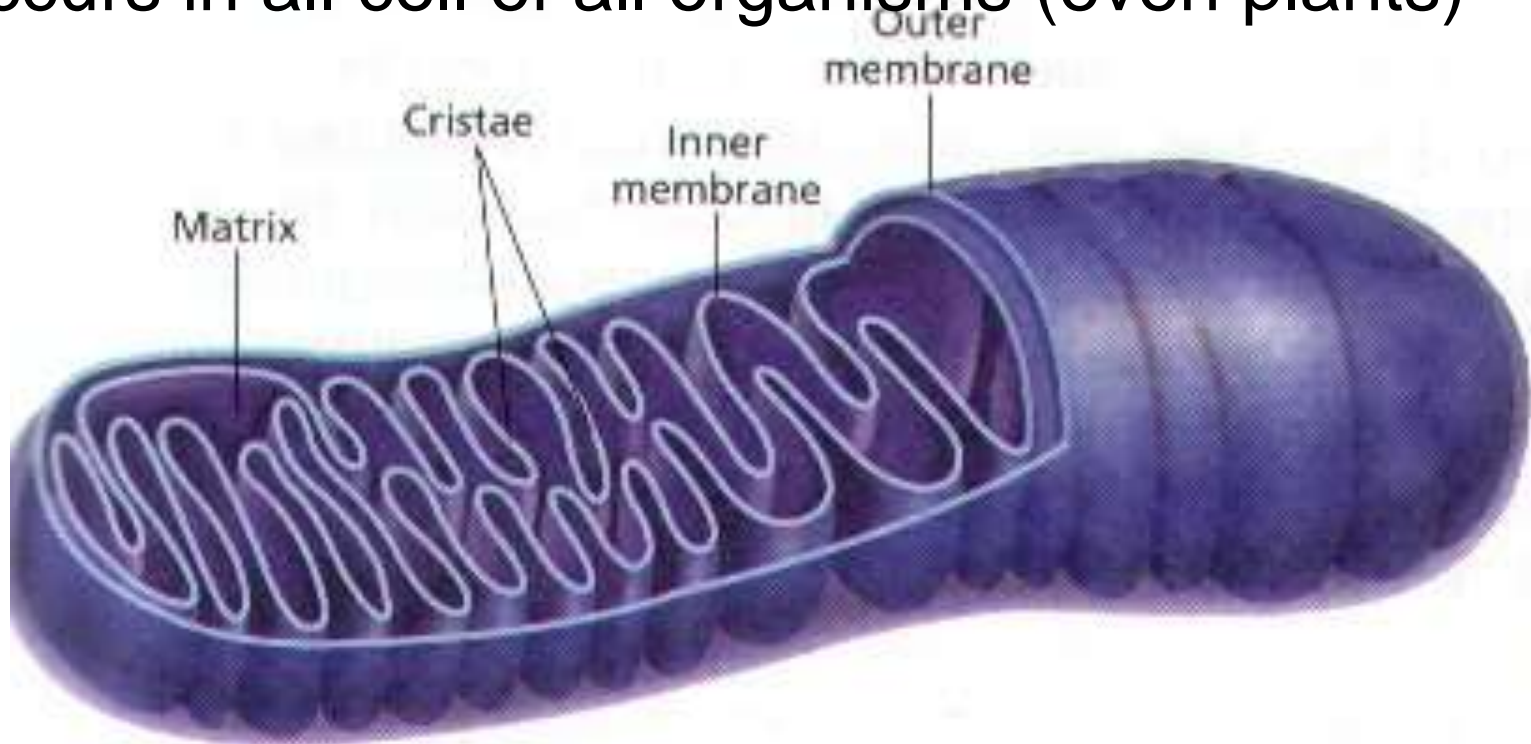
What is the equation for photosynthesis?*





Respiration

- Respiration food using process
- Occurs in *mitochondria* of Eukaryotes*
 - $C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + H_2O + \text{energy for the organism}^*$ (Sugar & Oxygen yields Carbon dioxide & water & energy)
- Occurs in all cell of all organisms (even plants)*



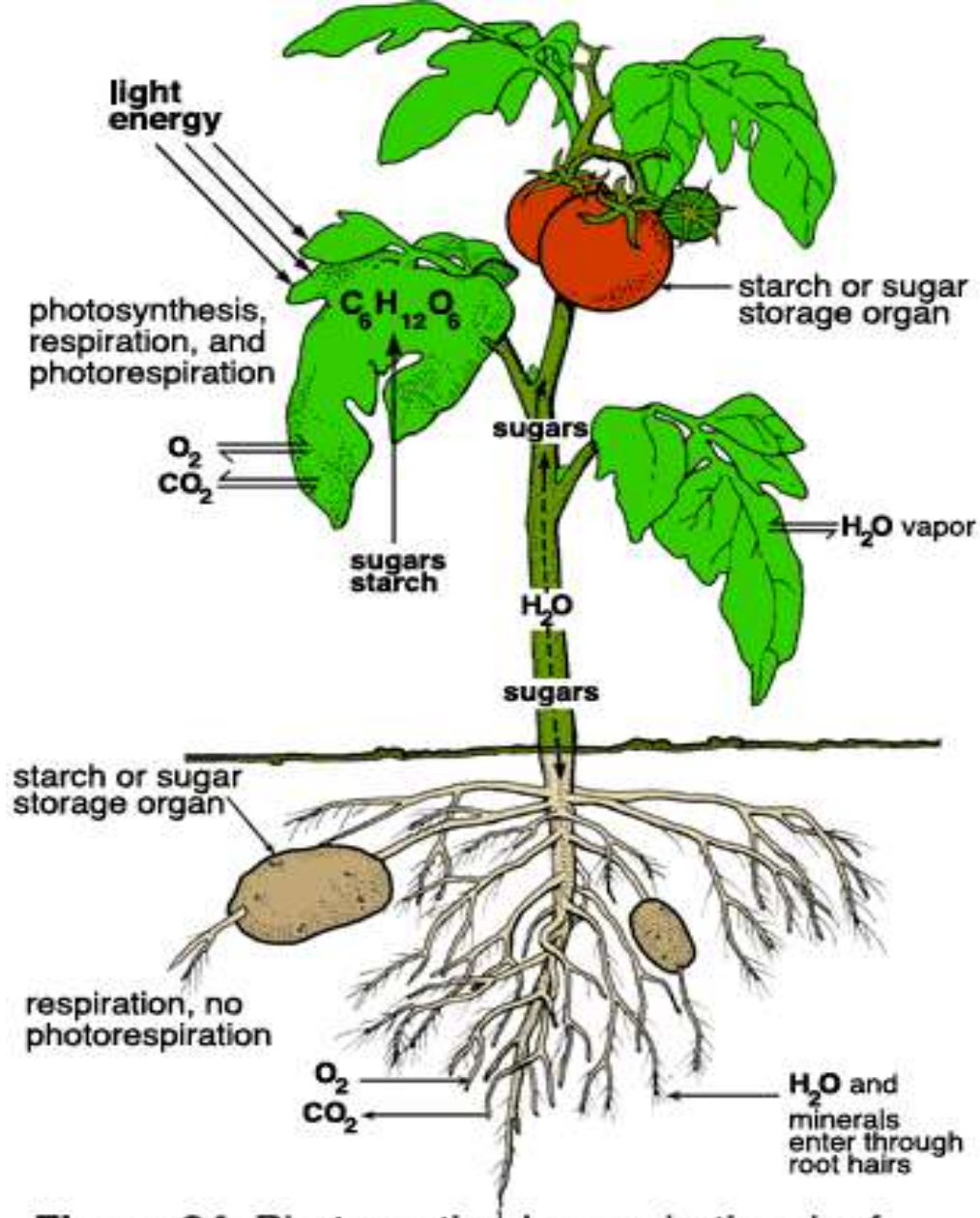
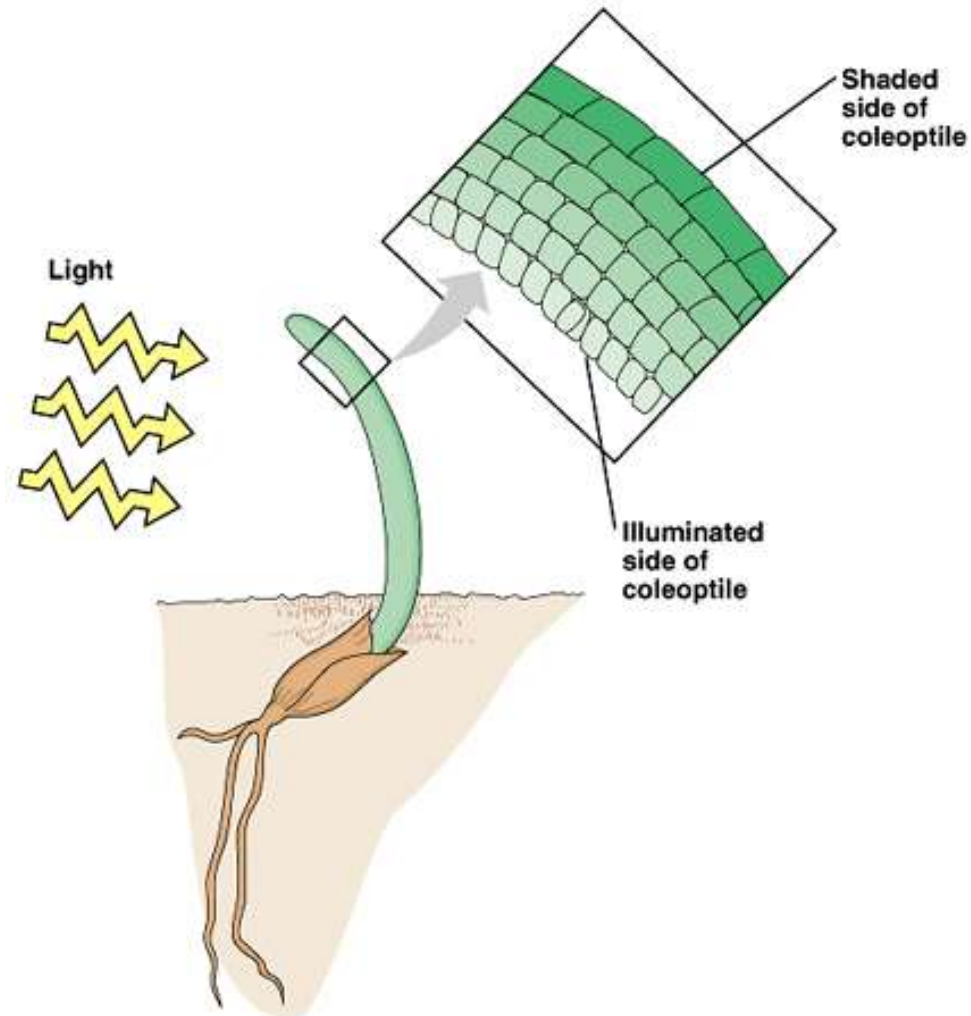


Figure 24. Photosynthesis, respiration, leaf water exchange, and translocation of sugar (photosynthate) in a plant.

Plant Responses

- **Tropism - a plant response to a stimulus (A growth process)***
 - **Thigmotropism*** - Sensitive to the touch (causes growth movement)
 - **Phototropism*** - Sensitive to light (light causes growth movement)
 - **Gravitropism*** (geotropism)- Sensitive to gravity (gravity causes growth movement)
 - Positive - grows toward*
 - Negative - grows away from*

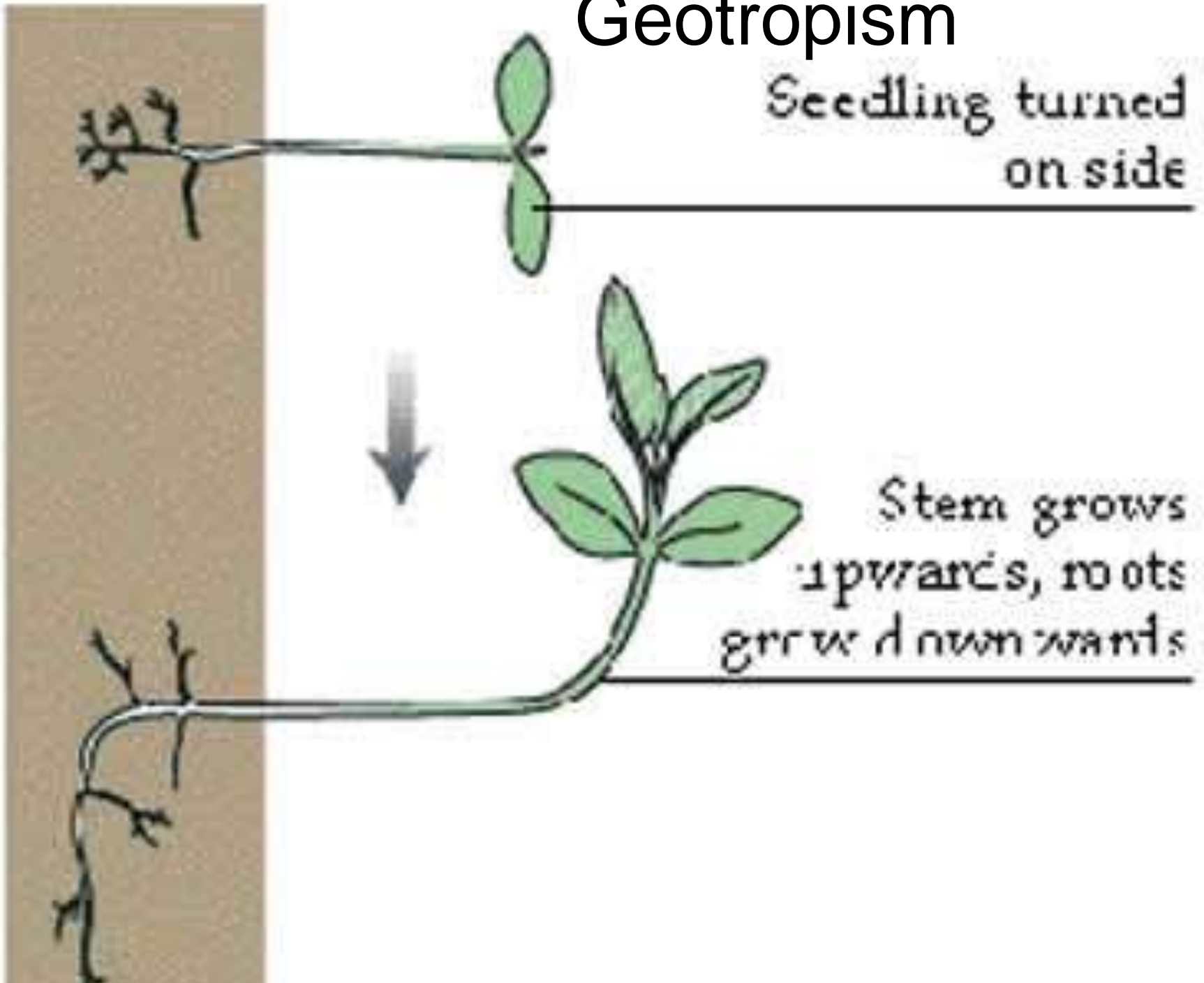


Geotropism

Seedling turned
on side

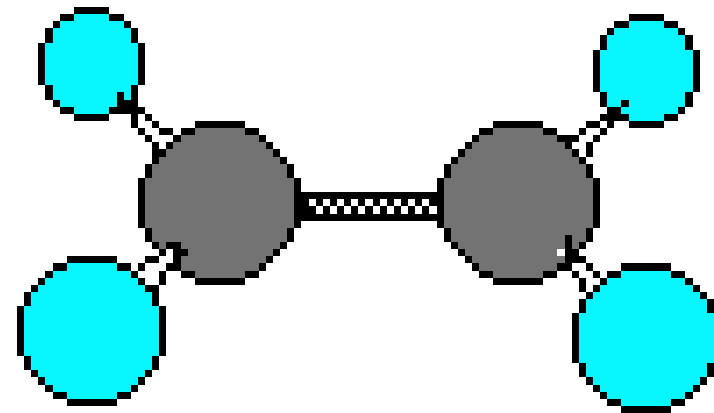


Stem grows
upwards, roots
grow downwards

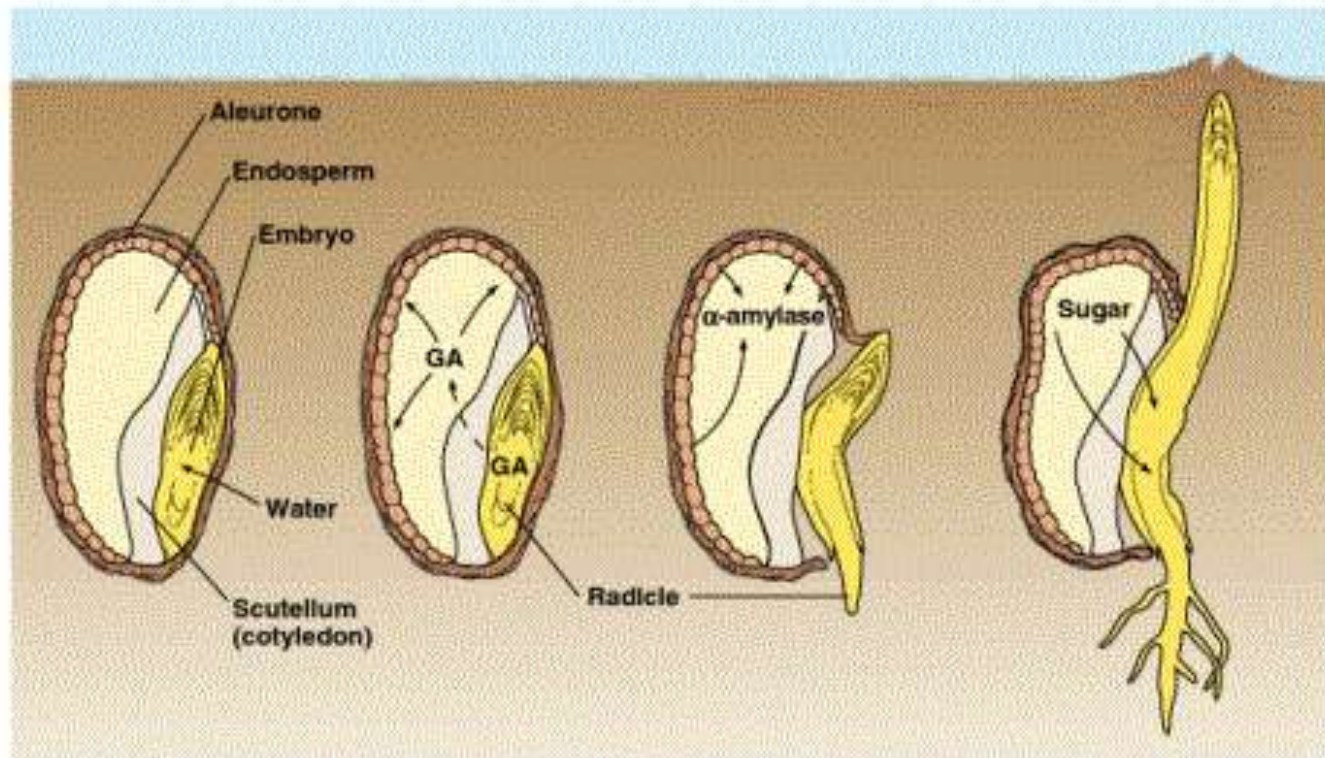


Plant Hormones

- Plant Hormones - what causes plant responses
- Auxins* cause positive phototropisms
- Ethylene gas - C_2H_4 causes fruit to ripen
- Photoperiods - plant response to the changes to the amount of light*
 - Short day plants*
 - Long day plants*
 - Day neutral plants*



Role of Gibberellin in Seed Germination



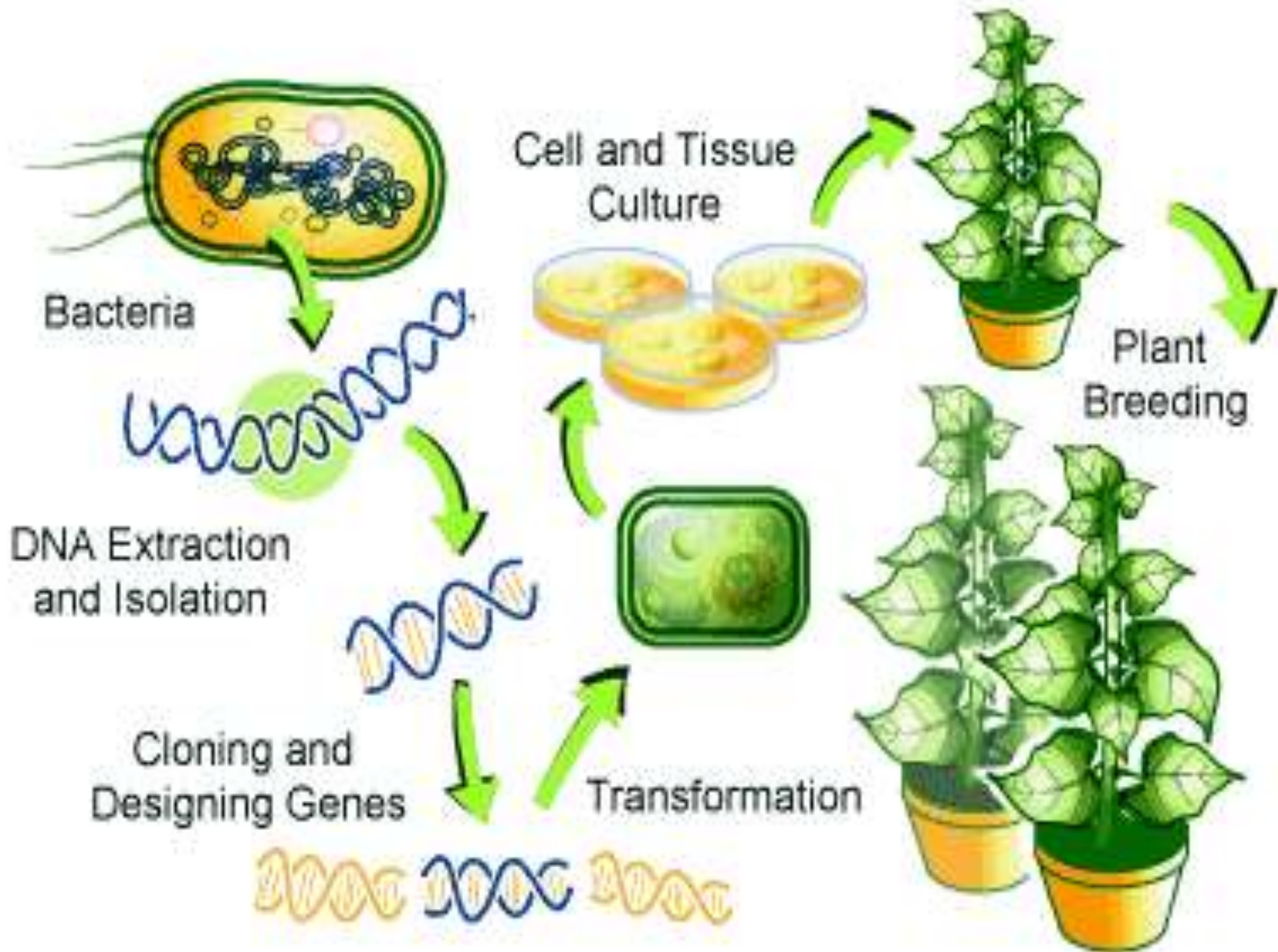
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1. Water uptake induces GA synthesis by embryo
2. GA stimulates α -amylase production by aleurone
3. Amylase breaks down starch reserves in endosperm
4. Sugars fuel growth of embryo

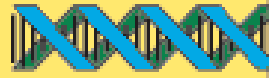
Transgenic Crops

- A plant that has been genetically altered
 - BT Corn
 - Round-up ready Soybeans

Why would a soybean that is immune to roundup be beneficial to farmers?



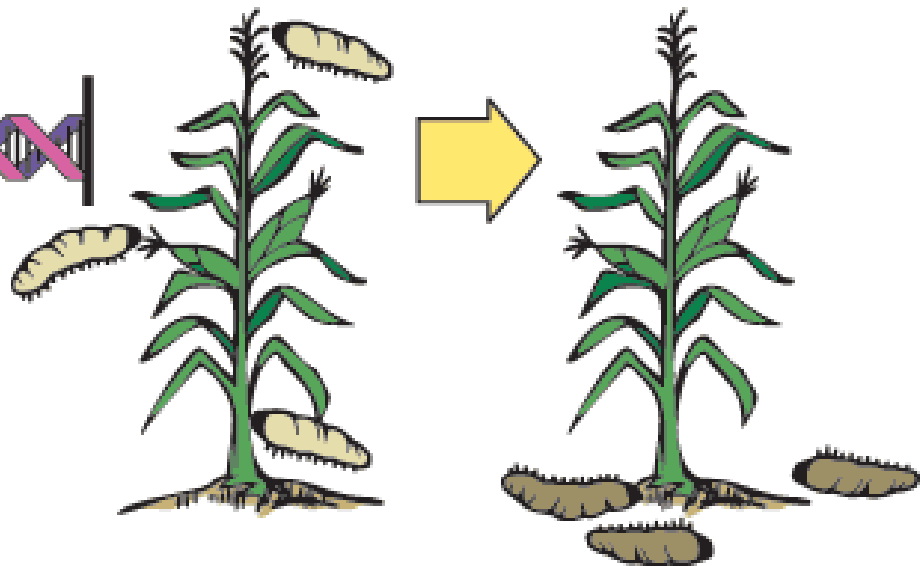
CaMV 35S Promoter



Cry 1Ab

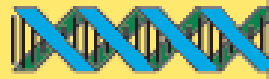


A expressed in ALL plant tissue



European corn borer feeding any plant part die when the *Bt* is expressed in all tissues.

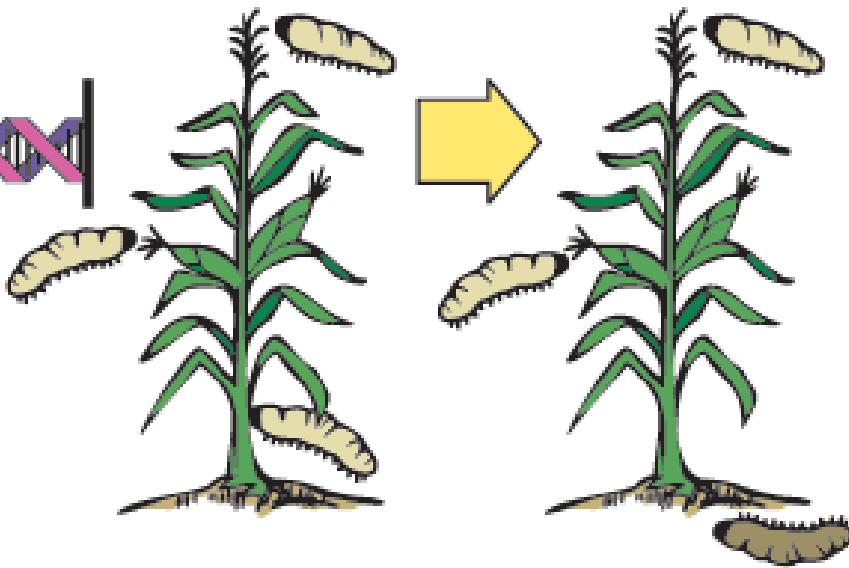
PEP Carboxylase Promoter



Cry 1Ab



B ONLY expressed in green tissue



When *Bt* is expressed only in green tissue, those European corn borer feeding on tassel and ear do not die.

Quiz Time

