FIELD CROPS AND CEREALS

IMPORTANCE OF FIELD CROPS

Food for man

Feed for animals

Industrial uses

Medicinal uses

PROBLEMS AND CONSTRAINTS

Improper seed selection

Lack of appropriate technology in cultural and management practices and post harvest handling.

Capital

Interest in farming

Peace and order

GENERAL MORPHOLOGY OF SOME IMPORTANT FIELD CROPS

Plant morphology deals with the development, form, structure and life history of plants. The plant parts may be divided into above ground parts and underground parts.

IDENTIFYING FIELD CROPS

1. CEREALS
   - Rice
   - Corn
   - Sorghum
2. LEGUMES
   - Peanut
   - Mungbean
   - Cowpea
3. Root crops
   - Sweet potato
   - Cassava
4. Others
   - Tobacco
   - Cotton

IDENTIFYING THE IMPORTANT PARTS OF FIELD CROPS

1. Underground Parts

   Roots – Primary, secondary, tertiary and root hairs.

2. Above Ground Parts

   Stem, branches, twigs, leaves, flowers, and fruits.

Functions of the plant parts

- Roots – food absorption, anchorage and storage of nutrients.
- Stem – supports the branches, twigs, leaves, flowers and fruits
- Leaves – responsible for the manufacturing of foods through photosynthesis
- Flowers – reproduction, multiplication and attraction.
- Fruits – reproduction, multiplication

ENVIRONMENTAL FACTORS AFFECTING FIELD CROPS

1. Climate

   - average condition of weather at a given place

- Temperature
- Rainfall
- Daylength
- Light intensity
- Wind velocity
- Relative humidity

ENVIRONMENTAL FACTORS AFFECTING FIELD CROPS

2. Soil Factors

- Topography – elevation, rolling, plain or hilly.
- Soil PH – Alkalinity/acidity of the soil.
- Soil texture – soil particles, sand, silt and clay.
- Soil structure – arrangement of soil particles

ENVIRONMENTAL FACTORS AFFECTING FIELD CROPS

3. Biotic Factors

- Insect pest
- Diseases – fungi, bacteria and viruses
- Weeds
- Rodents
- Others

EEDS AND SEEDING

What is a seed?

A **seed** is a small embryonic plant enclosed in a covering called the seed coat, usually with some stored food.

The formation of the seed completes the process of reproduction in seed plants.

Why are seeds advantageous for plants?

maintain dormancy until better environmental conditions arise

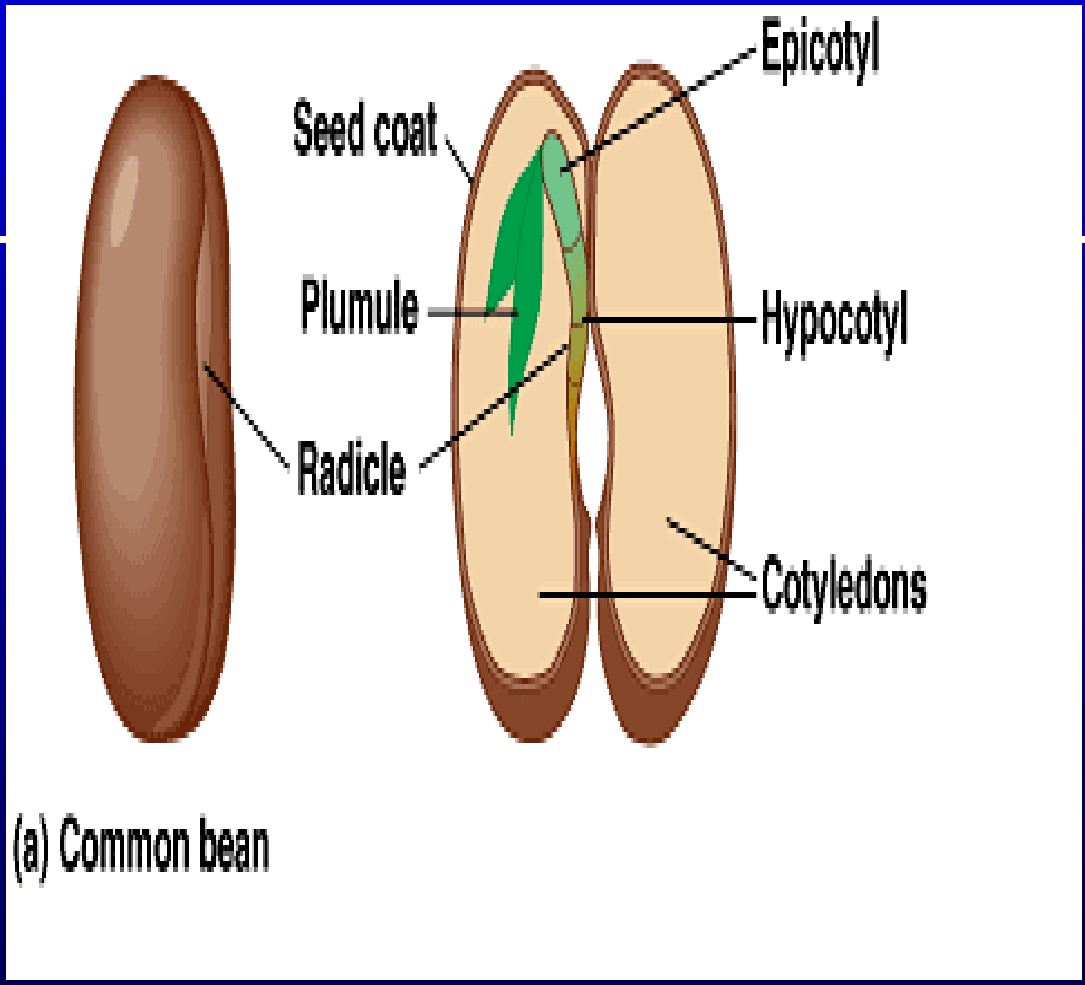
afford protection to young plant at vulnerable developmental stage

contain adequate food supply until photosynthesis is possible

dispersal of plants

SEED STRUCTURE

- External
  - Seed coat (*testa*)
  - Hilum
- Embryo
  - Cotyledon
  - Epicotyl / Hypocotyl
  - Pumule
  - Radical



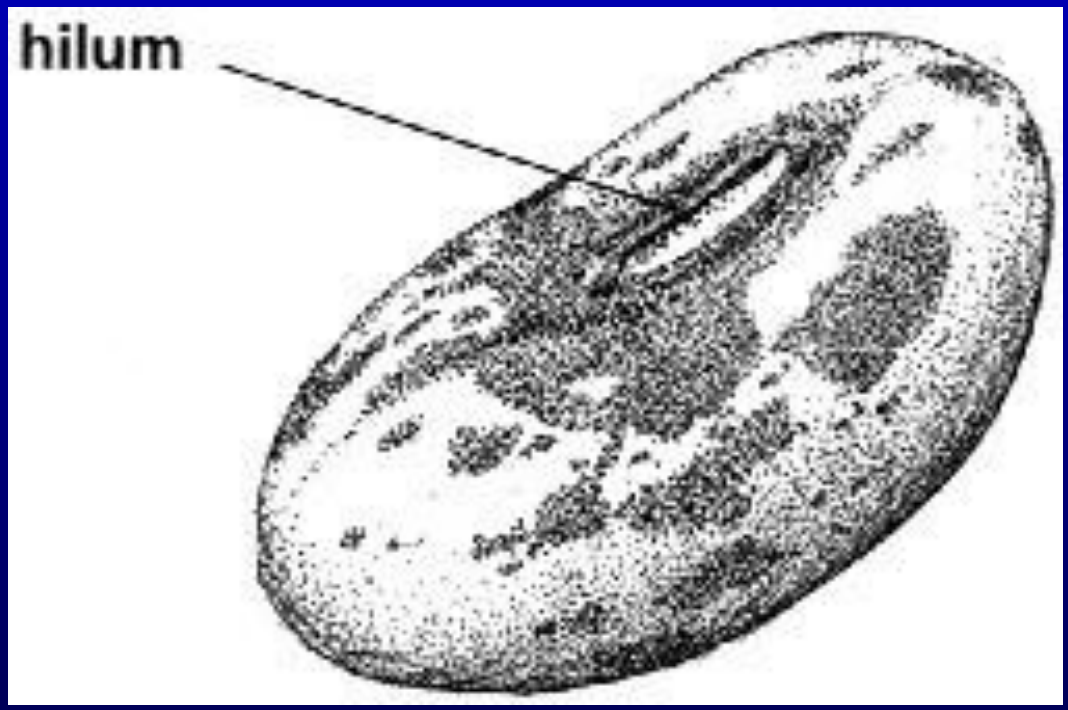
Seed Coat (= testa)

The seed coat protects the embryo

Can be of varying thicknesses, depending on the seed type.

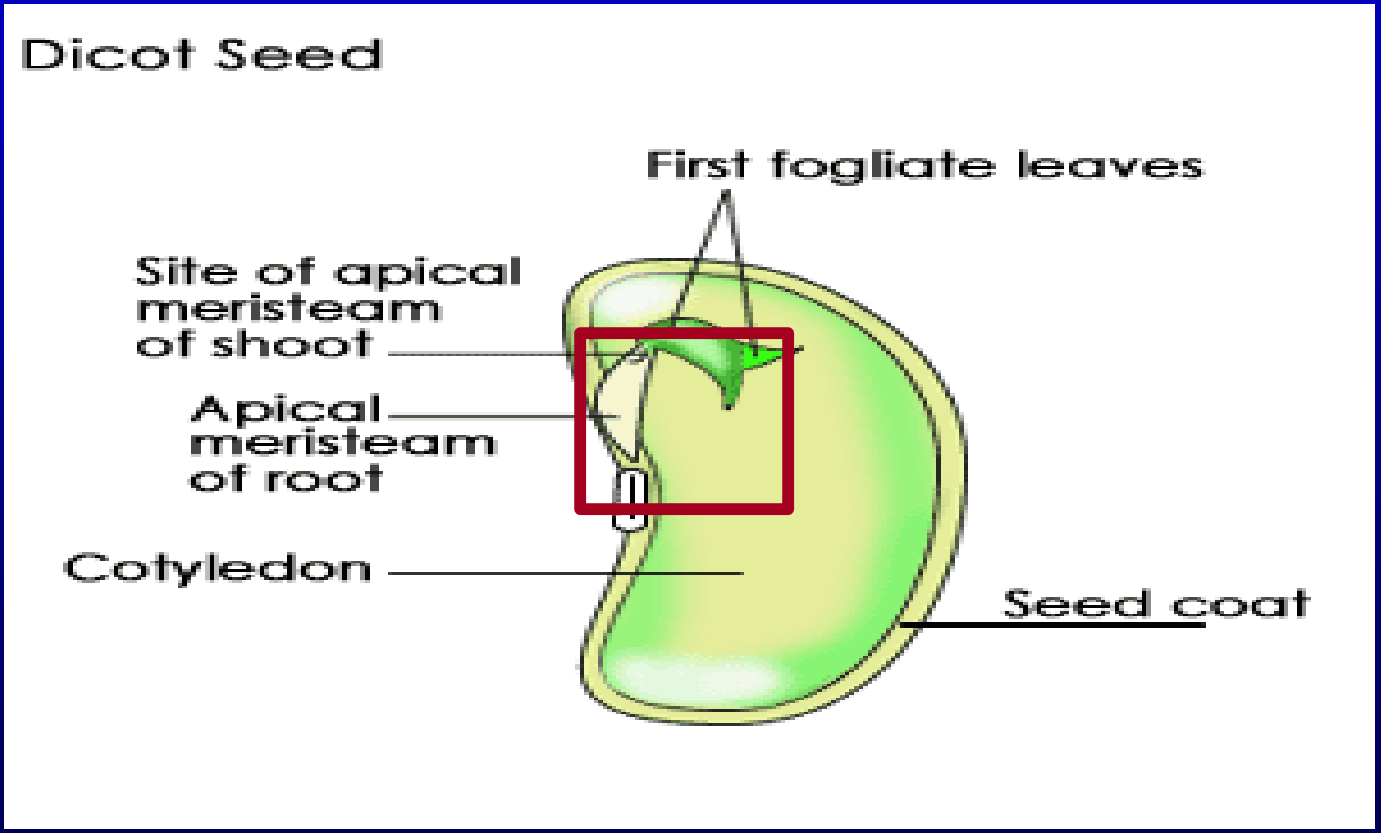
Hilum

Scar from the seed being attached to the parent plant



Embryo

The embryo is what forms the new plant once the opportune conditions are present.

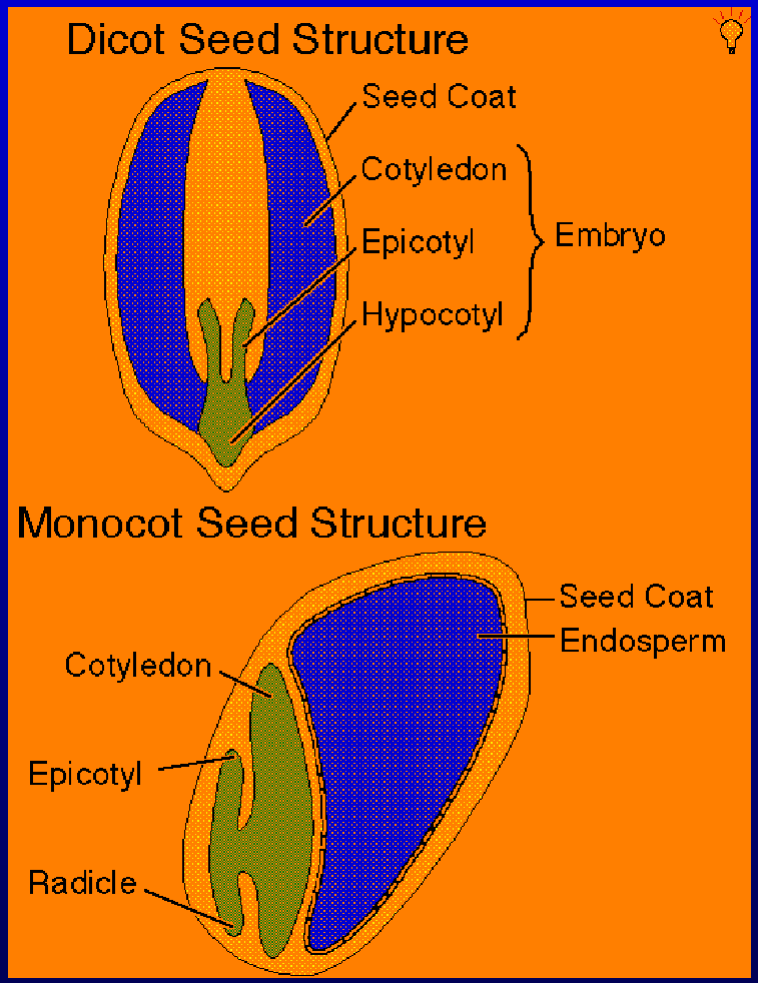


Cotyledon

The cotyledon is the first leaf that germinates.

It is filled with stored food that the plant uses before it begins photosynthesis.

Some plants have 1 cotyledon (monocot) and some have 2 cotyledons (dicot).

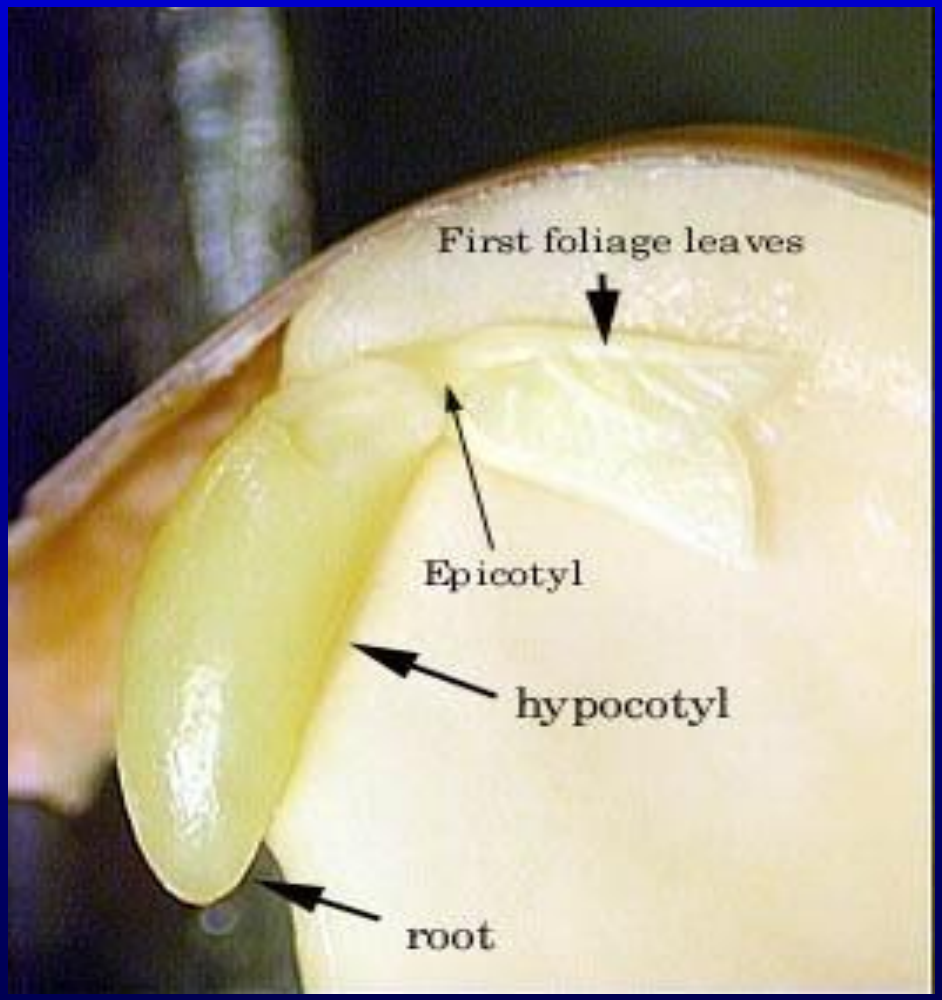


Epicotyl / Hypocotyl

The basis for the plant's stem.

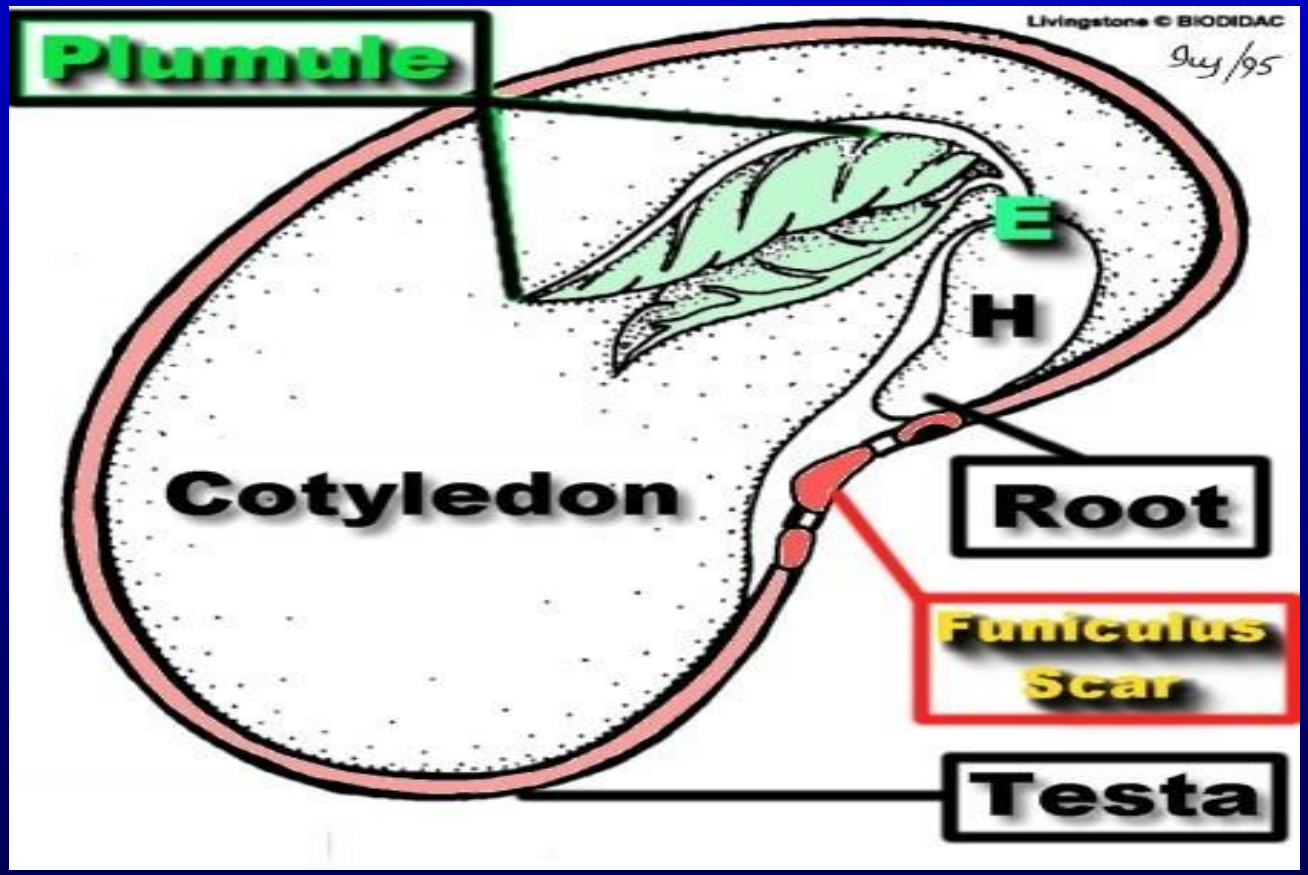
It is known as the *epicotyl above the cotyledon* and *a hypocotyl below the cotyledon.*

These grow upward in response to light.



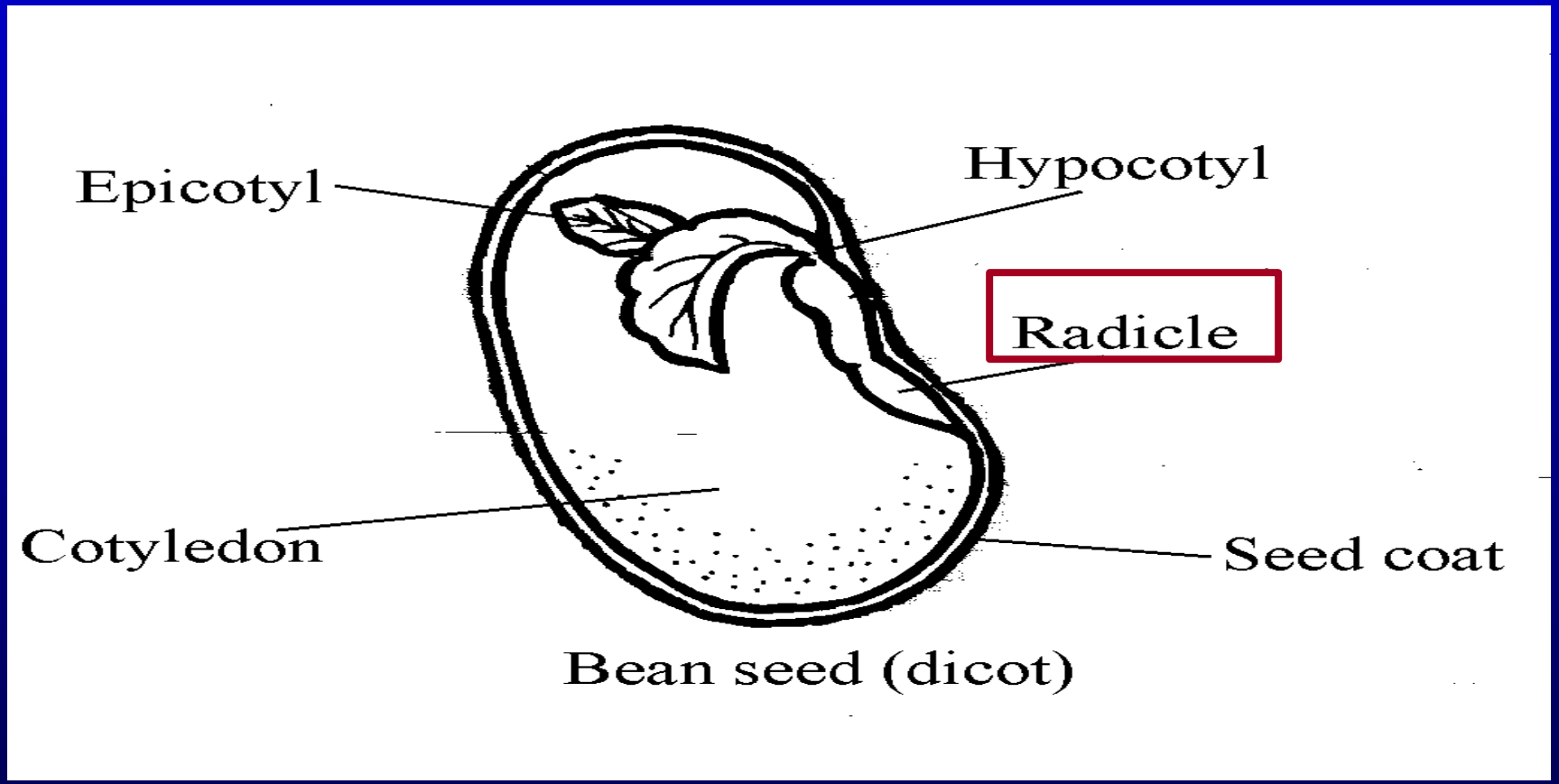
Plumule

The shoot tip with a pair of miniature leaves.

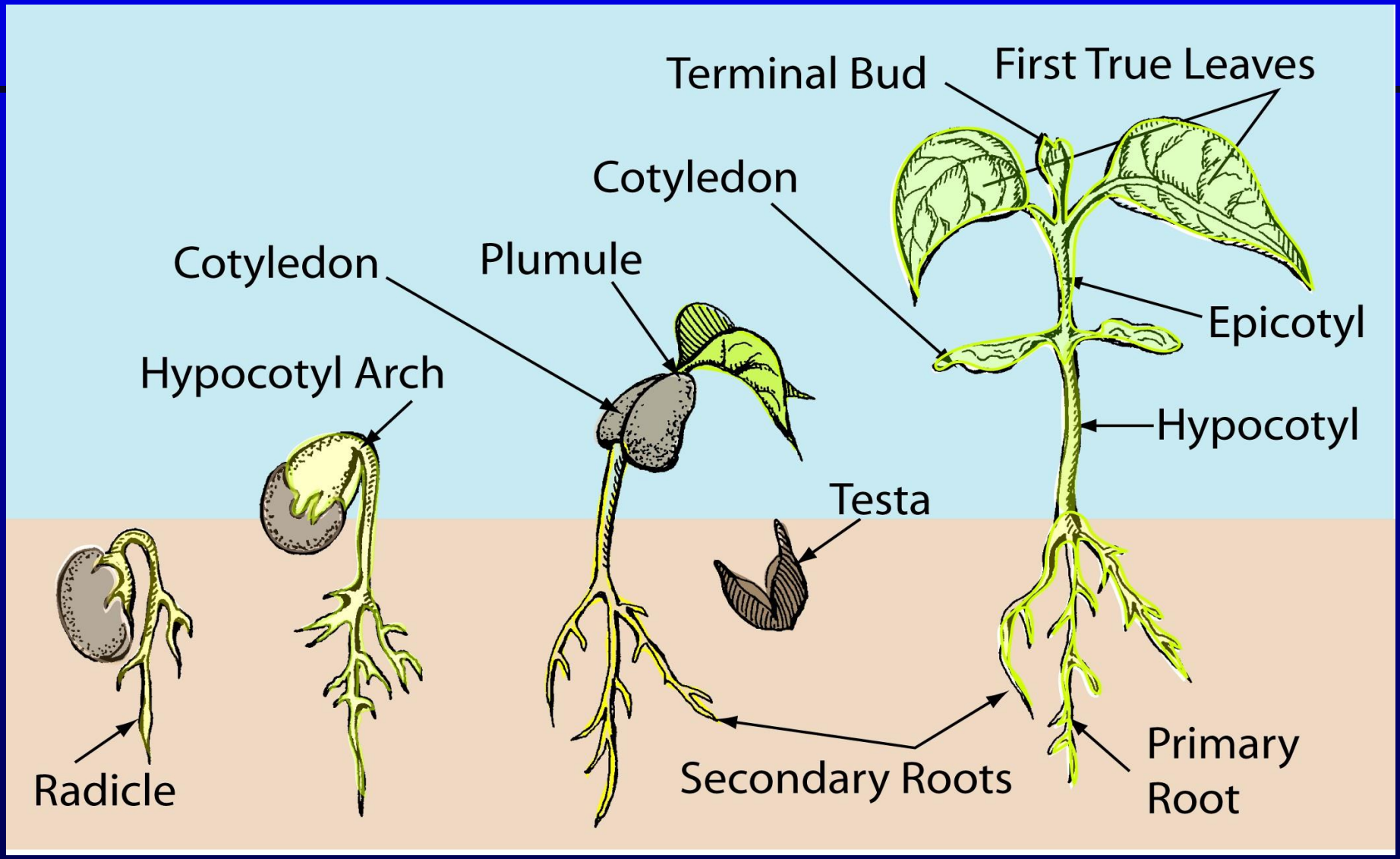


The Radicle

The part of the seed where the root develops.



Germination



Water Absorption

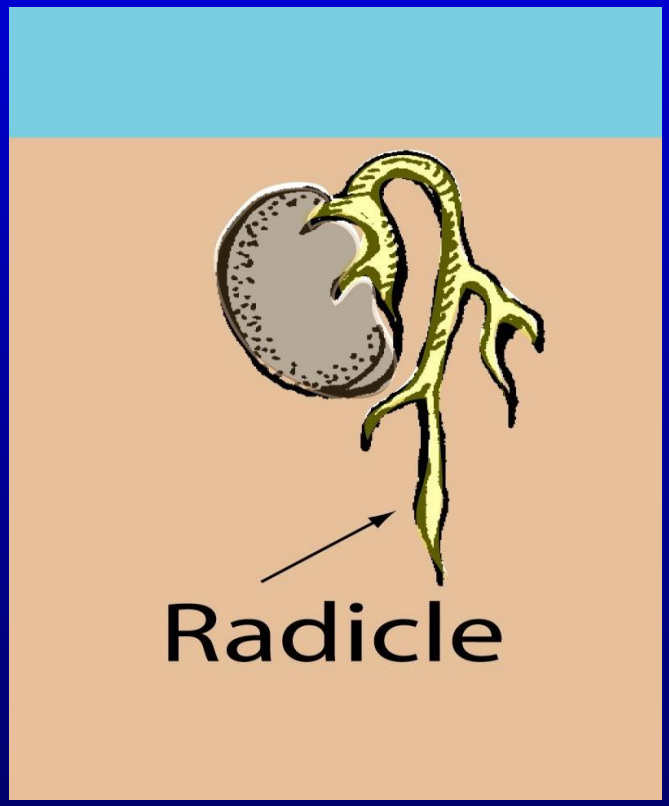
The seed absorbs water and oxygen.

Absorbed oxygen causes the seed to swell and increase in size.

The seed secretes enzymes that convert insoluble starches into soluble sugars.

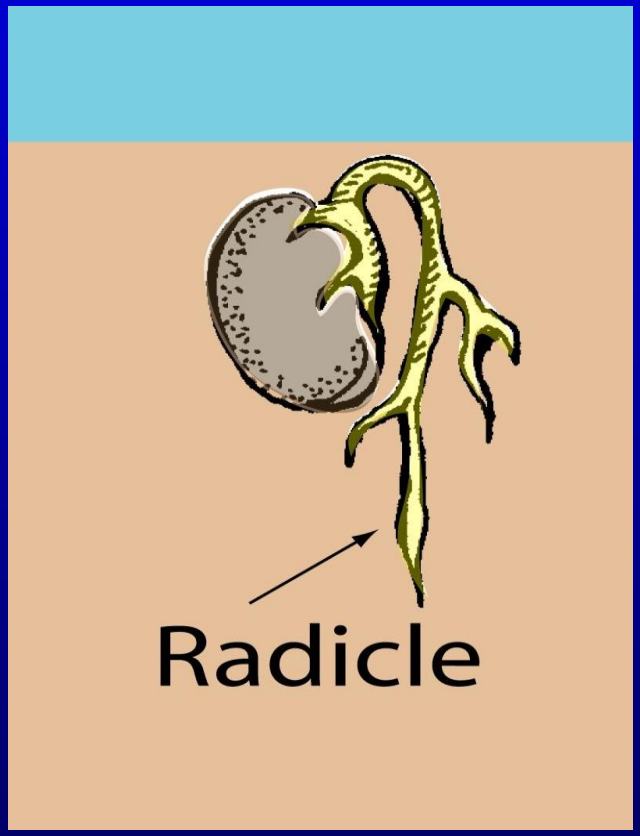
Soluble sugars dissolve in the absorbed water and are used as food by the plant embryo.

Emergence of Radicle



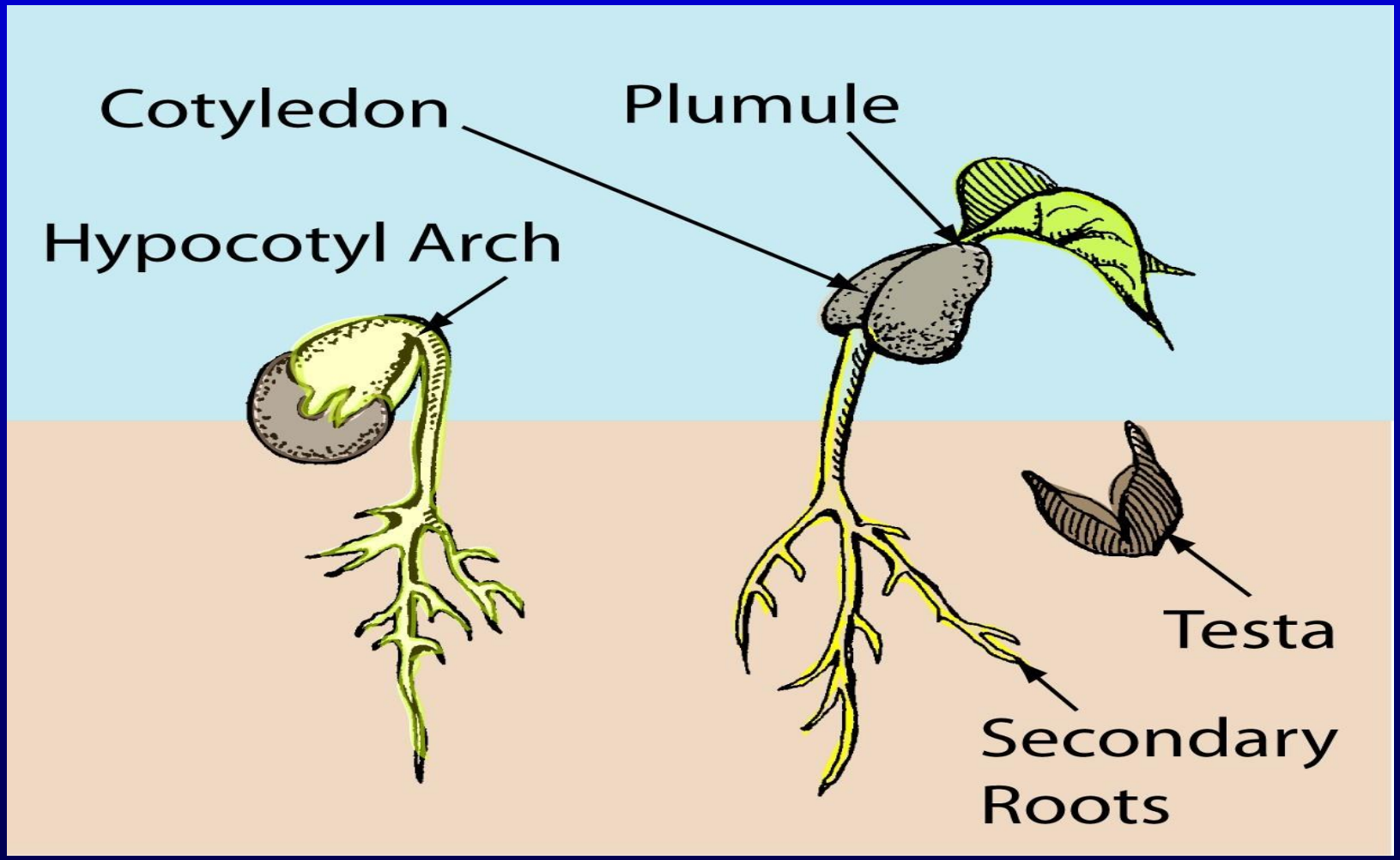
The seed coat ruptures permitting the young root **(radicle)** to emerge and grow downward to anchor the plant.

Emergence of Radicle (Cont.)

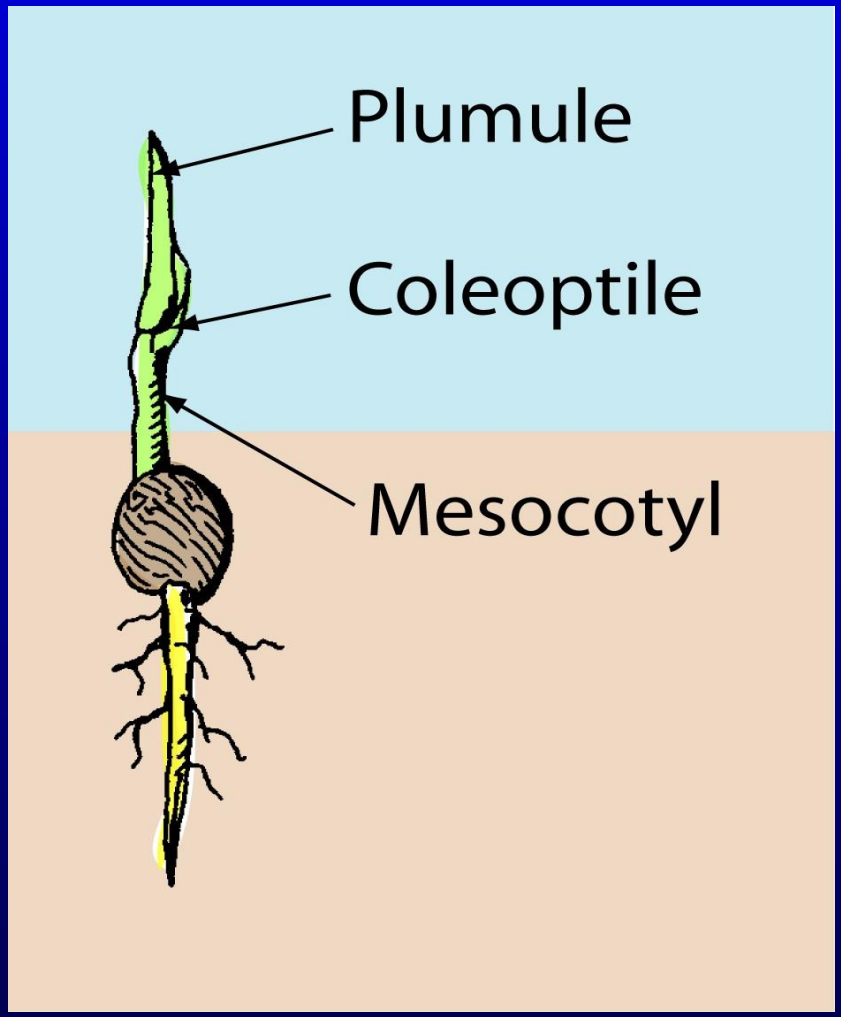


In a dicot, the seed coat (testa) splits near the hilum, and the young root becomes the primary root from which all branching roots form.

Plant Emergence



Plant Emergence (monocot)



In a germinating monocot seed, no hypocotyl arch exists to push the leaf portions through the soil.

Instead, the coleoptile covering the plumule (tight roll of leaves) pierces the soil surface exposing the developing plant to the sunlight.

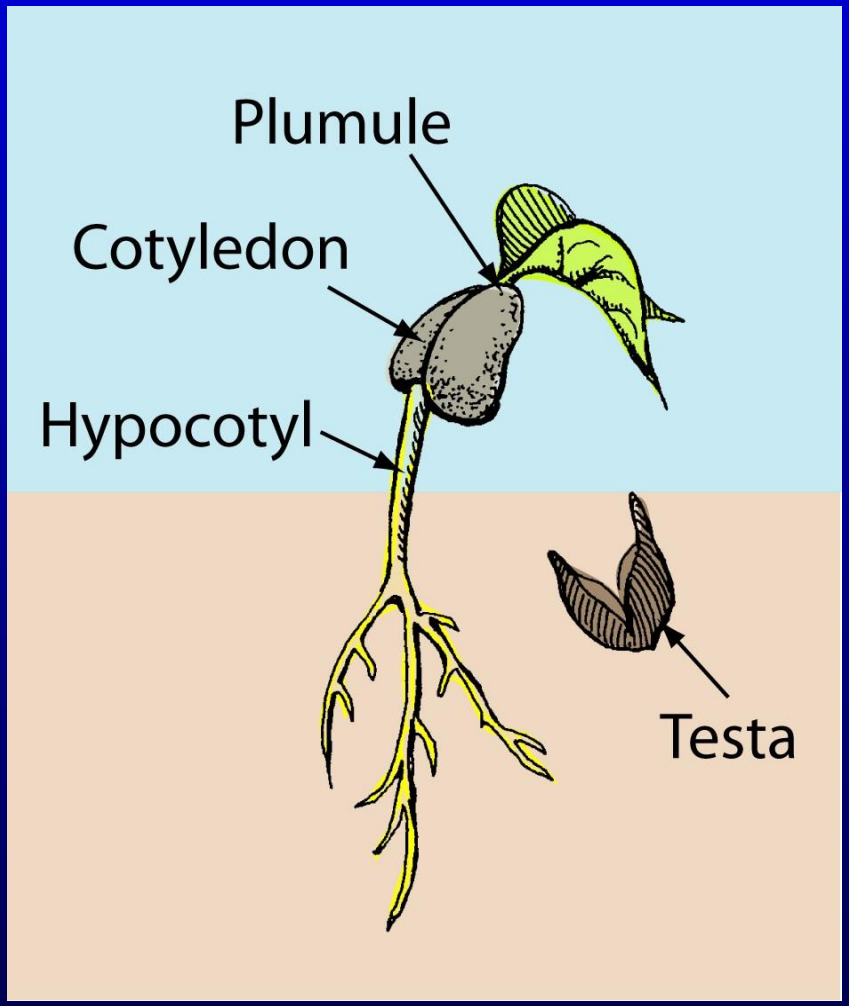
Dicot Germination

Two types of seed germination occur among dicots based on how the seedlings emerge.

Epigeous Germination

Hypogeous Germination

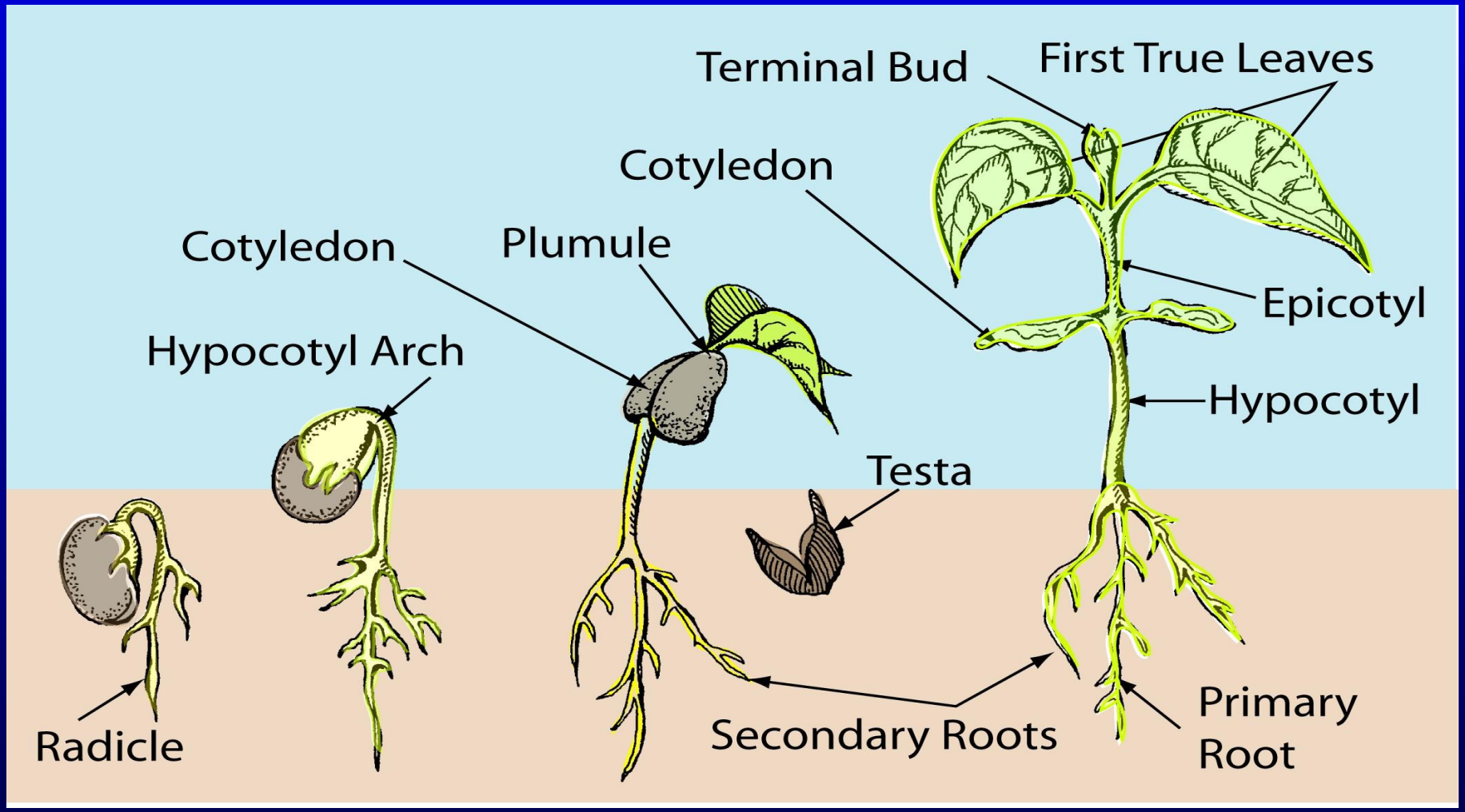
Epigeous Germination



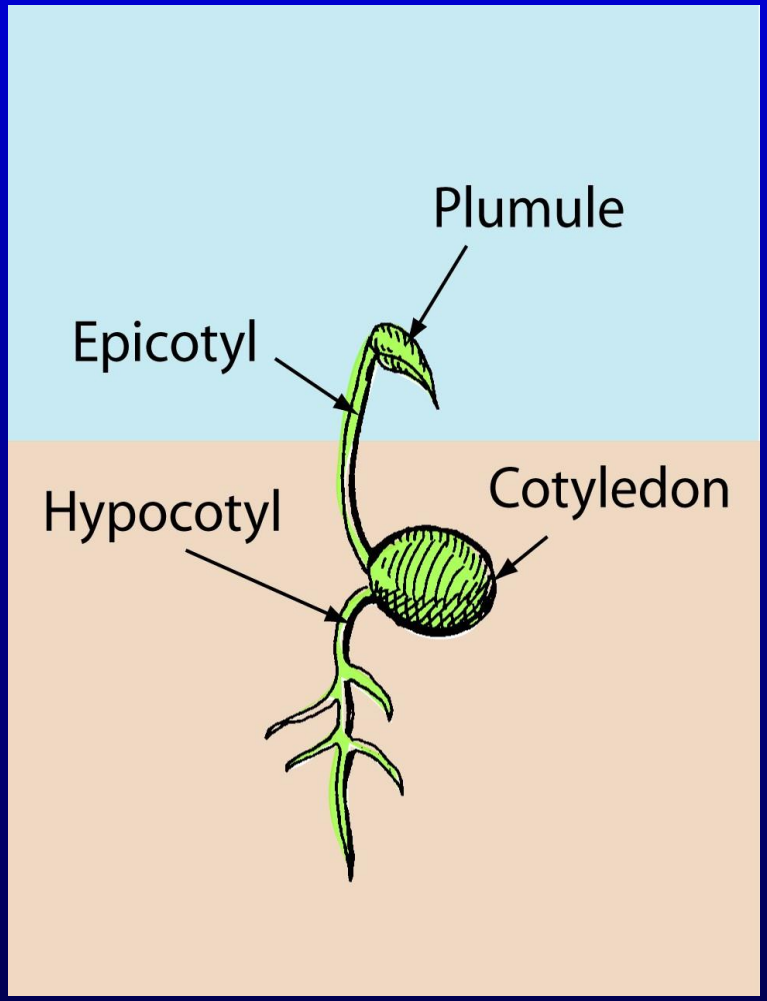
In **epigeous** germination, the hypocotyl of the embryo elongates and raises the plumule, epicotyl, and cotyledons through the soil surface and above the ground.

Garden beans have an epigeous type of germination.

Epigeous Germination



Hypogeous Germination



In **hypogeous** germination, the epicotyl elongates and raises the plumule above the ground.
The cotyledons (which are usually still enclosed by the seed coat) and the hypocotyl never emerge and remain below the surface of the soil.
Peas have a hypogeous type of germination.

Hypogeous Germination