



Unit B: Plant Anatomy

Lesson 5: Understanding Seed Anatomy

Vocabulary

- ✓ Burs
- ✓ Cotyledon
- ✓ Embryo
- ✓ Epicotyl (plumule)
- ✓ Hypocotyl
- ✓ Radicle
- ✓ Seed
- ✓ Seed coat

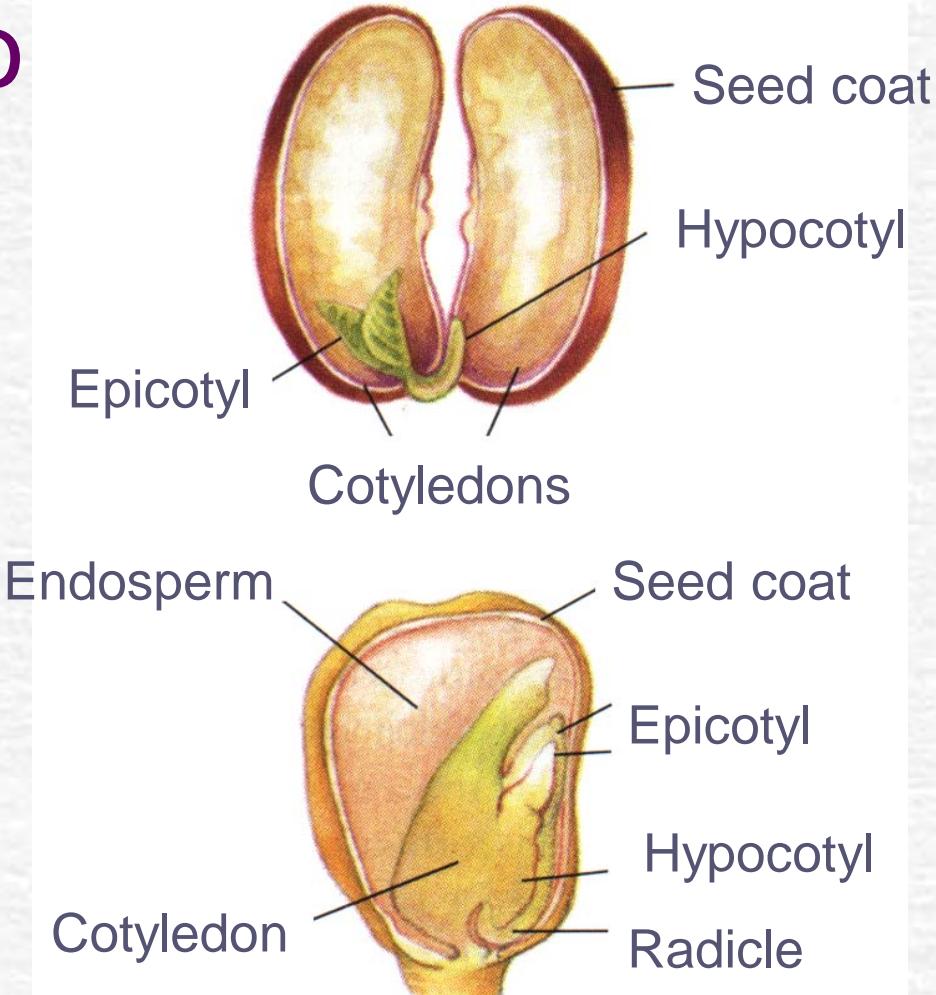
What Are the Major Parts of a Seed & Where Are They Located?

- ☛ A seed is a living entity that serves as a bridge between generations of a plant. A **seed** contains the embryo plant and stored food.
 - It is formed in the pistil of the flower and develops from the ovule following fertilization
 - As the fertilized egg (zygote) grows and develops, it becomes the embryo of the seed

Parts of the Embryo

- ☛ The embryo contains the root, stem and leaf of a complete plant
 - In addition to this, it also contains stored food to support development and growth of the embryo
 - The seeds of dicot plants have food stored **cotyledons**. In monocot seeds, most food is found in the endosperm
 - The embryo's root is called the **radicle**, the stem the **hypocotyl** and the leaf the **epicotyl**
- ☛ Surrounding the embryo & endosperm is a protective **seed coat**

Embryo Parts



What Is the Function of Each Major Part of a Seed?

- Each part of the seed has a specific function to help ensure that a healthy new plant will emerge from the seed
- The seed is a living entity which contains the embryo plant & everything necessary for its growth & development
 - Dicot plants (soybean, pea, oak) have two cotyledons while monocots (corn, coconut, lilies) have only one cotyledon in its seed

Seed Parts & Functions

Radicle	Lower part of the hypocotyl; forms the first root; first to emerge from the seed
Hypocotyl	Develops into the true stem
Epicotyl	Above the hypocotyl; develops into a pair of small leaves Tip is sometimes called the plumule – it is the terminal bud of the first shoot to emerge from the seed

Endosperm	Found in monocots in an area of high concentration of food; food source for the embryo
Cotyledon	Stores food absorbed from the endosperm when the seed is formed; provides energy until the plant produces its own food
Seed coat	Surrounds the seed and protects it from injury and dehydration

Describe seed dispersal

- Unlike animals, plants are limited in their ability to seek out favorable conditions for life and growth. As a result, plants have evolved many ways to disperse their offspring by dispersing their seeds. A seed must somehow "arrive" at a location and be there at a time favorable for germination and growth.

- Seed dispersal is seen most obviously in fruits; however many seeds aid in their own dispersal. Some kinds of seeds are dispersed while still inside a fruit or cone, which later opens or disintegrates to release the seeds. Other seeds are expelled or released from the fruit prior to dispersal. For example, milkweeds produce a fruit type, known as a follicle, that splits open along one side to release the seeds. Iris capsules split into three "valves" to release their seeds.

By wind

- Many seeds like maple and pine have a wing that aids in wind dispersal.
- The dustlike seeds of orchids are carried efficiently by the wind.
- Some seeds like dandelion, milkweed, poplar have hairs that aid in wind dispersal.
- Some winged seeds have two, and some have only one wing.



By water

- Some plants, such as Mucuna produce buoyant seeds termed sea-beans or drift seeds because they float in rivers to the oceans and wash up on beaches.



By animals

- Seeds with barbs or hooks are called **burs**. These seeds attach to animal fur or feathers, and then drop off later.
- Seeds with a fleshy covering are eaten by animals such as birds, reptiles, fish, and mammals. They then disperse these seeds in their droppings. These types of seeds include apple, cherry, and grape seeds.
- Nut seeds are an attractive long-term storable food resource for animals. The seeds are stored some distance from the parent plant, and some escape being eaten if the animal forgets them. These type of seeds include acorns, walnuts, pecans, and almonds.



Economical Importance of Seeds

- ☛ There are thousands of species whose seeds have economic uses.
 - Most people and animal diets include seeds.
 - Many seeds are edible and the majority of human calories comes from seeds, especially from cereals, legumes and nuts.

- ☛ Seeds also provide most cooking oils, many beverages and spices and some important food additives. In different seeds the seed embryo or the endosperm dominates and provides most of the nutrients.
- ☛ Seeds are used to propagate many crops such as cereals, legumes, forest trees, turf grasses and pasture grasses.
- ☛ Seeds are also eaten by animals, and are fed to livestock. Many seeds are used as birdseed.

- ☛ The world's most important clothing fiber grows attached to cotton seed. Other seed fibers are from kapok and milkweed.
- ☛ Many important nonfood oils are extracted from seeds. Linseed oil is used in paints. Oil from jojoba and crambe are similar to whale oil.
- ☛ Seeds are the source of some medicines including castor oil, tea tree oil and the discredited cancer drug, Laetrile.



- ☛ Many seeds have been used as beads in necklaces.
- ☛ Seeds once used as weights for balances.
- ☛ Seeds used as toys by children
- ☛ Resin from *Clusia rosea* seeds used to caulk boats.



Summary

- ❑ What part of the seed is the primary root?
- ❑ What is the function of a cotyledon?
- ❑ What part of the plant develops into the true stem?
- ❑ How is a monocot different from a dicot?
- ❑ What protects the seed before it germinates?
- ❑ How are seeds dispersed?
- ❑ How are seeds economically important?