

Basics of Plant Science & Health



What is the basic plant structure and function?

Every plant can be divided into two parts:

Shoot system:

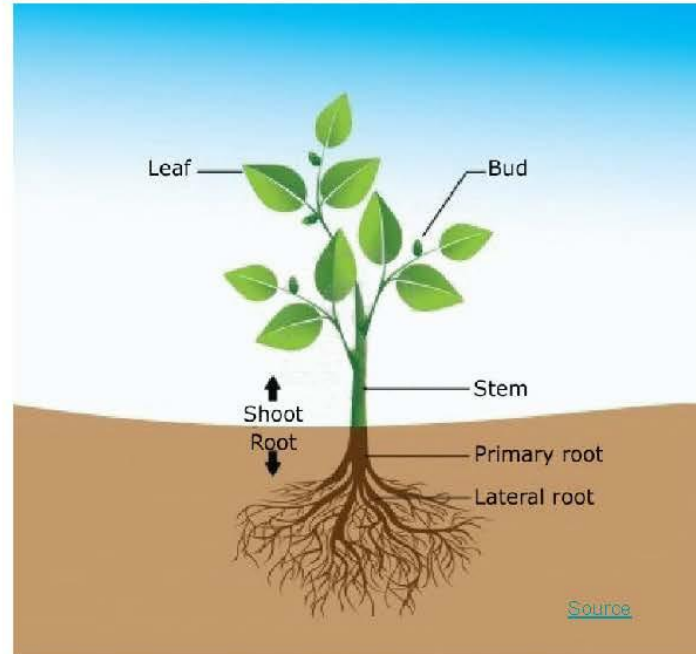
The above-soil part of a plant

Growth; Photosynthesis; Structure and Reproduction

Root system:

The below-soil part of a plant

Nutrient access, dissolvment and transport; Anchoring and Storage of metabolites



The Shoot System

The **shoot system** is made up of a few key components:

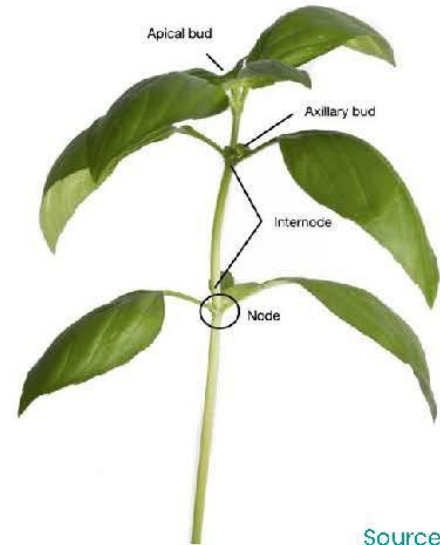
- The stem
- The leaves
- And reproductive structures (ie.flowers, fruits and seeds).

The stem is a core part of the plant. It is responsible for supporting the plant, providing a place for leaves, fruit and flowers to grow and ensures that the leaves are facing toward the sun.

The role of the stem is also transporting and storing water and nutrients from the roots up to the rest of the plant, while transporting back down the products of photosynthesis from the leaves.

Furthermore, **the stem consists of two parts:**

1. Nodes (where buds grow into leaves, flowers and fruits)
2. Internodes (the space between the nodes)



[Source](#)



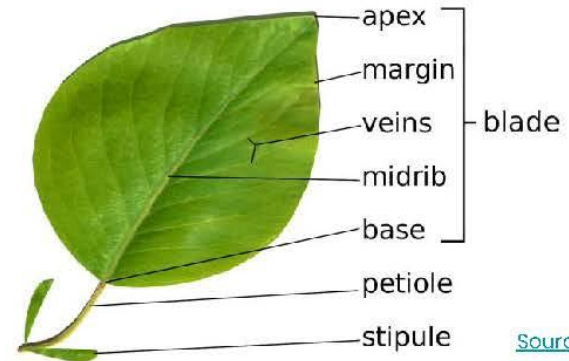
The Shoot System – Leaves

The leaves of the shoot system are **flat-like structures** that are important for key processes known as photosynthesis and transpiration.

The leaves produce the sugars through photosynthesis, and those sugars may be transported through specialized cells down the stem and to other structures

Some **leaves have specialized functions and traits** that make them appear in different colours and shapes. An example of this can be seen in pine trees where the pine needles are specialized leaves of the tree. They have a small surface area and are wax covered to reduce water loss especially during winter, as they remain on the plant. This is the reason deciduous trees need to drop their leaves.

The green colouring we see in leaves is a result of the green pigment that exists in the cells of plants known as **chlorophyll**.



[Source](#)

FUN FACT: Plants are green because it's the only wavelength not absorbed by chlorophyll.



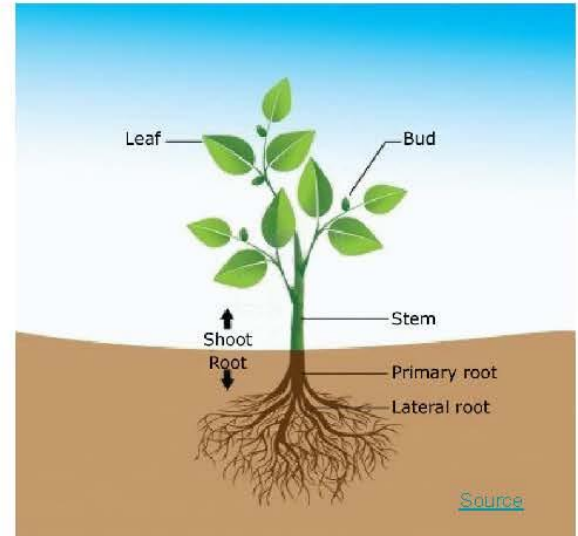
The Root System

The root system and all its structures are **primarily located below the ground**, although that is not always the case.

The goal of the root system is to **help anchor the plant** to the ground and **uptake water and minerals** and send it up to the rest of the plant for growth and development. Root systems also have the **ability to store water and nutrients** for the plant.

There are 3 main root systems:

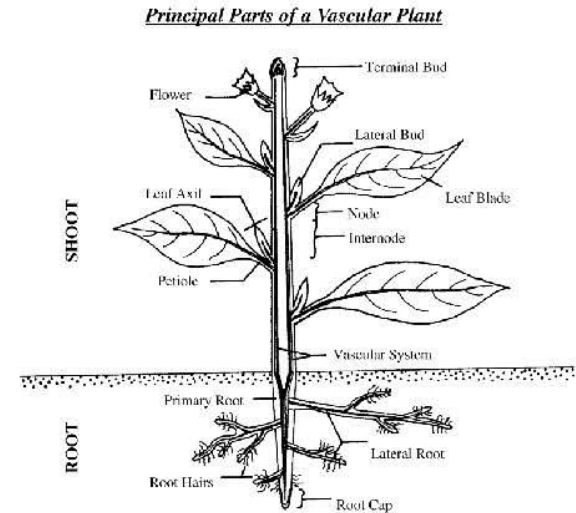
1. Fibrous root system (thin and hair-like)
2. Tap root systems (short and thick)
3. Buttress root systems (can be thick and long)



The Root System

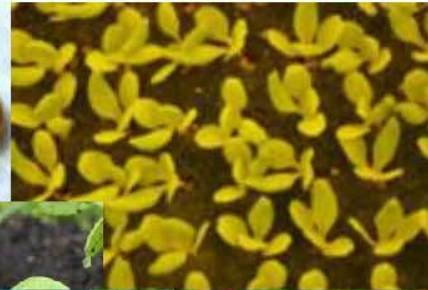
Amongst the three root systems, they all consist of a primary root, lateral roots, root hairs and a root cap.

- The **primary root**, much like the name is the first major root out of the plant and the main function is to anchor the plant and grow downwards.
- The **lateral roots** are roots that branch out from the primary root and their main function is to explore their substrate for water and nutrients.
- The **root hairs** are hair-like structures that emerge from lateral roots, they help the plant absorb more nutrients and water by increasing the surface area of the roots.
- The **root cap** is the tip of the plant root, it works to protect the growing tip in plants.



What are the stages of plant growth?

Stage	Function
Sprouting	Initial stage after germination, sustained over seed endosperm, exposition of radicle
Seedling	Unfolded cotyledon and first true leaves, primary roots developed
Vegetative	Mass accumulation, root-network development and production of leaves
Budding	Initial stage of reproduction, triggered by environmentals and plant age
Flowering	Development of reproductive organs for pollen distribution/ reception
Fruiting/Ripening	Maturation and ripening of flower ovaries for seed dispersal



Summary Checklist – Basics of Plant Science and Health

- The Shoot System is the above-soil part of a plant.
- The Root System is the below-soil part of a plant.
- Each stage of a plant's growth cycle is responsible for many different functions.

