

INTRODUCTION TO PLANT PROCESSES

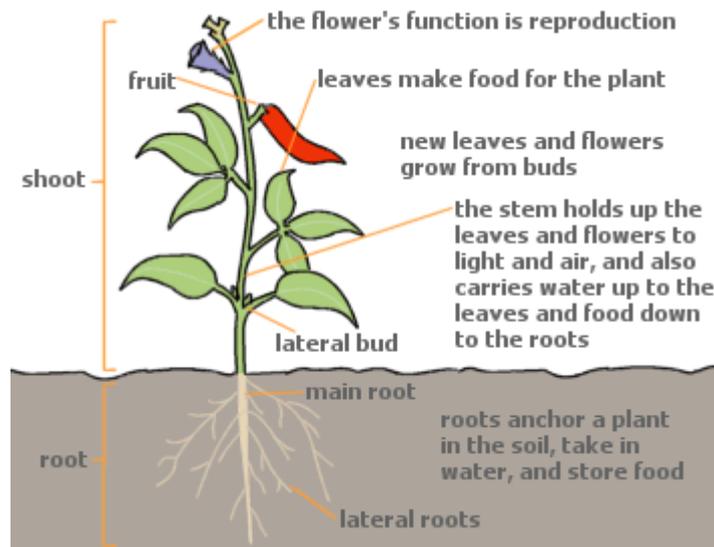
PLANT STRUCTURE

All plants have two things in common –

- (1) their cells have a cell wall made of cellulose; and
- (2) they make their own food by photosynthesis.

Because they make their own they are called *autotrophs*.

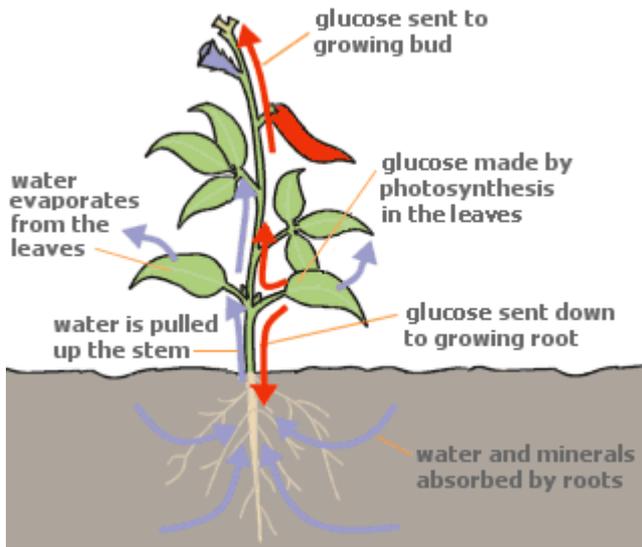
Typically, a flowering plant consists of roots, stems, leaves, buds and flowers.



The roots help provide support by anchoring the plant and absorbing water and minerals needed for growth. They can also store the sugars and carbohydrates that the plant uses to carry out other functions.

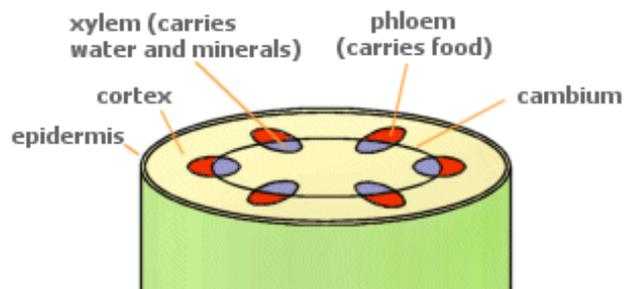
The stem is part of the shoot system of the plant. It holds the leaves above the ground so they get a maximum amount of light for photosynthesis. Leaves are usually thin and flat so that they have a large surface area to absorb light. Many leaves are green because many leaf cells contain chloroplasts. Stems also provide support for the plant allowing the leaves to reach the sunlight they need to produce food.

TRANSPORT



Plants contain tubes for carrying water and minerals and food around the plant. The tubes that carry water are called *xylem* and the tubes that carry food are called *phloem*.

The walls of the xylem are very hard and waterproof. They don't contain any living material they are just like straws. In trees, the hard waterproof xylem vessels are the main components of wood. Unlike xylem, phloem is a living tissue and the movement of food substances through the phloem requires energy.



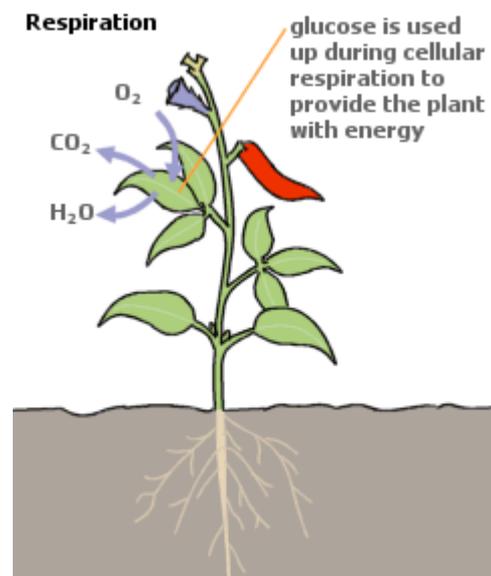
RESPIRATION

Respiration is a chemical reaction that occurs in the cells of all living things to provide energy.

In plants, gaseous exchange takes place through special openings or pores called stomata. Oxygen and carbon dioxide diffuse in and out of the plant through these little holes. Water vapour also moves out of the plant through the stomata.

Cellular respiration can occur in two ways:

(1) If oxygen is available, oxygen combines with glucose to convert it into energy while carbon dioxide and water are released. This is known as aerobic respiration.



(2) Some organisms can break down glucose to provide energy without oxygen being present. This is known as anaerobic respiration.

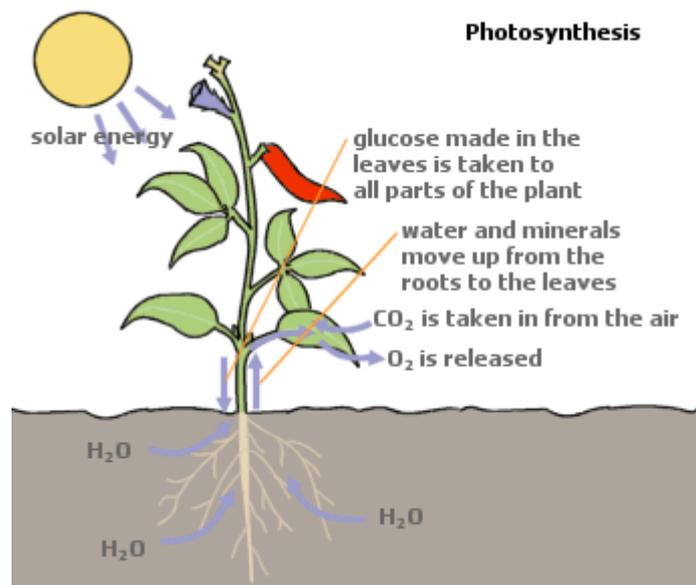
Both processes release energy from food by breaking it down chemically.

PHOTOSYNTHESIS

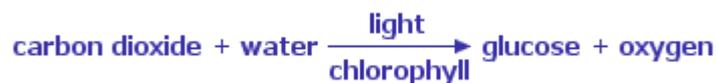
All the food we eat was originally made by the action of sunlight on plants.

Plants make food by a process called photosynthesis. In this process, carbon dioxide and water in the presence of chlorophyll (the green pigment) and light energy are changed into glucose (a sugar). This energy-rich sugar is the source of food used by most plants.

Photosynthesis is special to plants! Photosynthesis supplies food for the plant and oxygen for other forms of life. A plant helped make the oxygen you are breathing today.



From the equation for photosynthesis we know that plants need light, carbon dioxide, chlorophyll and water to photosynthesise successfully.

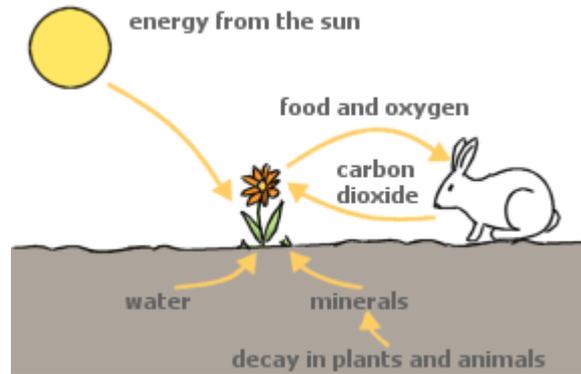


CYCLING OF NUTRIENTS

Some of the sugars made by photosynthesis are used for respiration, or converted into starch for storage. Certain plants form other storage substances, such as fats and oils. These fats and oils are then stored in the seeds.

During the day, both photosynthesis and respiration take place in plants all the time. At night, only respiration takes place because there is no light energy for photosynthesis.

Plants play a vital role in the cycling of nutrients. The process of photosynthesis incorporates the carbon atoms from carbon dioxide into sugars. Animals eat the plants and use the carbon to build their own tissues. Animals eat each other and then use the carbon for their own needs.



These animals return carbon dioxide into the air when they breathe, and when they die, since the carbon is returned to the soil during decomposition. The carbon atoms in soil may then be used in a new plant or small microorganisms.



Producer: The many green leaves on this potato plant allow it to make its own food



Consumer: This cow will get its energy from the grass it is eating