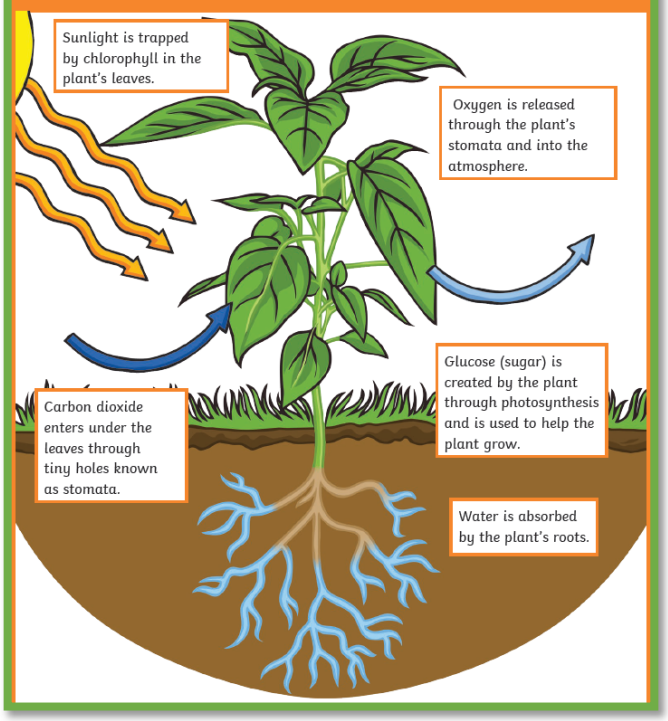
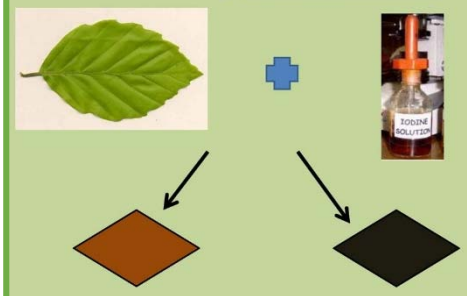
Knowledge organiser

Photosynthesis



We can test leaves for the presence of starch using iodine solution…

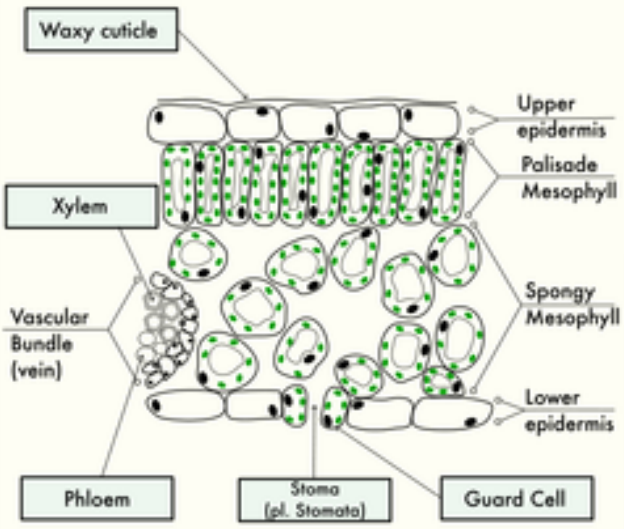


Plant and minerals summary

Mineral	Use in plant	Deficiency signs
nitrogen	making leaves	stunted growth and yellow leaves
phosphorus	making roots	poor roots and purple leaves
potassium	making flowers and fruits	yellow leaves with dead spots
magnesium	making chlorophyll	leaves turn yellow from the bottom

ADAPTATIONS OF THE LEAF TO PHOTOSYNTHESIS

STRUCTURE OF A LEAF



FUNCTIONS OF THE LEAF PARTS

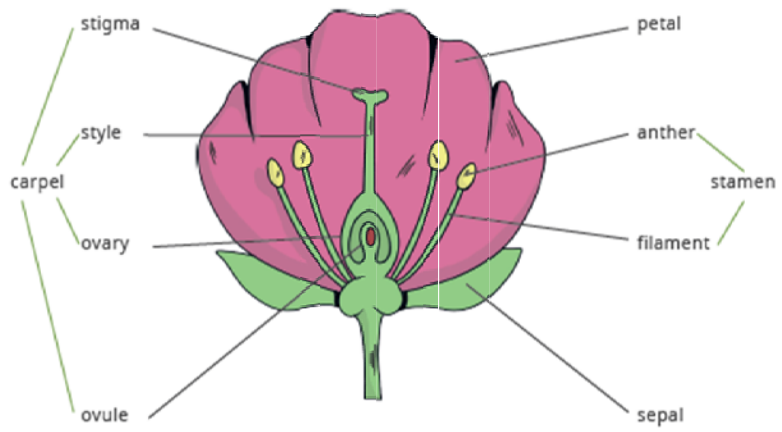
Leaf Part	How is it involved in Photosynthesis?
Waxy Cuticle	Prevents water loss but allows light through.
Upper Epidermis	Transparent to allow light to pass through. Also a protective layer to prevent entry of pathogens.
Palisade Mesophyll	Tall, thin cells packed closely together, each containing large numbers of chloroplasts. Allows maximum absorption of light.
Spongy Mesophyll	Large air spaces allow gases to circulate in the leaf. Carbon dioxide has to diffuse to the cells for photosynthesis.
Lower Epidermis	Has pores called stomata to allow carbon dioxide into the leaf. Guard cells can close stomata to reduce water loss.
Xylem	Brings water to the leaf, which is needed for photosynthesis.
Phloem	Takes away some of the products of photosynthesis for other parts of the plant to utilise and for storage.

KS3 Plant Reproduction **Knowledge Organiser**

Key Words

asexual reproduction	Reproduction involving only one parent that produces genetically identical offspring (clones).
cutting	A piece of plant that is cut from a parent plant and then made to form roots and shoots by putting it in favourable conditions.
fertilisation	The fusion of male and female gametes.
gamete	A male or female sex cell.
germination	In plants, the growth from a seed after a period of dormancy.
nectar	A sugary liquid which attracts pollinating animals to a flower.
pollen	The male plant sex cell.
runners	Side branches of a plant that have plantlets on them that can grow into a new plant. Some plants reproduce asexually by producing these.
sexual reproduction	Reproduction in which male and female gametes fuse at fertilisation to produce offspring that are genetically different to the parents.

Parts of a Flower



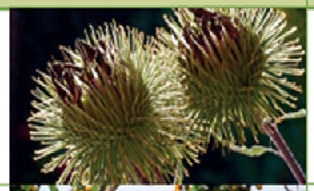
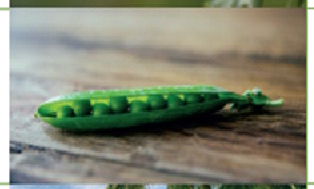
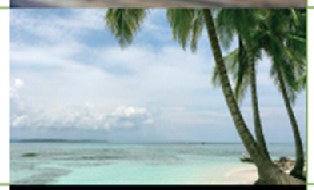
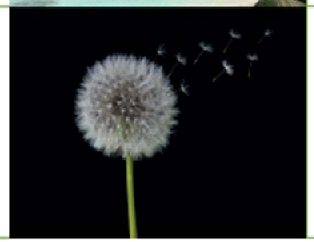
Adaptations of Plants for Pollination

Insect-Pollinated Plants	Wind-Pollinated Plants
They have bright petals with a sweet smell to attract insects.	No petals or small green/brown petals, as no need to attract insects.
The stigma and anther are inside the flower.	The anther hangs loosely out of the plant to make it easier for wind to blow it from the plant.
The stigma is sticky, so that pollen carried from the insects sticks to it.	The stigma hangs outside of the plant to make it easier to catch pollen on the wind
Pollen grains are larger and can easily stick to insects, so fewer pollen grains need to be produced.	The stigma may be feathery or sticky to catch pollen blown by the wind.
The anthers are firm and rigid to allow the insects to brush against them.	They produce large amounts of pollen to increase the chances of it reaching another plant.
They often contain nectar, which is sweet and sugary to attract insects. Some bees use nectar to make honey.	Their pollen has a low mass so can be blown far on the wind.

Roles

Part of the Flower	Function
anther	Produces male sex cells (pollen grains).
carpel	The female reproductive part of the flower, consisting of the ovary, ovule, style and stigma.
filament	A stalk-like structure that supports the anther.
ovary	Produces female sex cells (eggs).
ovule	Develops into a seed after fertilisation.
petal	May be brightly coloured to attract insects.
sepal	These protect the flower before it is opened when it is still a bud. They are often green.
stamen	The male part of a flower consisting of an anther held up on a filament
stigma	The top of the female part of the flower, which is sticky, so pollen grains stick to it.
style	The tube connecting the stigma to the ovary which pollen travels down.

Seed Dispersal

Method of Seed Dispersal		Description	Adaptations
animal dispersal (external)		Seeds stick to the animals' fur when they brush past them. This means they are transported with the animal and eventually fall, or are rubbed off, in a different location. Examples include burrs or goose grass. Animals such as squirrels store hard nuts and seeds to be eaten during winter. If the seeds are not retrieved by the squirrel they can germinate. Examples include acorns.	Seeds have hooks or spikes to hook onto the fur of passing animals. Seeds are coated in a sticky substance to stick to animals as they pass. Seeds or nuts provide a food source which animals want to bury for future use.
animal dispersal (internal)		Some seeds are found in fruits that are eaten by animals. The seeds pass through the digestive systems of the animals and are deposited on the ground in a different place in the animals' faeces. Examples include plums and strawberries.	The fruit is brightly coloured and edible to attract animals to eat it. The seed is usually small and can be in a hard case for protection.
drop and roll		Some plants produce nuts or fruits. When these are ripe, they fall from the tree and roll away when they hit the ground, allowing them to grow new plants away from the parent. Examples include apples and acorns.	Heavy nuts and fruits drop from branches due to gravity and break open when they hit the ground. Some fruits are round in shape to allow them to roll as far away as possible when they hit the ground. Some trees grow very tall before producing fruits, so when the fruit hits the ground it does so with a large force.
explosion		Some plants, such as peas, produce pods which can explode, dispersing the seeds.	These seeds are dispersed in summer when one side of the pod dries more quickly than the other causing it to buckle and split open and ejecting the seeds.
water dispersal		In certain environments, some plants will grow near a water source such as a river or ocean. The seeds or fruits from these plants will fall into the water and be carried away to another area. Examples include coconuts.	The seeds have a low density and will float. The seeds can often be transported by wind as well as water.
wind dispersal		Some plants such as dandelions or sycamore seeds use the wind to help them disperse their seeds. The force exerted on these seeds by the wind is enough to dislodge them from the plant and carry them long distances.	Dandelions seeds have feathers or fluff which act as parachutes and are carried on the wind. The seeds are very light and can be carried a long way by the wind. The feathery parts also create a large surface area to allow the seeds to catch as much of the wind as possible. Sycamore seeds have 'wings' which provide a large surface area to be caught in the wind. They twist and turn in the wind to carry the seeds away from the parent plant. The seeds are relatively heavy and therefore to be most effective, need to be released from a high up in windy conditions.