

Plants Unit

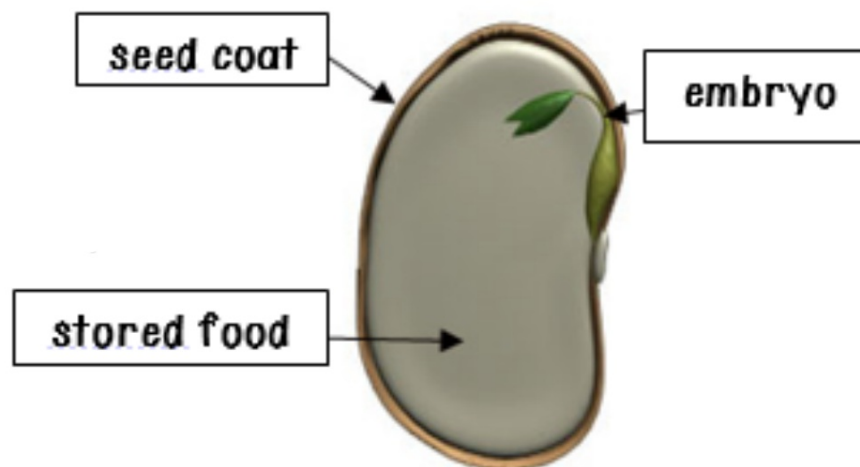
Every plant and animal has a pattern of growth and development called a life cycle. As seed plants and animals go through their life cycles, they grow within a habitat for which their needs can be met. Plants and animals have adaptations that allow them to survive the conditions within the habitats in which they live.

- An adaptation is a characteristic that improves the organism's ability to survive.
- A habitat is a place where an organism or groups of organisms live and obtain the air, food, water, shelter or space, or light needed to survive.

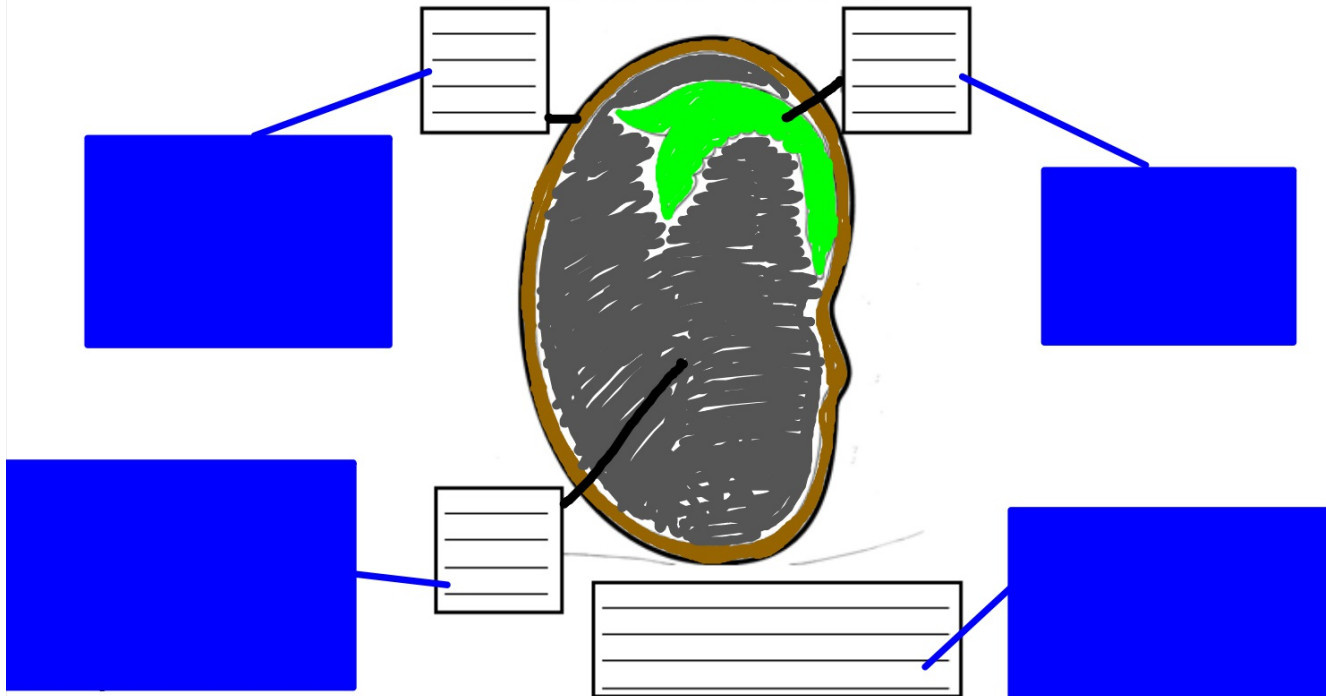
1. Define life cycle - _____

2. _____ allow plants and animals to survive the conditions within the habitats in which they live.

The dry seeds you hold in your hand are asleep. To wake them up all you need to do is give them water or plant them in the ground at the right time of year. A seed that is alive but asleep is said to be dormant.



Parts of a Seed



Life Cycle of Seed Plants:

All plants go through a life cycle. Listen begin by talking about the first stage in the life cycle of a plant, a seed...

1. Seed:

Seeds carry the beginnings of plants inside them. They contain a tiny undeveloped plant with enough food for growth to start. A seed has a seed coat covering it for protection. The seed coat also keeps the embryo from drying out. Inside, you can see the roots, leaves, embryo and food storage area. Seeds need water, soil, light and warmth to germinate and grow.

coconut seed



poppy seed

Seeds come in different shapes, sizes and locations according to the plant from which they came. Some can be eaten and some can't. They can be thin and soft as in beans or thick and hard as in locust or

coconut seeds. Some may be big like lima beans or tiny like poppy seeds.

After **pollination** (which is the spreading of pollen from one flower to another flower) occurs, seeds are produced and may be stored in the fruits that are produced. When a seed is exposed to the proper conditions it will begin to **germinate**. Water and oxygen are taken in through the seed coat. This makes the seed begin to swell. The embryo's cells start to enlarge. Then the seed coat breaks open and a root emerges first, followed by the shoot that contains the leaves and stem.

Some seed coats are so hard that water and oxygen cannot get through until the coat breaks down. Soaking or scratching the seeds will help break down the seed coat. Morning glories and locust seeds are examples. Other seeds need to be exposed to proper temperatures. Apple seeds will not germinate unless they are held at cold temperatures for a period of time.



Many things can cause poor germination. Overwatering causes the plant to not have enough oxygen. Planting seeds too deeply causes them to use all of their stored energy before reaching the soil surface. Dry conditions mean the plant doesn't have enough moisture to start the germination process and keep it going.



2. Seedling

Seedlings produce the parts of the plant that will be needed for the adult plant to survive in its habitat. Roots begin to grow and take in nutrients and water from the habitat. The stem pops out of the ground and starts to grow towards the light. The first leaves form on the stem. Later, more leaves will form that help the plant make its food.

3. Mature Plant

Mature plants have the same structures as seedlings; such as roots, stems, and leaves. In addition they develop flowers or cones, which produce seeds. ~~Flowering plants reproduce and make new seeds using~~



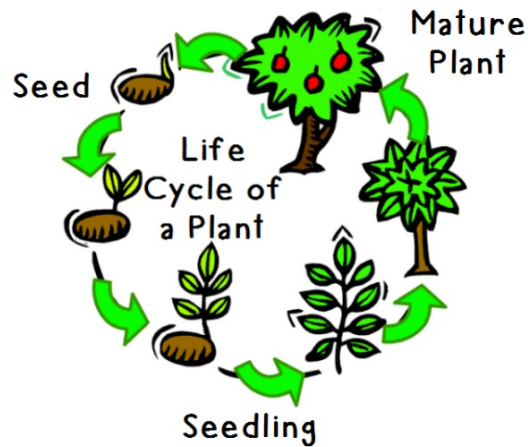
apple tree (flowers & fruit)

conifer

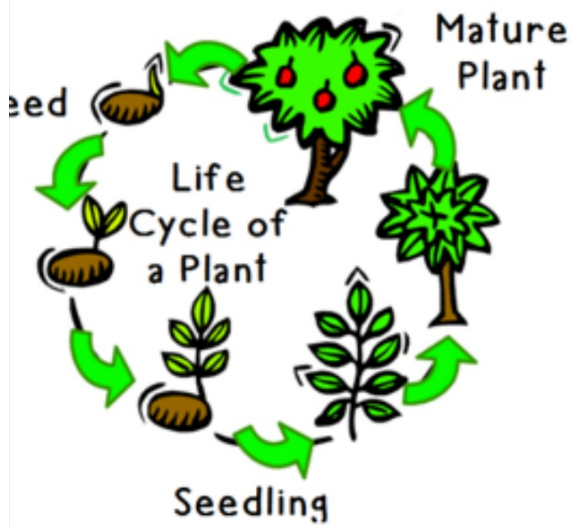


flowers. Eventually the flower dies and a fruit forms around the seeds made in the flower during pollination.

Have you ever picked up a pine cone? Cones are plant structures that make seeds too. Plants that reproduce with cones are called conifers. Conifers share a very similar life cycle to flowering plants, but make their seeds inside of cones instead of flowers.



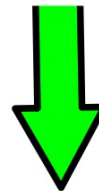
Life Cycle of a Plant



Seed



Seedling

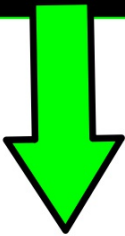


Mature Plant



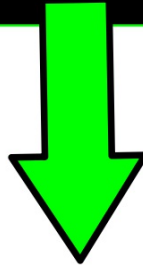
1. Seed

carries the beginnings of plants inside them; comes in many shapes, size, textures and colors



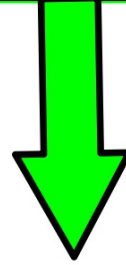
2. Seedling

After pollination the seed germinates; it grows roots, a stem and the first leaves; the baby plant pops out of the ground



3. Mature Plant

the seedling begins to grow other parts (flowers, seeds, fruits) and more leaves; some make flowers and others make cones



Adaptations of Seed Plants: physical

Some plants have special ~~structural adaptations~~ for meeting their needs in their particular habitat. These examples of plant adaptations to conditions in may include:

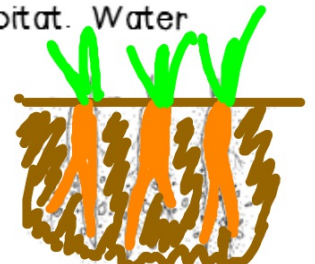
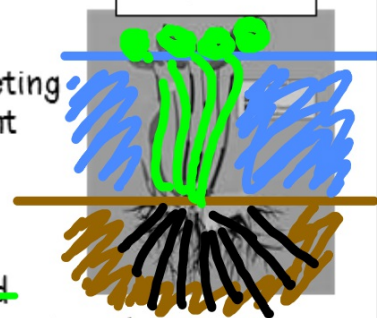
A. Roots

cacti roots

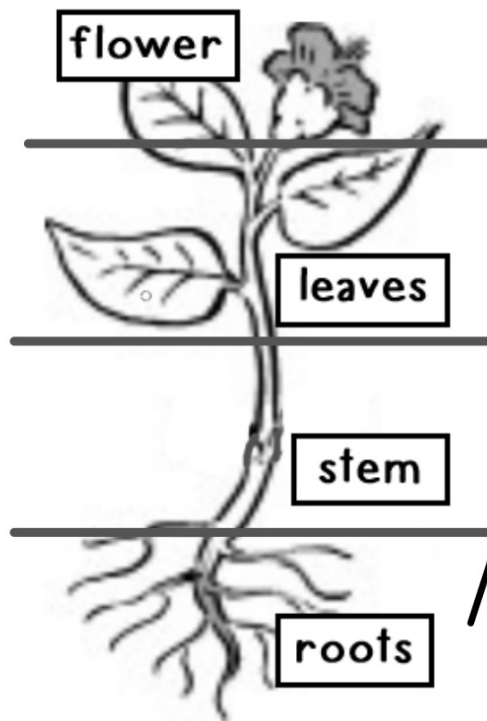


~~Roots take in water and nutrients from the habitat. They may also hold the plant in place and store food and water.~~ Each variety of plant will survive where its roots size, length, and spread are adapted to the habitat. Water lilies have long roots that can take in nutrients from the muddy bottoms of ponds or lakes. Cacti have roots that spread out close to the surface for living in dry habitats. Carrots and dandelions have a large, thick root that is longer than its other roots. This long root helps the plant survive by reaching far underground to find water and to firmly anchor the plant.

water lilies



carrots



Jobs of the Root

- * soaks up water and nutrients from the ground
- * they anchor or hold the plant in the ground
- * store food (nutrients) and water

Types of Roots

- * shallow, spread out roots = to soak up as much water as possible near the surface of the ground (cacti roots)
- * long, deep roots = to get water from deep in the ground (water lilies)
- * large, thick roots = longer than the rest of the roots; reaches far underground to find water and firmly anchor it (carrots & dandelions)

B. Stems

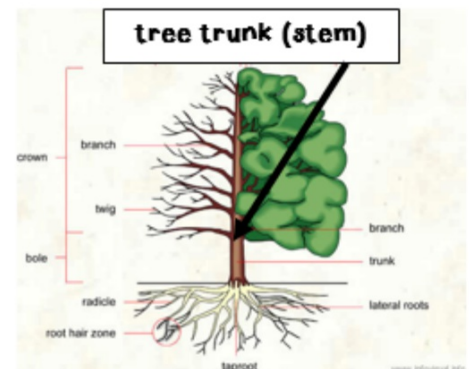
~~Stems move and store water and nutrients in the plant.~~

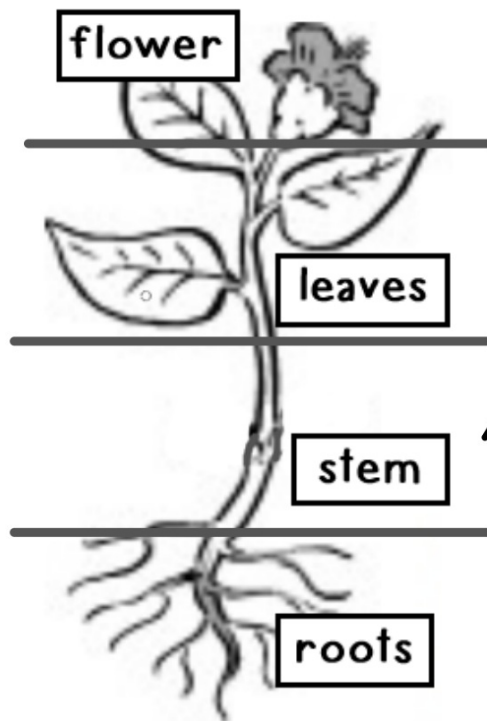


~~Stems also provide support and protection for the plant.~~

Vines have stems that can climb and stick to various surfaces to ensure that the leaves are exposed to light. Corn and sunflowers have stems that grow thick and strong but remain green and flexible so that they can grow

toward the sun. Trees develop woody stems to support their size and provide protection during their long life cycles. Cacti have thick stems that store water when the habitat does not provide it. Some stems have thorns that provide protection.





Jobs of the Stem

- * move and store water and nutrients
- * provide support for the plant
- * provide protection for the plant

Types of Stems

- * some stems can climb and stick to surfaces to make sure it gets enough light (**vines**)
- * some stems grow thick and strong, but stay green and flexible so they can grow toward the sun (**sunflower/corn**)
- * some develop woody stems to support size and protection over a long life cycle (**trees**)
- * thick stems to store water in habitats where water is scarce (**cacti**)

C. Leaves

Leaves produce food for plants in the presence of light. Each variety of plant will survive where its leaf size, texture, thickness, and shape

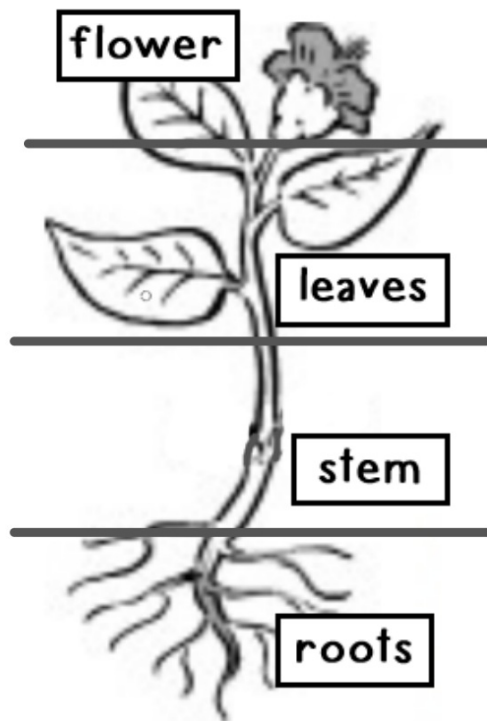
are adapted to the habitat. Water lilies develop wide leaves that allow them to float on the water to capture sunlight to make food. Evergreen trees have leaves that are thin, waxy needles to protect them from freezing and from losing water.



Evergreen needles



Lily leaves



Jobs of the Leaves

- * produce food for the plant in the presence of light

A plant can survive in its habitat when its leaves' size, texture, thickness and shape are adapted.

Types of Leaves

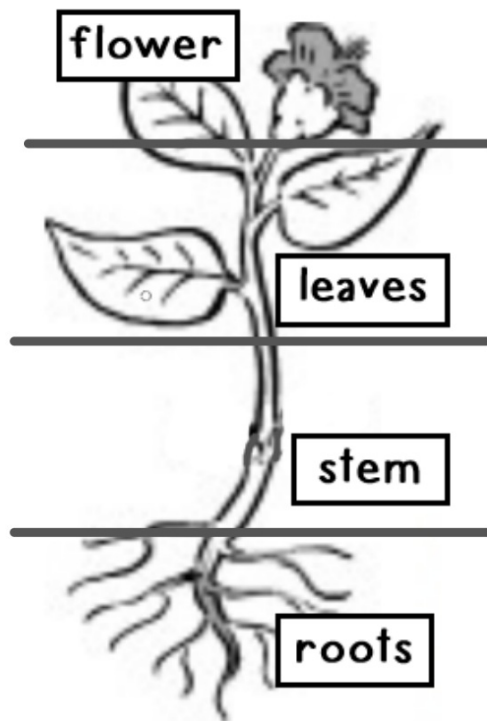
- * large, wide leaves = to float on water and soak up as much sun as possible (lily leaves)
- * thin, waxy, needle-like leaves = to protect them from freezing and losing water (evergreens-Christmas trees)

D. Flowers

Flowers often have special sizes, smells, shapes, or colors that attract organisms for pollination. A flower is a plant structure that makes seeds. This is a very important job. Pollen must move from flower to flower in order for a seed to form. This is called pollination. In flowering plants, fruit forms around the seeds.

apple blossom





Flowers often have special sizes, smells, shapes and colors that attract organisms for pollination.

Jobs of the Flower

- * pollination happens in the flower
- * makes the seeds
- * in flowering plants, fruit forms around the seeds

E. Fruit

inside of a tomato



Fruits are formed around the seed to protect it. Some fruits are moist and fleshy (tomatoes, grapes, or peaches). Fleshy fruits attract animals that eat them helping to disperse the seeds. Others fruits are dry and/or hard (coconuts, walnuts or pea pods).



walnuts

fruit

- * Fruits protect SEEDS.
- * Adaptations of fruit include...
 - moist & fleshy (tomatoes, grapes, peaches)
 - dry and/or hard (walnuts, pea pods, coconuts)

Fleshy fruits attract animals that eat them helping to disperse (spread out) the seeds.

F. Seeds

~~Some seeds begin to grow as soon as conditions allow for germination.~~ Seeds have adaptations that allow them to be dispersed and also have enough stored food for the plant until it begins making its own food. ~~Seeds are the beginning of the life cycle of a plant.~~



seeds

- * Seeds begin to germinate (grow) when the conditions allow it to.
- * Seed adaptations allow the seed to...
 1. be dispersed (spread out)
 2. have enough stored food to start growing

Physical and Behavioral Adaptations of Plants

Plants cannot move like animals can, but ~~they can respond to a change in their environment.~~ Before a seed can germinate, it has to find its way to the soil. How does it get there? Let's find out!

1. Seed dispersal

Seeds travel in many ways. Birds eat seeds and spread them, while some are ~~carried on the wind~~ and still others ~~travel on water~~. ~~Most plants produce a large number of seeds because most of the seeds do not survive.~~ In order to ensure that seeds will survive, they must be carried away (*dispersed*) from the parent plant.

dandelions in the wind



Have you ever walked through woods and found



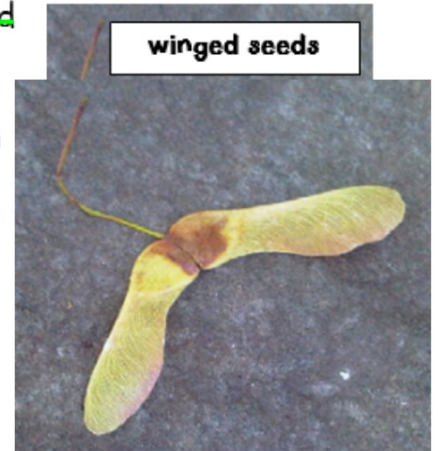
floating pumpkin seeds

little seeds attached to the legs of your pants?

These seeds ~~have hooks on them that allow them to attach to animal fur or clothes.~~ Have you ever carved a pumpkin and watched your mom put the seeds into a bowl of water? What happens to the seeds? They ~~begin to float because some seeds are able to float in water.~~ Some seeds are light and ~~have wings or thin hairs that~~

~~allow them to be carried away by wind.~~ If you have played outside in the spring, you may have seen these. They seem to float and spin in the wind.

Seed dispersal is very important for plants. If the seeds



winged seeds

Seed dispersal is very important for plants. ~~If the seeds~~

seeds with hooks



~~were to drop straight to the ground and begin to germinate, they may not survive.~~ We mentioned earlier that all

~~plants need space.~~ If a seed begins to grow right next to the mature plant it came from, it will likely not have enough space to mature. Therefore, seeds have found many creative ways to move; ~~by attaching themselves with hooks, carried in the wind, or even floating in water.~~

There are some seeds however that do none of these things.

~~These seeds depend on being eaten by animals and deposited in areas away from the parent plants.~~



Physical & Behavioral Adaptation of Plants

Seed Dispersal

Color

Response to Light

Most plants produce a large number of seeds because most won't survive.

1. Seeds must get carried away from the parent plants so they have space to grow.

Physical

hooks - attach to animal fur

hairs & wings - carry in wind

Behavioral

floats - carried by water

Some seeds must be eaten by animals and deposited somewhere else.

2. Color

~~Flowers come in a variety of shapes, sizes, and colors.~~
Have you ever smelled a flower? Most people love to smell



flowers, but these scents were not meant for us. ~~Certain bees and birds~~

~~are attracted to their smells.~~ Petals come in many colors.

We often love to look at all of the beautiful colors, but again these bright colors were not meant for us. ~~The coloration~~

~~of parts of some plants (fruits for example - berries, or flower petals)~~

~~makes them attractive to some birds and/or bees.~~ The various colors, scents (smells), sizes and often times the shape of a flower are ~~adaptions~~ meant to help with ~~pollination~~. We depend on animals like birds and bees to spread pollen. ~~The mixing of pollen from one flower to another is way a plant produces seeds.~~



Physical & Behavioral
Adaptation of Plants

Seed
Dispersal

Color

Response to
Light

Flowers come in a variety
of Shapes, Sizes and
colors.

Why are petals scented and
colored?

to attract bees and
birds to spread the
pollen for pollination

The mixing of pollen from
one flower to another is
a way a plant produces
seeds.

3. Response to light



Have you ever noticed that if you set a plant near a window, it will actually reach for the light? This is because ~~a plant needs sunlight or some other light source to survive~~. It uses the light for the energy it needs to make its food. ~~A plant always turns its leaves and bends its stems toward the light.~~

Physical & Behavioral Adaptation of Plants

Seed Dispersal

Color

Response to Light

A plant needs sunlight or some other source of light to survive.

What does it use light for?
the plant uses sunlight for energy to make food in its leaves

A plant ALWAYS turns its leaves and bends its stem toward the light.

Habitats of Plants

Organisms have needs for survival that are found in their particular habitats. ~~Organisms can only survive in an area where its basic needs (air, food, water, shelter or space, and light) can be met.~~ The specific characteristics of the habitat that allow the needs of energy, growth, and protection to be met are dependent upon the particular plant or animal. The habitat for some animals and plants may cover ~~a large area; such as grazing animals that need lots of area to get enough food, birds flying from place to place to get food, or large trees that will grow in areas where enough water is available for their growth.~~

Other animals or plants have habitats that may be ~~a small part of a larger environment; such as squirrels making their nests in one tree in a forest, some small insects living under a fallen log in the forest,~~ orchid flowers living by hanging on trees found only in warm, wet areas, or water lilies living in ponds in the shallow water.

smaller plant living on a tree (larger plant)

