

3.6.1 Asexual Reproduction in Plants

Asexual reproduction

- does not involve the manufacture or union of sex cells or gametes e.g. binary fission, fragmentation, spore formation and budding
- It involves only one parent and offspring are genetically identical (have the same genetic content) to the parent

Vegetative Propagation

- A form of asexual reproduction in plants
- Does not involve gametes, flowers, seeds or fruits
- Offspring are produced by a single plant (genetically identical to parent)
- Can happen **naturally** or it can be done **artificially**

Natural Vegetative Propagation

e.g. runners, tubers, plantlets, bulbs

What happens?

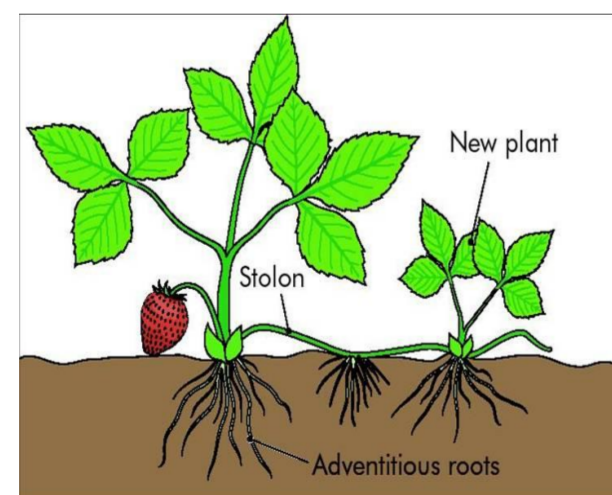
- Part of the plant becomes separated from the parent plant and divides by mitosis to grow into a new plant
- As a result the offspring are genetically identical to the parent

Parts of the parent plant may be specially modified for this purpose:

Modified Stems

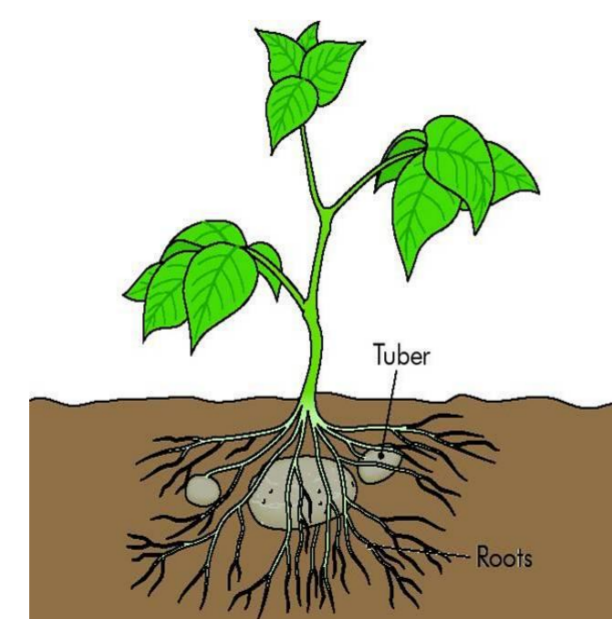
Runners

- horizontal, running over the soil surface
- terminal bud of the runner sends up new shoots
- e.g. strawberry, creeping buttercup.



Stem Tubers

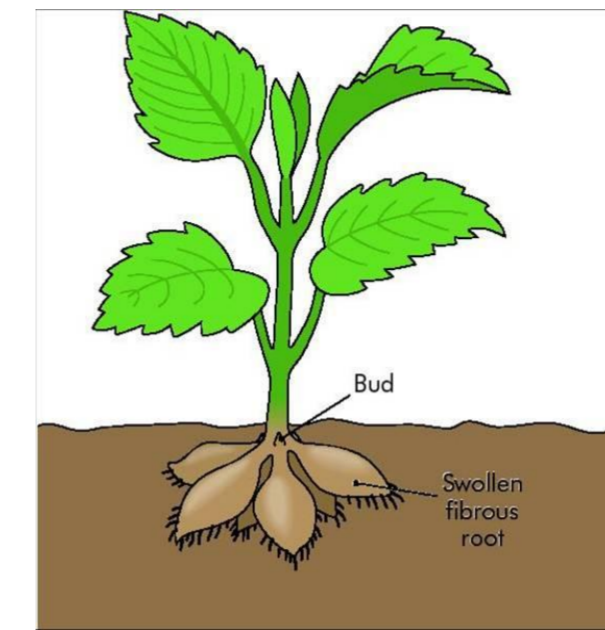
- swollen underground stem tips
- buds (eyes) produce new shoots
- e.g. potato



Modified Roots

Root Tuber

- swollen fibrous roots
- the tuber stores food, but the new plant develops from a side bud at old stem
- e.g. dahlia, lesser celandine



Note:

Tap Roots e.g. carrot and turnip, are swollen roots for food storage in biennial plants... they are not reproductive organs

Modified Leaves

Plantlets

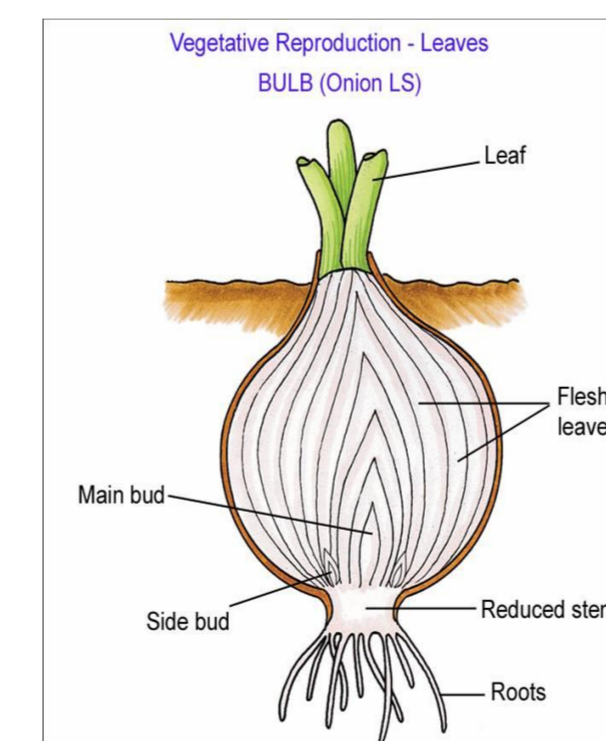
- Some plants produce plantlets along the edges of the leaves
- Plantlets reach a certain size, fall off and grow into new plants
- e.g. Lily, Kalanchoe Or Bryophyllum (mother of thousands)



Modified Buds

Bulbs

- A bulb contains an underground stem, reduced in size
- Leaves are swollen with stored food
- e.g. onion, daffodil, tulip
- The main bud (apical bud) will grow into a new shoot)
- The side buds (lateral buds) will also grow into new shoots



Artificial Vegetative propagation

used by gardeners to propagate plants

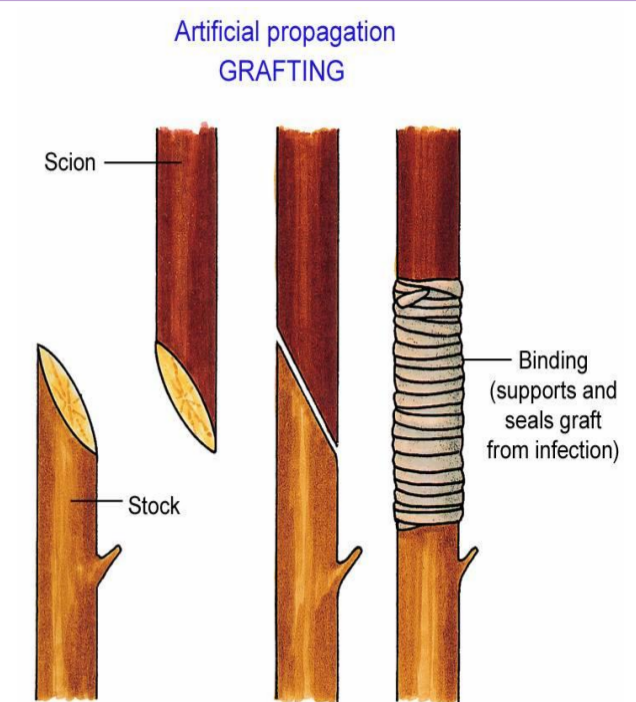
e.g. cuttings, grafting, layering, micro-propagation, etc.

Cuttings

- Parts of a plant (usually shoots) removed from plant allowed to form new roots and leaves
- rooted in water, well-watered compost, or rooting powder,
- e.g. busy lizzie, geranium

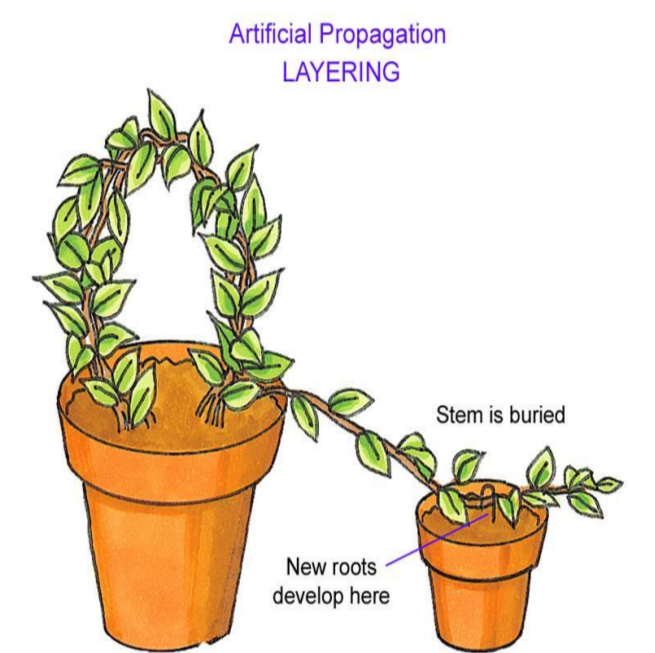
Grafting

- Part of a plant (scion) is removed and attached to a healthy, rooted part of a second plant (stock)
- Useful qualities from both plants combined into one e.g. rose flower and thorn-less stem
- e.g. apple trees



Layering

- A branch of a plant is bent over and pinned to the earth at a node
- When roots develop the branch is separated from the parent plant.
- Used to propagate woody plants
- e.g. blackberry, gooseberry.



Micropropagation (Tissue Culture)

- Cells removed from plant and grown as a tissue culture in a special medium
- Growth regulators and nutrients added so that the growing cells form a group of similar cells called a callus
- Different growth regulators are then added so that this tissue develops into a plantlet
- Plantlet can be divided up again to produce many identical plants
- Entire plant can be grown from a small piece of stem, leaf or root tissue
- Used in mass production of house plants and crops such as bananas and strawberries
- Provides a larger number of plants more quickly than cuttings.
- Can be used to check cells for a particular feature e.g. resistance to chemicals or a particular disease

Cloning

- All offspring genetically identical - produced asexually
- Clones are produced by mitosis
- All the offspring from the various methods of vegetative reproduction (both natural and artificial) mentioned are examples of clones