

Flower structure and variations

What is a flower?

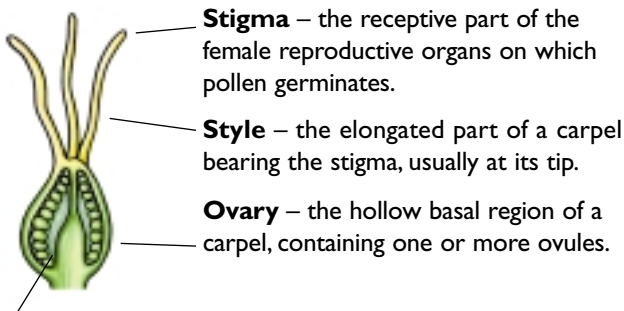
A flower is a functional unit concerned with sexual reproduction.

A flower can be pictured as a very short stem (the receptacle) which holds the components of the flower in sequence. At the very tip of this stem, so they appear in the centre of the flower, are the female organs (the gynoecium). Behind them are the male organs (the androecium), and behind them, on the outside of the flower, are the petals and sepals.



Flower structure

Kew information sheet B4



Stigma – the receptive part of the female reproductive organs on which pollen germinates.

Style – the elongated part of a carpel bearing the stigma, usually at its tip.

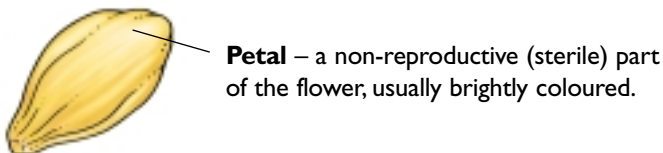
Ovary – the hollow basal region of a carpel, containing one or more ovules.

Ovules – the structures in the chamber of an ovary containing the egg cell, within the embryo sac. The ovule develops into the seed after fertilisation.

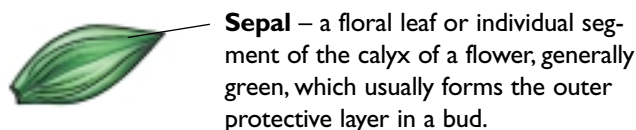


Anther – usually bilobed. Contains the pollen.

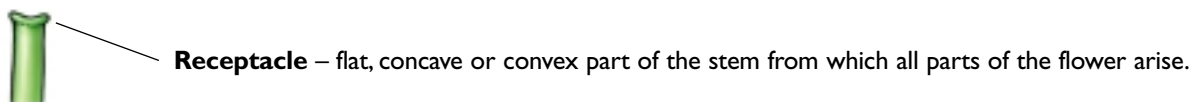
Filament – the stalk



Petal – a non-reproductive (sterile) part of the flower, usually brightly coloured.



Sepal – a floral leaf or individual segment of the calyx of a flower, generally green, which usually forms the outer protective layer in a bud.



Receptacle – flat, concave or convex part of the stem from which all parts of the flower arise.

Carpel – one of the flower's female reproductive organs, comprising a stigma, a style and an ovary.

Gynoecium (=pistil) – collective term for all the female reproductive organs of a flower comprising one or more free or fused carpels.

Stamen – the male reproductive organ of a flower consisting of an anther and filament.

Androecium – collective term for all the male reproductive organs of a flower (stamens).

Corolla – collective term for all the petals of a flower.

Perianth – the floral envelope, usually divisible into an outer whorl (calyx) of sepals and an inner whorl (corolla) of petals.

Calyx – collective term for all the sepals of a flower.

A complete flower is one with all parts (calyx, corolla, stamens and pistil) present. A flower lacking one or more of these parts is said to be incomplete. A perfect flower is one with both androecium and gynoecium. If either are lacking, the flower is said to be imperfect.

Variations on a theme

Modifications of the four basic components of the flower (sepal, petal, androecium and gynoecium), together with how groups of flowers are arranged in an inflorescence, lead to the world's overwhelming floral diversity. The details of floral morphology form the basis of flowering plant classification, so accurate descriptions are fundamental to identifying plants.

The presence or absence, number, arrangement, form and colour of these structures are all important.

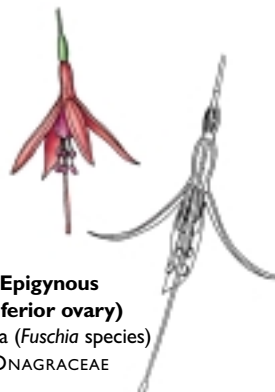
Ovary position in relation to perianth



Hypogynous (superior ovary)
Cranesbill (*Geranium sylvaticum*)
GERANIACEAE



Perigynous (around ovary)
Cherry (*Prunus avium*)
ROSACEAE



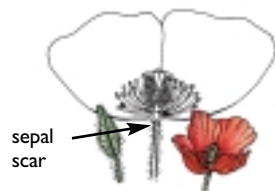
Epigynous (inferior ovary)
Fuschia (*Fuschia* species)
ONAGRACEAE

Inflorescences – reproductive shoot bearing flowers



Cyme
Comfrey (*Symphytum officinale*)
BORAGINACEAE

Perianth parts absent, reduced or indistinguishable



Sepals lost when flowers open
Poppy (*Papaver* species)
PAPAVERACEAE



Reduced petals
Petals reduced to nectaries.
Hellebore (*Helleborus viridis*)
RANUNCULACEAE



Petals and sepals identical (tepals) – Monocot plants
Lily (*Lilium* species)
LILIACEAE



Raceme
Shepherd's purse (*Capsella bursa-pastoris*)
BRASSICACEAE
The lowest structures are seed capsules

Parts free/fused



Sepals, petals, anthers & carpels free
Creeping buttercup (*Ranunculus repens*)
RANUNCULACEAE



Sepals fused
Petals free, carpels fused.
Bladder campion (*Silene vulgaris*)
CARYOPHYLLACEAE



Petals fused
Sepals free, carpels fused.
Strawberry tree (*Arbutus unedo*)
ERICACEAE



Umbel
Fool's parsley (*Aethusa cynapium*)
APIACEAE

Terminology: parts free, e.g. petals = polypetalous parts fused, e.g. sepals = gamosepalous

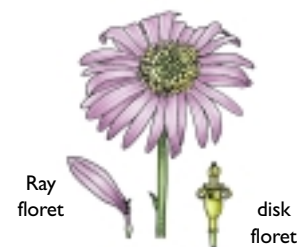
Flower symmetry



Actinomorphic (radially symmetrical)
Mallow (*Althaea cannabina*)
MALVACEAE



Zygomorphic (bilaterally symmetrical)
Perennial pea (*Lathyrus latifolia*)
FABACEAE



Capitulum – flower head
Sea aster (*Aster tripolium*)
ASTERACEAE

Illustrations: Debbie Mazels

Further information

Bell A. D. & Bryan A. (1993) *Plant Form: an Illustrated Guide to Flowering Plant Morphology*. Oxford University Press, Oxford.

Heywood V. H. (1993) *Flowering Plants of the World*. Batsford Press, London.

Baumgardt J. P. (1982) *How to Identify Flowering Plant Families*. Timber Press, Portland, Oregon.