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.

ROYAL BOTANIC GARDENS KEW

Kew **information** sheet **B4**

Flower structure

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

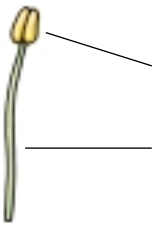
Style – the elongated part of a carpel bearing the stigma, usually at its tip.

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.

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.



Anther – usually bilobed. Contains the pollen.

Filament – the stalk

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).

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

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

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.

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

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

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

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

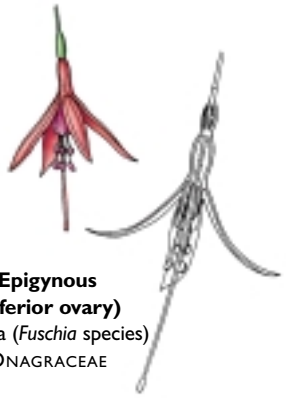
Modifications of the four basic components of the flower (sepal, petal, androecium and gynoecium), together with how groups of flowers are arranged in an inflorescence, lead to the world's overwhelming floral diversity. The details of floral morphology form the basis of flowering plant classification,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

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

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

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

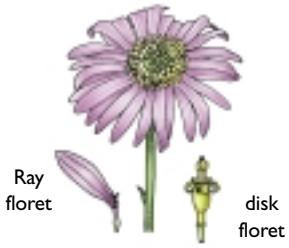
Illustrations: Debbie Maizels

Inflorescences – reproductive shoot bearing flowers

Cyme
Comfrey (*Symphytum officinale*)
BORAGINACEAE

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

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



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

Further information

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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.