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"*Floral*" redirects here. For other uses, see [Floral \(disambiguation\)](#).

Clockwise from top: [Strelitzia reginae](#), a pink [rose](#), [Epipactis palustris](#), and inflorescence of [Dracophyllum traversii](#)

**Flowers**, also known as **blooms** and **blossoms**, are the reproductive structures of flowering plants ([angiosperms](#)). Typically, they are structured in four sets, called whorls, around the end of a stalk. These whorls include: [calyx](#), modified leaves; [corolla](#), the petals; [androecium](#), the male reproductive unit consisting of stamens and pollen; and [gynoecium](#), the female part, containing [style](#) and [stigma](#), which receives the pollen, and [ovary](#), which contains the [ovules](#). When arranged in groups, with or without modified leaves ([bracts](#)), they are known collectively as an [inflorescence](#). Flowers can be described systematically using both formulae and diagrams.

Flowers grow out of an [apical meristem](#) (stem tip) and are controlled by the presence [MADS-box genes](#). Simple models are used to describe this development. Flowers are [heterosporous](#), and so produce both [microspores](#) and megaspores, which generally create male and female [gametophytes](#) (organism that leads to creation of sex cells) respectively. [Pollination](#) mediates the transport of pollen to the ovules in the ovaries, to facilitate [sexual reproduction](#). It can occur between different plants, as in cross-pollination, or between flowers on the same plant—or even the same flower, as in [self-pollination](#). Vectors transport the pollen between stamen and stigma. They may be living animals, such as birds and insects, or non-living factors such as wind and water. Pollen, especially from wind-dispersing plants, is a large contributor to [asthma](#)

After pollination, fertilisation occurs. It involves both [plasmogamy](#) (fusion of cells excluding the cell wall) and [karyogamy](#) (fusion of the [nuclei](#)). The result is a diploid (two copies of each [chromosome](#)) cell called a [zygote](#). Through cell and nuclear division ([mitosis](#)) the zygote grows into a [seed](#), which contains structures to assist in the future plants survival and success. At the same time, the ovary forms into a [fruit](#), and the other floral structures die. Its function is to protect the seed and aid in dispersal. This dispersal is divided into external vectors (allochory or by the plant itself (autochory). External vectors include both living things, such as animals and insects, and non-living things, which includes wind and water.

Flowers evolved between 150 and 190 [million years ago](#), during the later part of the [Jurassic](#) era and early [Cretaceous](#). As a subgroup of [seed plants](#), angiosperms used the flower to out compete them, as a result of greater efficiency. The colour of flowers assist in pollination and are the result of [photosynthetic pigments](#).

In [taxonomy](#), which is the study of plant classification, flowers are a key tool used to differentiate plants. For thousands of years humans have used flowers for a variety of purposes including: decoration, medicine, food, and perfumes. In human cultures, flowers are used symbolically and feature in art, literature, religious practises, ritual, and festivals.

## Etymology

Flower is from the [Middle English](#) *flour*, which referred to both the ground grain and the reproductive structure in plants, before splitting off in the 17th century. It comes originally from the Latin name of the Italian goddess of flowers, [Flora](#). The early word for flower in English was *blossom*,<sup>[1]</sup> which is still in use.<sup>[2]</sup>

## Morphology

Main article: [Floral morphology](#)

Diagram of flower parts.

The [morphology](#) of a flower, or its form and structure,<sup>[3]</sup> can be considered in two parts: the vegetative part, consisting of non-reproductive structures such as [petals](#); and the reproductive or sexual parts. A stereotypical flower is made up of four kinds of structures arranged in whorls around the tip of a short stalk or axis, called a [receptacle](#).<sup>[4]</sup> The four main whorls (starting from the base of the flower or lowest node and working upwards) are the [calyx](#), [corolla](#), [androecium](#), and [gynoecium](#).<sup>[5]</sup>

### Perianth

Main article: [Perianth](#)

#### Calyx

The [sepals](#), collectively called the calyx, are modified leaves that occur on the outermost whorl of the flower. They are leaf-like, in that they have a broad base, [stomata](#) and [chlorophyll](#) and may have [stipules](#). Sepals are often waxy and tough, and grow quickly to protect the flower as it develops.<sup>[6][7]</sup> They may be [deciduous](#), but will more commonly grow on to assist in fruit dispersal. If the calyx is fused it is called gamosepalous.<sup>[6]</sup>

#### Corolla

The [petals](#), collectively called corolla, are almost or completely fiberless leaf-like structures that form the innermost whorl of the perianth. They are often delicate and thin and are usually colored, shaped, or scented to encourage pollination.<sup>[8]</sup> Although similar to leaves in shape, they are more comparable to stamens in that they form almost simultaneously with one another, but their subsequent growth is delayed. If the corolla is fused together it is called [sympetalous](#).<sup>[9]</sup> In [monocotyledonous](#) flowers (e.g., [Lilium sp.](#)), petals and sepals are indistinguishable and are individually called [tepals](#). Petals also tend to have patterns only visible under ultraviolet light, which are visible to pollinators but not to humans.

### Reproductive

Main article: [Plant reproductive morphology](#)

Reproductive parts of easter lily ([Lilium longiflorum](#)). 1. Stigma, 2. Style, 3. Stamens, 4. Filament, 5. Petal

#### Androecium

The [androecium](#), consisting of stamens, is the whorl of pollen-producing male parts. Stamens consist typically of an [anther](#), made up of four pollen sacs arranged in two [thecae](#), connected to a [filament](#), or stalk. The anther contains microsporocytes which become [pollen](#), the male [gametophyte](#), after undergoing [meiosis](#). Although they exhibit the widest variation among floral organs, the androecium is usually

confined just to one whorl and to two whorls only in rare cases. Stamens range in number, size, shape, orientation, and in their point of connection to the flower.<sup>[8][9]</sup>

In general, there is only one type of stamen, but there are plant species where the flowers have two types; a typical one and one with anthers that produce sterile pollen meant to attract pollinators. These plants are called heterantherous.<sup>[10]</sup>

## Gynoecium

The [gynoecium](#), consisting of one or more [carpels](#), is the female part of the flower found on the innermost whorl. Each carpel consists of a [stigma](#), which receives pollen, a [style](#), which acts as a stalk, and an [ovary](#), which contains the ovules. Carpels may occur in one to several whorls, and when fused are often described as a [pistil](#). Inside the ovary, the [ovules](#) are attached to the [placenta](#) by structures called *funiculi*.<sup>[11][12]</sup>

## Variation

Although this arrangement is considered "typical", plant species show a wide variation in floral structure.<sup>[13]</sup> The four main parts of a flower are generally defined by their positions on the receptacle and not by their function. Many flowers lack some parts or parts may be modified into other functions or look like what is typically another part.<sup>[14]</sup> In some families, such as the [grasses](#), the petals are greatly reduced; in many species, the sepals are colourful and petal-like. Other flowers have modified petal-like stamens; the double flowers of [peonies](#) and [roses](#) are mostly petaloid stamens.<sup>[15]</sup>

Many flowers have symmetry. When the [perianth](#) is bisected through the central axis from any point and symmetrical halves are produced, the flower is said to be [actinomorphic](#) or regular. This is an example of [radial symmetry](#). When flowers are bisected and produce only one line that produces symmetrical halves, the flower is said to be irregular or [zygomorphic](#). If, in rare cases, they have no symmetry at all they are called asymmetric.<sup>[16][17]</sup>

Flowers may be directly attached to the plant at their base ([sessile](#)—the supporting stalk or stem is highly reduced or absent).<sup>[18]</sup> The stem or stalk subtending a flower, or an [inflorescence](#) of flowers, is called a [peduncle](#). If a peduncle supports more than one flower, the stems connecting each flower to the main axis are called [pedicels](#).<sup>[19]</sup> The apex of a flowering stem forms a terminal swelling which is called the torus or receptacle.<sup>[17]</sup>

In the majority of species, individual flowers have both carpels and stamens. These flowers are described by botanists as being perfect, bisexual, or [hermaphrodite](#). In some species of plants, the flowers are imperfect or unisexual: having only either male (stamen) or female (carpel) parts. If unisexual male and female flowers appear on the same plant, the species is called [monoecious](#).<sup>[20]</sup> However, if an individual plant is either female or male, the species is called [dioecious](#). Many flowers have floral [nectaries](#), which are glands that produce a sugary fluid (nectar) used to attract pollinators. They are not considered as an organ on their own.<sup>[21]</sup>