Royal Society of Biology

The Royal Society of Biology: **The UK's favourite flower poll**

Educational resources and activities

Activities and resources

Introduction

Why are flowers important?

The theme for this year's Biology Week Poll was chosen to highlight the importance of flowers not only environmentally, but culturally and economically.

In the last 70 years, 95% of meadows have disappeared, making way for housing and infrastructure, resulting in this environment covering just 1% of the UK. This has undoubtedly had a negative impact on the abundance of some of the flowers featured in this poll.

That's not to say all plants live in flowers: flowers are also found in a number of other wild habitats includeing hedgerows, forest clearings, and even cliff edges.

Not only are all of the flowers listed attractive in their own right, but they can also provide many health benefits, including the use of flowers medicinally; for example, the foxglove was the original source of digoxin isolated in the 1930s which lead to the development of a medicine used to treat heart conditions.

Flowers are vital for maintaining certain wildlife populations, providing nectar and pollen for many bird and bee species. This is a critical step in cross-pollination of plants and flowers, creating seeds and maintaining diversity in a habitat. Flowering plants also aid in pollination of food crops, therefore contributing to the economy.

The flowers we have listed all contribute crucial habitats for insects which in turn support bird and other small animal populations, again contributing to the diverse nature of the habitats in which these flowers live.

How to use these resources

The resources we have developed to support our annual species poll can be used in the classroom, at home, or for reference.

Each activity is matched to a suitable age group, and the information pages can be used as a starting point for understanding more about botany, or as a basis for other activities.

Each flower that features in the poll also has its own factfile, including details on habitat, soil preference, pollination and more.

If you would like larger versions of our resources, or printed copies sent to your school or another UK based address, contact **philippa.skett@rsb.org.uk**

How do we classify flowers?

A whistle-stop taxonomy tour

For all the species of living organisms on our planet, there is a universal naming system. This system is known as binomial nomenclature, and ensures that, even if an organism has different names in different languages, there is a common scientific name for classifying that species that is the same the world over.

This system gives the organism a two-term name, with the first term referring to the genus, and the second referring to the species

For example, daffodil is called *Narcissus pseudonarcissus*; with *Narcissus* being the genus and *pseudonarcissus* the species. These two terms are always used in conjunction with one another when referring to a species.

Higher up the scale of classifying species, there are different divisions. The broadest classification of an organism is the kingdom it belongs to -- for plants the kingdom is Plantae. The classification of species in this way is called taxonomy.

In total there are seven taxonomic ranks:

Kingdom
Phylum
Class
Order
Family
Genus
Species

These ranks get more specific and less broad as you go descend from Kingdom through to species. For example, the taxonomic rank for the daffodil is:

Kingdom	*Plantae*
Phylum	*Magnoliophyta*
Class	*Magnoliopsida*
Order	*Asparagales*
Family	*Amaryllidaceae*
Genus	*Narcissus*
Species	*N. pseudonarcissus*

Plants are most often grouped at Family level. This is the stage of classification where the everyday person would be able to identify differences between flowers.

There are several hundred plant families, and different botanists will recognise different ones, sometimes classifying them instead as ‘sub-families’. Names of families end in *–aceae*.

The lifecycle of a plant

Which plants are officially late bloomers

Flowering plants are generally classified into annuals, biennials or perennials, depending on how long it takes to complete their life-cycle. This can vary depending on the plant's location or purpose.

Annuals

Annual plants grow and complete their life-cycle in one year. They will germinate and produce flowers, foliage and mature seeds, then die back within the year. The seeds from this plant are then left behind, distributed by animals, wind or water, to take root elsewhere and continue the cycle for the next season.

In general, annuals need plenty of water and soil with good aeration to allow carbon dioxide to reach the roots of the plant.

Perennials

Perennial plants will grow and flower for more than a year, often on a continuous cycle for many years. The plant will grow from a seed, flower and germinate, and then degenerate slightly in the winter. The plant will then flower again the following spring.

The difference between perennials to annuals and biennials, is that the parent plant doesn't die after producing mature seeds. Some perennials, such as some types of bamboo, have a cycle of up to 100 years!

Biennials

Biennials take two years to complete their life-cycle. They will generally grow foliage and leaves close to the ground in the first year, for example spring 2018, and flower the following year, spring 2019, which is when they produce mature seeds. Biennial plants will remain dormant in the winter between these two stages of growth.

Most will die at the end of the second year and the seeds are left to produce more plants of the same species.

The importance of pollination

How plants reproduce

Pollination is the process of reproduction for plants. The flowers on plants produce seeds which, when pollinated, go on to create more plants of the same species. Flowers are therefore vital in making sure a plant species continues to survive and succeed.

Pollen is the male sex cell (gamete) and is held on the anther which, along with the filament, makes up the male part of the flower, the stamen.

Pollen has to travel to the stigma (the female part of the flower) and down to the ovary where the female sex cells are held, to cause pollination.

Usually flowers will possess both male and female parts and have the ability to self-pollinate.

Cross-pollination between flowers of the same species is most common however, and occurs by wind or when pollinators such as bees and other insects transfer the pollen from flower to flower.

The pollinators will pick up pollen on tiny hairs on their legs and other body parts when they reach into the flower to drink the sugary nectar held in the nectary.

When a plant is pollinated by insects in this way, they will generally have adaptations such as colourful petals and a strong fragrance to attract the insects to them. The petals of a flower are very important for pollination.

Conservation of vital insect species, such as bees, is important to keep crop and fruit harvests successful to meet food demands -- an estimated one third of the food we consume is dependent on insect pollination.

After the pollen grain reaches the ovary it will fuse with an ovule. This is known as fertilisation and causes the female parts of the flower to develop into a fruit and seeds.

Once the plant is ready to disperse the seed, it may do so by encasing the seed in flesh that is attractive to birds or mammals, that will eat the fruit and disperse the seeds once the fruit is excreted.

Other methods of seed dispersal include by the wind, by water, by attaching to animals as they pass by the plant, or even by plants developing physical mechanisms to forcefully launch seeds away when ready.

Once the seed finds the right conditions to propograte, the whole cycle begins again.

Flower habitats and range

Different climates across the UK

Although the UK isn't known for its consistency (or sunshine for that matter) when it comes to the weather, there are still plenty of beautiful flowers that thrive in different regions and habitats.

With winters in Britain getting shorter and wetter than in previous decades, flowers such as snowdrops that blossom in the late winter to early spring from bulbs are growing even earlier.

In the south-east of the UK, species such as delphiniums are struggling to survive the drier summers. Species like these favour damper soils which are getting rarer in the summer months. The populations of these flowers in the north-west however, where rainfall is more frequent, are more stable.

In wetter regions, particularly in the north of England and Scotland, bulbous flowers do not cope well with the water-logged soils, and hence populations struggle to survive.

All that being said, the growing season for flowering plants is said to be a month longer now than it was in 1990, giving plants a longer timeframe in which to germinate. This is due to the warmer weather, so more plants are able to grow over a longer period, and also similarly due to a decline in the number of days that frost is recorded.

At present, the plant growing season is on average 280 days. This is defined by periods where the daily temperature is above 5°C for 5 or more consecutive days.

Illustrating the pollination sequence

Activity notes

Suitable for children aged 8 and upwards

This activity can be conducted in groups or pairs (for younger years), or individually.

1. Groups of three or four children get a copy of the flower parts and functions cards and must match each part to their respective function for pollination
2. Each child then gets a print out of the empty pollination sequence
3. Once children understand the function and purpose of each part of the flower, they can illustrate the pollination process under the stages set out on page 5
4. Detailed diagrams of parts of the flower are encouraged

To increase the difficulty of the task, the worksheet on page 5 can be cut up, and children have to put the pollination sequence in the correct order before illustrating the process.

Older children may be able to also do the activity without guidance from the descriptions in the box.

Further activity

Refer to the 'flower parts and functions' notes to talk through the function and importance of each part of the flower.

Refer to the flower fact files to give older children further information on specific species, and further reading on the importance of native species, pollination and the threats posed to them.

Illustrating the pollination sequence

Use the information provided to draw a sequence of events to show the process of fertilisation and pollination in a flower, labelling flower parts where relevant.

Pollinating insects such as bees, butterflies and beetles search for a food source, nectar, from inside a flower

Colourful, patterned petals and attractive smells of the flower attract the insect. These are adaptations used to help flowers pollinate

The insect lands on the flower to reach the nectar and pollen grains on the anther of the flower stick to tiny hairs on the insects legs and body

The insect moves on to another flower and the pollen is moved onto the stigma of this flower

The pollen moves to the ovary of the flower, causing fertilisation

The ovary gets larger and forms a seed, which is later released, forming a new flower

Labelling a flower

Activity notes

Suitable for children aged 8 or above

This activity can be conducted as a quick starter activity when done in class, with the picture of the unlabelled flower at the front and the labels being put on one by one. Large versions of the labels are available on page 11.

The activity can also be done in smaller groups or by individuals using the worksheet on page 10.

Refer to the 'flower parts and functions' notes to talk through the function and importance of each part of the flower.

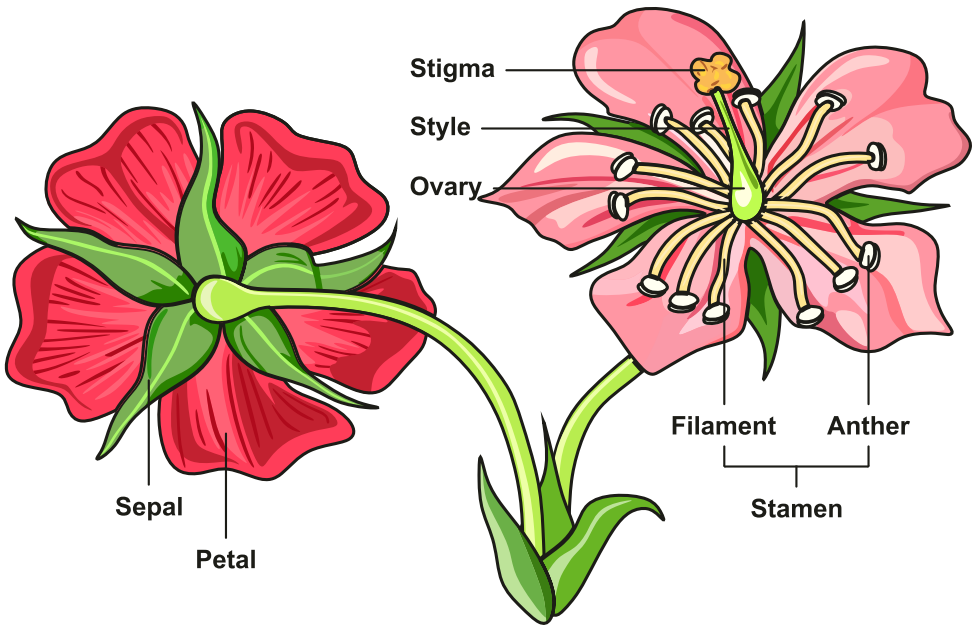
1. Cut out the label and their descriptions
2. Each group gets a print out of the flower with no labels and the set of cards naming parts of the flower
3. Groups must match the flower parts cards to the respective parts on the picture of the flower
4. For older children, identify the male part (stamen) and female part (stigma) to the class, and the male gametes (pollen) and female gametes (in the ovary)

Further activity

Refer to the flower fact file guides to give further information on specific species.

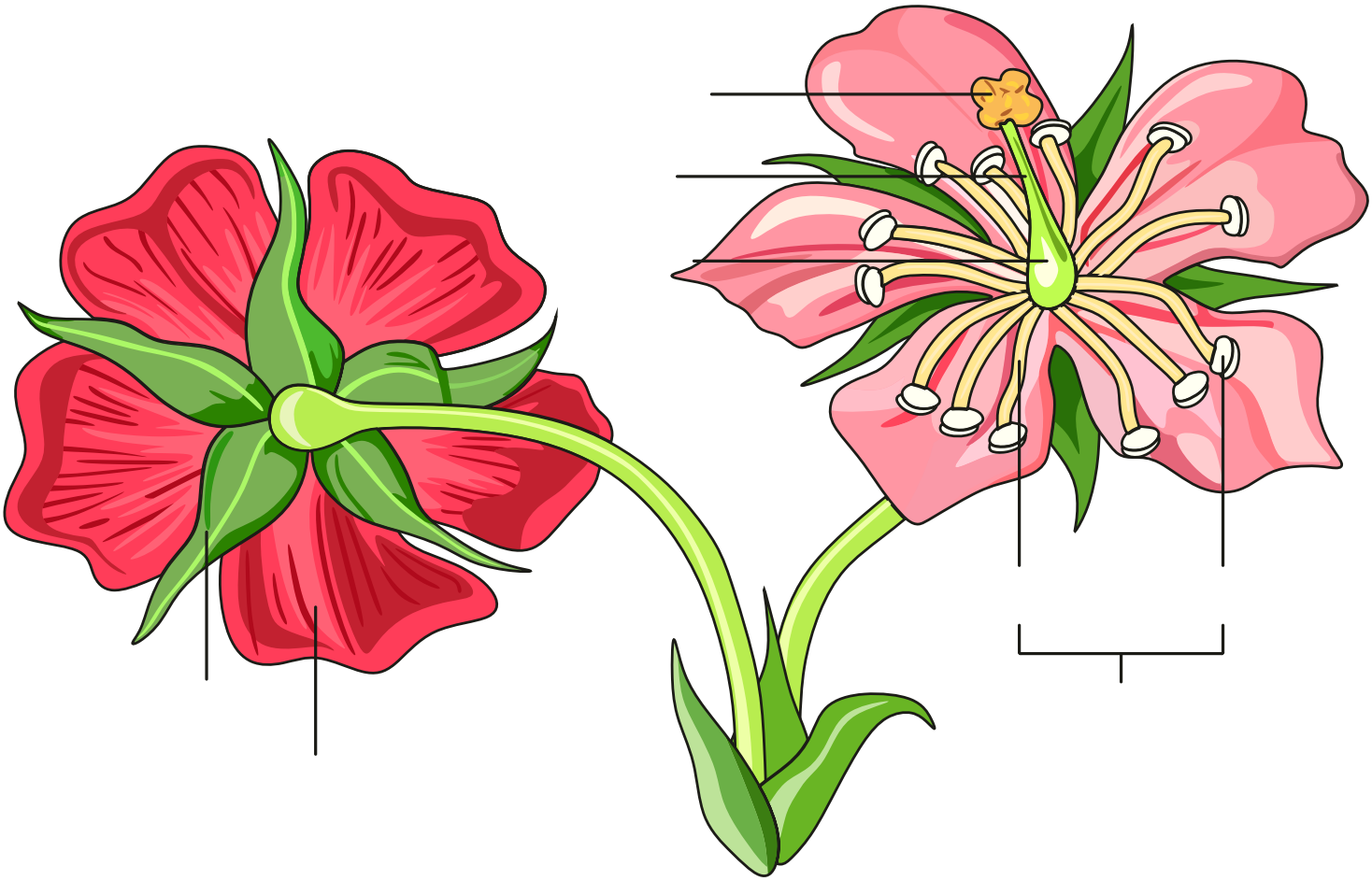
Answers

Petal	Coloured, scented or patterned to attract pollinating insects
Anther	Firmly attached to filament inside the flower. Produces sticky pollen grains which are the male gametes
Stamen	Male part of the flower made up of a filament with an anther at the top
Stigma	Sticky female part of the flower, collects pollen grains from insect
Ovary	Produces female gametes contained in ovules
Sepal	Modified leaves that protect the flower and support the petals
Style	Coloured, scented or patterned to attract pollinating insects
Filament	The stalk that holds up an anther



Labelling a flower

The boxes below contain labels for different parts of the plant and definitions. Cut out the boxes and stick both the correct label and the definition to the diagram below.



Petal	**Stamen**	Coloured, scented or patterned to attract pollinating insects	Coloured, scented or patterned to attract pollinating insects
Firmly attached to filament inside the flower. Produces sticky pollen grains which are the male gametes	Male part of the flower made up of a filament with an anther at the top	**Filament**	The stalk that holds up an anther
Produces female gametes contained in ovules	**Anther**	**Stigma**	**Sepal**
Style	Sticky female part of the flower, collects pollen grains from insect	**Ovary**	Modified leaves that protect the flower and support the petals

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Flower Identification Bingo

Activity notes

Suitable for children aged 8-11

This activity can be conducted as a class separated into smaller groups, in the classroom or outside in the school grounds if some species are present, or as a take-away activity for children to do in their own time if some of the species are local to the area.

1. Separate children into approximately five groups, giving a different bingo card to each
2. Choose flowers to read out at random, or for added difficulty, hold up a larger photo of just the flower without giving its name
3. Groups cross off the flower on their sheet when it is called out
4. The first group to get a row of four across, down, or diagonally has to call out BINGO

Further activity

1. If the children finish quickly, keep playing until a group gets two rows of four, then three rows, then a full house crossed off.
2. Use the flower fact files provided on rsb.org.uk to give a fact about each flower after it has been read out e.g. habitat, height, flowering months etc.
3. If the activity is being used outdoors, get the children to note down the habitat they found each flower in, any nearby insects they found, and the conditions of the soil the flower was growing from.

Wild flower bingo: card 1


Poppy


Daisy


Cornflower


Common knapweed


Bluebell


Dog rose


Dandelion


Buttercup


Lily of the Valley


Snowdrop


Honeysuckle


Herb Robert


Field scabious


Foxglove


Primrose


Cow parsley

Wild flower bingo: card 2

Bluebell

Cornflower

Daisy

Cow parsley

Poppy

Snowdrop

Buttercup

Dandelion

Field scabious

Dog rose

Primrose

Foxglove

Lily of the Valley

Herb Robert

Honeysuckle

Common knapweed

Wild flower bingo: card 3


Honeysuckle


Foxglove


Cornflower


Dog rose


Primrose


Common knapweed


Herb Robert


Snowdrop


Lily of the Valley


Buttercup


Poppy


Dandelion


Cow parsley


Daisy


Bluebell


Field Scabious

Wild flower bingo: card 4


Herb Robert


Snowdrop


Buttercup


Field scabious


Poppy


Daisy


Honeysuckle


Foxglove


Dandelion


Cornflower


Primrose


Bluebell


Dog rose


Common knapweed


Lily of the Valley


Cow parsley

Wild flower bingo: card 5


Cow parsley


Dog rose


Foxglove


Poppy


Herb Robert


Primrose


Bluebell


Buttercup


Common knapweed


Lily of the Valley


Daisy


Honeysuckle


Snowdrop


Dandelion


Cornflower


Field scabious

Further reading

More sources of information on UK flora

The Woodland Trust
www.woodlandtrust.org.uk

The Royal Horticultural Society
www.rhs.org.uk

Royal Botanic Gardens Kew
www.kew.org

Eden project
www.edenproject.com

UK Plant Sciences Federation
http://www.plantsci.org.uk/

The British Society for Plant Pathology
http://www.bspp.org.uk/

GARNet
https://www.garnetcommunity.org.uk/

Importance of native species

Royal Botanic Gardens Kew on meadow habitats and their importance
https://www.kew.org/blogs/in-the-gardens/why-meadows-matter

Wild-flowers and invertebrate conservation

Haaland et al (2011) Sown wildflower strips for insect conservation: a review
https://doi.org/10.1111/j.1752-4598.2010.00098.x

Feltham et al (2015) Experimental evidence that wildflower strips increase pollinator visits to crops
https://doi.org/10.1002/ece3.1444

Threats to native flower species

Charity Plantlife's article on threats to plant species and their habitats on road verges
www.plantlife.org.uk/uk/blog/road-verges-are-a-refuge-for-some-of-our-rarest-plants

Fauna & Flora International on threats to flower habitats
www.fauna-flora.org/environments/wild-flower-habitats

Nicolson and Wright (2017) Plant-pollinator interactions and threats to pollination
https://doi.org/10.1111/1365-2435.12810

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