

Garden

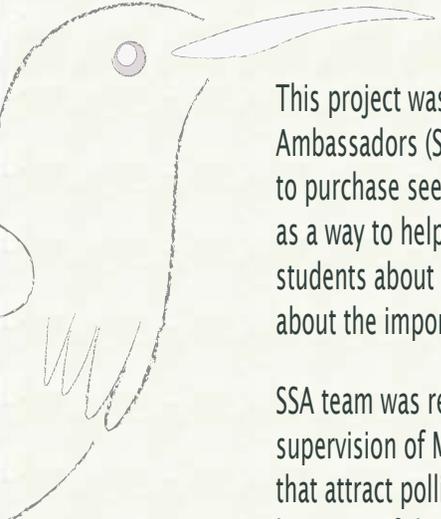
for

Pollinators





## Foreword and Acknowledgements:



This project was started in late 2020/early 2021 when Patricia Schavarosk, former Coordinator for the Student Sustainability Ambassadors (SSA) program, applied for a grant from the World Wildlife Fund - Canada (WWF-Canada). The grant proceeds were used to purchase seeds, bulbs, plants, soil and supplies to plant flower beds in different locations on campus. The project was envisioned as a way to help the environment by replacing grassy, unattractive areas on campus with pollinator-friendly plants while educating students about planting and growing techniques through hands-on learning. In addition, the project was used to raise awareness about the importance of pollinators and to beautify the campus for other students to enjoy.

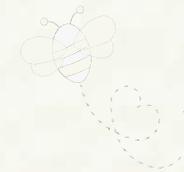
SSA team was responsible for the project. The plants were started and grown in the campus greenhouse under the guidance and supervision of Mario Moniz de Sa, a biology instructor. Garden design and species selection focused on native species and plants that attract pollinators such as bees, hummingbirds and butterflies. A mixture of annuals and perennials was used to ensure longevity of the gardens and succession of different flowers at different times of the year. Student volunteers helped start the seeds and bulbs in the greenhouse during the early spring and later transplanted seedlings in their respective flower beds. The Langara facilities department provided support in preparing the site, lending tools and watering the plants. Student volunteers also participated in the cleanup and weeding activities.

By creating this ebook, the SSA wanted to capture the diversity and natural beauty of these plants even when they are not in full bloom so that more students can enjoy and learn about them.

We gratefully acknowledge the support of WWF-Canada.

In addition to the above named individuals, we would like to thank the following persons for their unwavering support:

Brunna Pimenta, Sustainability Student Ambassador program coordinator  
Deborah Schratte, Communications Officer  
Ji Yong Yang, Instructor of Biology Department  
Maggie Stewart, Volunteer Program Coordinator  
Michael Clark, Facilities Maintenance Coordinator  
Raymond Yeung, Facilities Services Manager  
SSA and all other student volunteers





## Who are the pollinators?

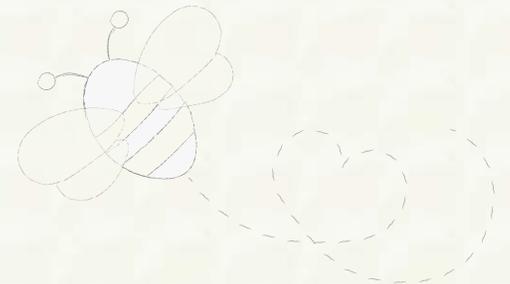
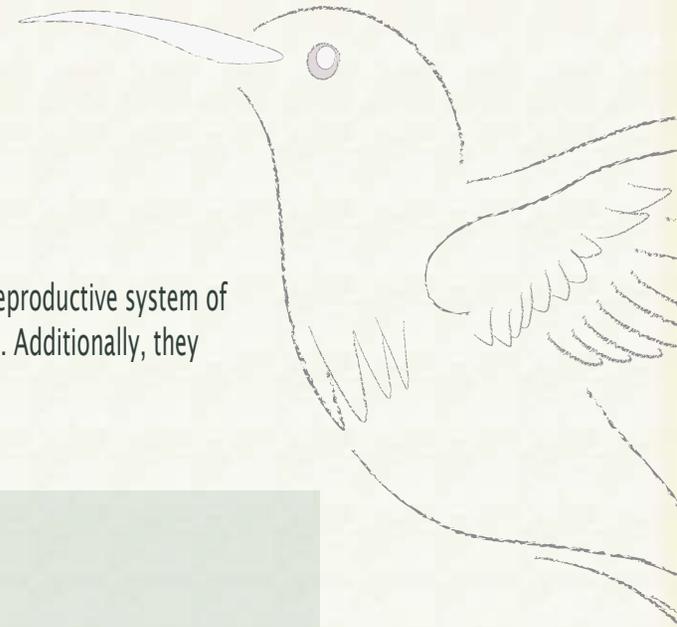
Bees, birds, bats, beetles, butterflies, moths, and other small mammals play a critical role in our ecosystem.

Our diet hangs on them because the vast majority of the world's crops need them for reproduction.

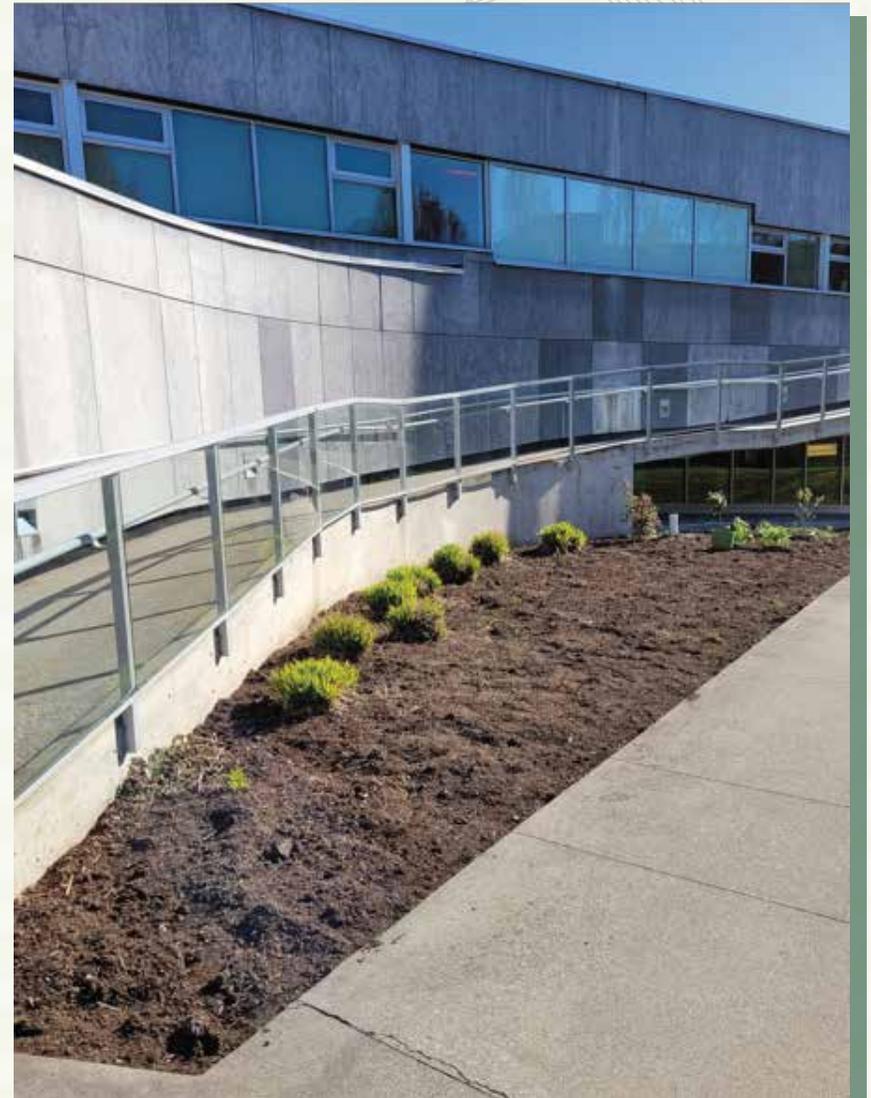
Their work consists of traveling from plant to plant transporting pollen on their bodies that is a part of the reproductive system of most flowering plants. Once pollinated, these plants give us oils, fibers, raw materials, fruits, and vegetables. Additionally, they prevent soil erosion and increase carbon sequestration.

Get to know them a little more:

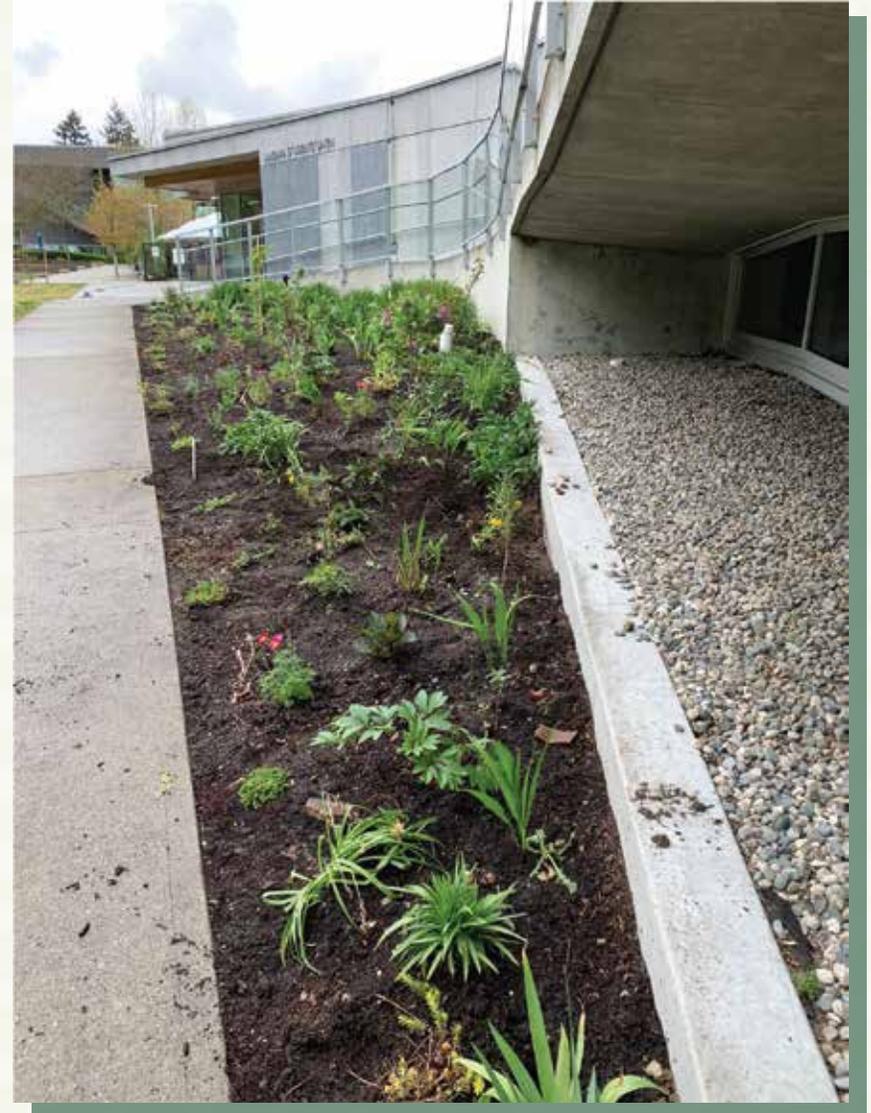
- In Canada, we have around 1.000 species of pollinating insects.
- Pollinators are attracted to flower's colours and scents. Some flowers even emit UV light to attract pollinators.
- Not all bees live in hives, some species are solitary.
- How many female blue orchard bees are needed to pollinate an acre of apples? Only 250, can you believe it?
- Want to help them? Leave some rotting logs, rocks, and leaf piles in your garden to provide them a habitat during frigid months.



## *Our Garden Before*



# Our Garden In Process



# Our Garden In Spring





# Lavender

*Lavandula angustifolia*  
Family Lamiaceae



- Is a fragrant perennial herb related to mint.
- It is native to the Mediterranean and it has become popular all over the world due to its decorative and healing properties.
- It's been used in ancient Rome to heal burns, small wounds and as an insect repellent.
- Lavender is grown commercially for the production of essential oils.
- It can be used as a remedy for insomnia, as a tea or seasoning in cooking.
- Lavender flowers symbolize purity, silence, devotion, serenity, grace, and calmness.

Have you heard this before?

- Lavender flowers are full of nectar and pollinator insects such as honey bees and bumblebees love them! They will travel up to 6.5 miles to get to the flowers. Honey bees make special monofloral honey from it which can be quite expensive.
- In Roman times a pound of lavender flowers were sold for as much as a monthly wage of 50 labourers.

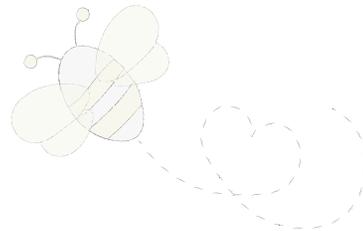
# Astilbe

*Astilbe arendsii*  
Family Saxifragaceae

- Originally from mountain ravines and woodlands in Asia and North America, it is also known as False Spiraea or False Goat's Beard.
- White, violet, pink, and red are the different colours of Astilbe's flowers.
- Astilbe plants grow in full or partial shade and require low maintenance.
- They attract butterflies, bees, moths, and hummingbirds.

## Amusing Fact:

- In Greek, "Astilbe" means "without brightness" or "without sheen" and alludes to the dull leaves of some species.





# Fox Glove

*Digitalis purpurea*  
Family Plantaginaceae

- Foxglove flower in the second year.
- Its beautiful purple flowers attract bees and hummingbirds.
- 'Digitalis' is derived from a Latin word digitus which means finger. The first mention of this plant's name was by Leonhard Fuchs in a 1542 book "De historia stirpium commentarii insignes" (Notable commentaries on the history of plants), based on German word "fingerhut", which means 'thimble'. Folk myths obscured the literal origins of the name by inferring that foxes wore the flowers on their paws in order to silence their movements as they sneakily hunted their prey.
- It's also known as dead man's bells and witch's gloves because of its toxicity.
- Although foxglove has medicinal uses, it is extremely toxic to humans and other animals, and can even cause death if ingested.
- Various plant species in this genus contain cardiac glycosides, including one known as digoxin, which is used to control heart rate. The foxglove plant is grown commercially for preparation of this medication. Because of its narrow therapeutic range, patients taking this medication have to be carefully monitored.

Have you heard this before?

- It is possible that digitalis, which was used to treat epilepsy around this time, contributed to Vincent van Gogh's "Yellow Period." There are two of his paintings in which this plant appears.
- Columbo, an American television series that features crime dramas, frequently suspects digitalis as being used to kill victims.

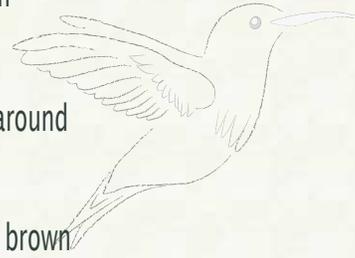
# Snapdragon

*Antirrhinum majus*  
Family Plantaginaceae

- Snapdragon is a short lived perennial flower species which are grown annually, especially in colder regions.
- They can withstand low as well as higher temperatures but do best around 17-25 degree Celsius.
- These plants are prone to rusting (which is a fungal disease causing brown spots on the leaves) but rust-free varieties are easily found in the market.
- They attract several pollinators such as bumble bees and hummingbirds.
- Due to their shape and different variety of colours snapdragon flowers are widely used for ornamental purposes.

## Fun Facts:

- Some restaurants around the world use them in their dishes and drinks for garnishing.



# Cornflower

*Centaurea cyanus*

Asteracea or Compositae family

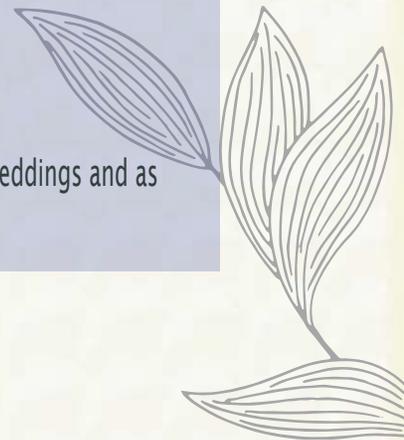


- Cornflowers, which produce nectar, attract hummingbirds, butterflies, and ladybugs to gardens.
- Wild cornflowers produced an average of 895.831 micrograms of nectar per flower head, according to a study published in 2016. This score made it one of the most important sources of nectar in the study. Moreover, a flower head remains in bloom on average for about 6.4 days, which gives bees a good time to gather nectar from the flower.
- Cornflowers thrive in the same conditions as corn, often growing in corn fields hence its name.
- In some parts of the world it's considered endangered species.
- One of the rare naturally blue flowers, however as a popular garden plant, other colours are also available.
- It's an annual plant easily grown from seeds.



## Fun Facts!

- This is an edible flower!
- It's also known as bachelors button because it's used in weddings and as boutonnières symbolizing love and devotion.



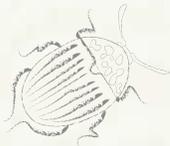
# Garden Petunia

*Petunia × atkinsiana*  
Family Solanaceae

- Petunia is a tender perennial having its origin in South America.
- Most of the varieties of petunia we see worldwide are hybrids of wild petunia.
- This plant prefers to be in dry soil and grows well in heat.
- The bright coloured blossoms appear around mid-summer and attract pollinators such as long tongued bees and butterflies. They also act as hosts for larvae of buckeye butterflies.

Guess what!

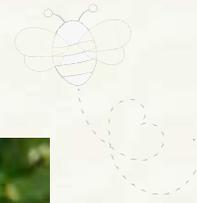
- They are close relatives of tomatoes, potatoes and eggplant.



# Poppies

*Papaver rhoeas*

Family Papaveraceae



- There are many species of poppies and although a typical image is of scarlet red flowers, they come in many shapes and sizes.
- Although they do not produce nectar, bumble bees, honey bees and a range of solitary bees love their pollen. Poppy mason bees harvest the delicate petals of the common poppy and use them to line their nest burrows.
- Poppies have been grown since ancient times and are often imagined as growing in the fields after the battle. They symbolize death and rebirth. They are used to commemorate fallen veterans.
- Commercially their seeds are used for their medicinal properties, baking and extracting oil.

## Fun Facts:

- They owe their somewhat unpopular image to the fact that opium is extracted from the milky substance present in the unripe seed capsule.
- Opium is used to derive morphine, heroin and codeine.



# Crocosmia

*Crocosmia crocosmiiflora*  
Family Iridaceae

- Crocosmia belongs to the same family as Iris and is native to South Africa.
- It is also known under the names of falling stars, coppertips, montbretia.
- Crocosmia cultivar known as Lucifer with bright red flowers is the most common among gardeners.
- It attracts hummingbirds and bees as pollinators.
- It can be toxic to humans and pets causing mild intestinal upset

## Amusing Fact:

- The name of this flower comes from Greek words "kroskos" which means saffron and "osme" which means scent.
- It was named Crocosmia because when dried flowers are steeped in water, they smell like saffron.



# Sunflower

*Helianthus annuus*  
Family Asteraceae



- Large annual plant commonly reaching 3 m in height. The tallest sunflower grew to over 9 m tall!
- In addition to common honey bees, sunflowers attract many types of wild bees such as bumblebees, carpenter bees, leaf-cutter bees (*Megachile* spp.), digger bees (*Anthophoridae*), sweat bees (*Halictidae*) and mason bees (*Osmia* spp.). Volunteers in a nationwide project called Backyard Bee Count plant sunflowers and track what kind of pollinators visit them in an effort to draw conclusions about non-commercial bee populations.
- Seeds are an important source of food for humans, birds and other animals.
- It was first cultivated by native Americans around 5,000 years ago.
- Often grown along the edges of the fields because it enhances the growth of other plants (allelopathy).
- Grows in full sun in fertile soil.
- Many groups throughout history used sunflowers as their symbol but generally it's taken as a symbol of hope.



## Interesting Facts:

- The florets in the head of the sunflower are arranged in a geometrical pattern called Fermat's spiral with a mathematical formula:

$$r = c\sqrt{n},$$

$$\theta = n \times 137.508^\circ,$$

where:

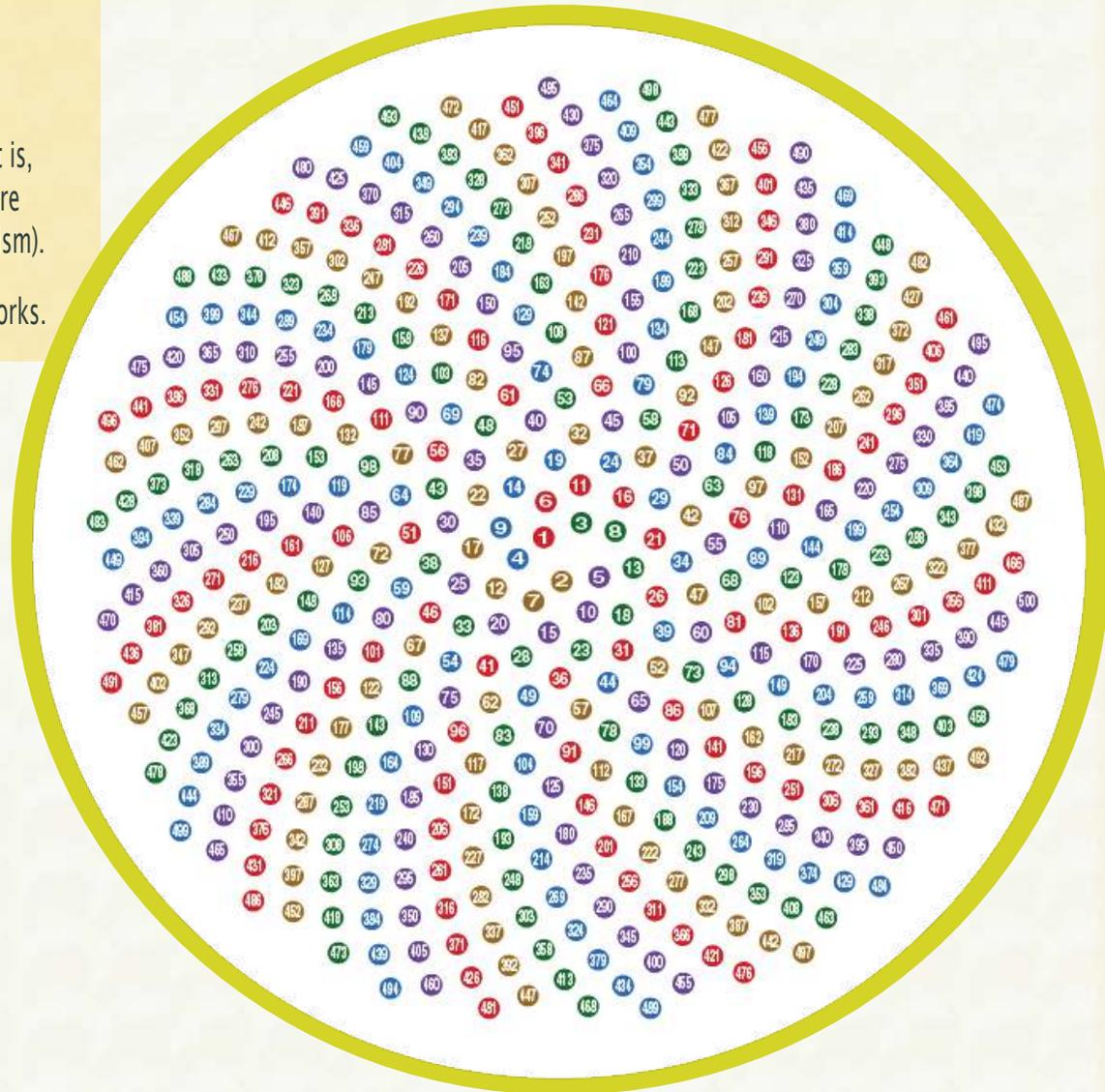
r - radius

c - constant scaling factor

n - index number of the floret

- an angle

- The notion that sunflowers turn with the sun is partially a myth. That is, mature sunflowers don't turn, they usually face East. But the immature flowers do orient themselves in the direction of the sun (heliotropism).
- Vincent Van Gogh painted sunflowers in some of his most famous works.



# Black Lace Elderberry

*Sambucus nigra*  
Family Adoxaceae



- Black Lace is an elderberry cultivar popular among gardeners for its versatility and durability.
- This shrub features dark purple foliage shaped like delicate lace, which contrasts beautifully with the pink flowers (lemon scented) that it produces in the summer.
- In order to produce berries, it needs to be cross pollinated with compatible cultivars of the same species (Black Beauty®, Instant Karma®, or Laced Up).
- Elderberry is used as a cold and flu remedy in traditional medicine. In addition, it is claimed to have the following medicinal uses and is known as somewhat of a “cure-all”  
Flower - diaphoretic, astringent, diuretic, vulnerary  
Berry - antirheumatic, antioxidant, antipyretic, immune enhancing, pectoral  
Bark - purgative, emetic, expectorant
- Flowers can be used in cooking. Elderflower fritters are a popular dish. In Northern Europe and the Balkans, flowerheads were traditionally soaked in water to create infusions which are now commercialized as cordials. Several kinds of liqueurs are made from elderflowers, including St-Germain and sparkling elderflower champagne. A more alcoholic home-made version is also available.





- When cooked, the berries are edible and can be turned into soups, jams, jellies, syrups, and wines. It's even used to make beer in Belgium.
- The unripe berries, seeds, and green parts of the plant contain cyanogenic glycosides, making them poisonous. It is also poisonous to dogs and cats.

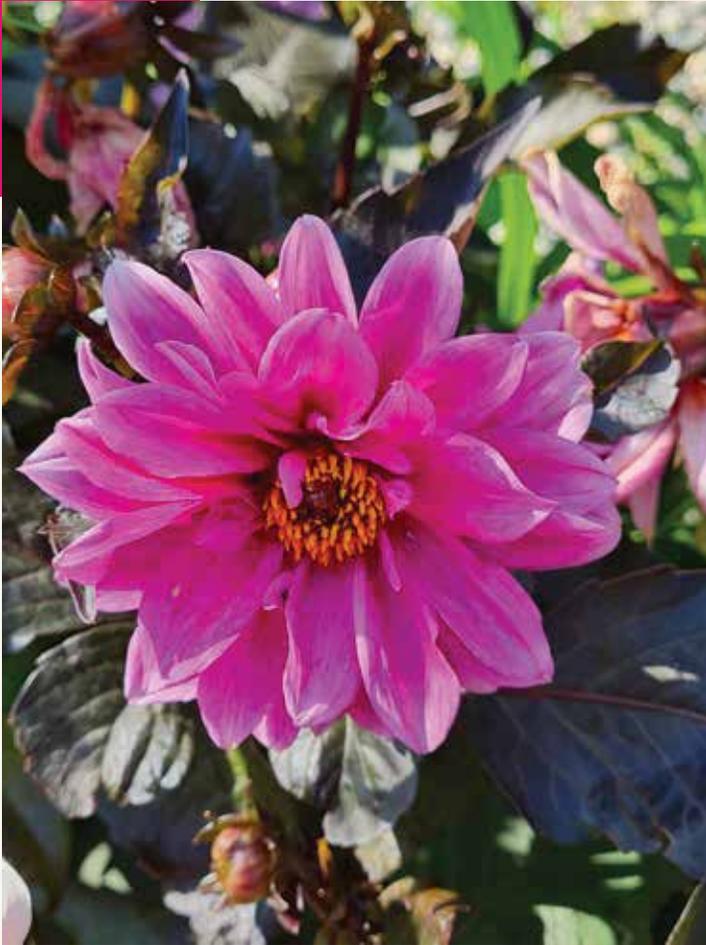
Have you heard this before?

- Elderberry is considered to be a good luck charm that can protect against robbers and snakes.



# Dahlia

*Dahlia pinnata*  
Family Asteraceae



- Originally from Mexico, was declared as the national flower in 1963.
- Were grown by the Aztecs due to different benefits. The tubers are edible, the hollow stem was employed for water pipes, and the flower was used as an epilepsy treatment.
- It is considered as one of the native ingredients in Oaxacan cuisine and an extract from the roasted tubers is used to prepare beverages.
- The tubers have high fructose content and were used to balance blood sugar prior to the discovery of insulin.
- Garden dahlia not only attracts pollinators but several insects such as aphids, red spiders, caterpillars which threaten the plant by feeding on its different parts especially petals.

## Fun Facts:

- If you like potatoes and radishes, probably you would like Dahlia's tubers, because they taste like a mix between those two.
- Have you seen a blue Dahlia? Probably no, blooms can be found in almost any color except blue.



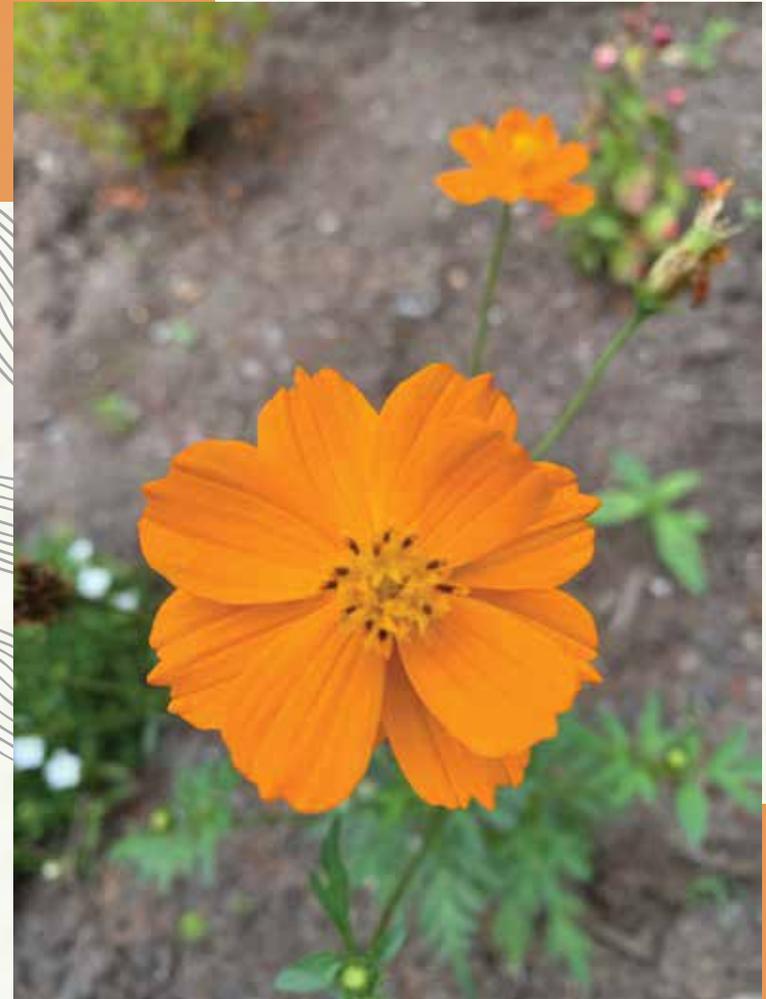
# Cosmos

*Cosmos bipinnatus*  
Family Asteraceae

- Cosmos is an annual flowering plant in the same family as sunflowers (and daisies).
- It native to Mexico and South America.
- It is a popular garden plant because it's very easy to grow from seeds, requires very little care and produces colourful flowers which attract pollinators such as honey bees and hummingbirds.
- In Brazil and Mexico, cosmos plants are used against malaria. A component of the plant called dimethoxychalcone is used to treat illnesses like eczema and fibromyalgia, as well as some viruses. In addition to treating skin problems, it can also relieve muscle pain.
- The name of this flower "cosmos" comes from the Greek word kosmos which means order or world. It symbolizes peace and love.

## Fun Fact!

- Chocolate cosmos variety smells like, well you guessed it - Chocolate!





# Liatris

*Liatris spicata*  
Family Asteraceae

- Commonly known as a Blazing Star, Liatris are perennials in the same family as sunflowers
- They survive winter and other adverse conditions in the form of corms which are underground storage organs.
- It is native to North America. Indigenous people used it to induce sweating, menstruation, as a diuretic, expectorant, to relieve gas and colic, as a treatment for backache and as stimulant. All parts of the plant were utilized.
- There is also some research from the 70's that suggested it has antitumor and anti leukemic properties.
- Liatris is also an important pollinator plant. These flowers attract butterflies, hummingbirds, native bees, bumblebees, and honeybees. In the late fall and winter, birds feed on its seeds. Because of its somewhat spiky appearance, it is deer resistant and a popular decorative plant in gardens.

Guess what!

- Unlike most plants that flower from the bottom up, Liatris flower from the top down.



# Gladiolus

*Gladiolus italicus*

Family Iridaceae Iridaceae

- Named for their shape, Gladiolus is the diminutive of “gladius” in Latin, and means “little sword”.
- Nowadays, there are a huge variety of hybrids, which all originated from only seven species in South Africa.
- Gladiolus is a perennial plant, parts of the plant over the ground die before winter, and a new plant emerges from the corm during the spring.
- Gladiolus are pollinated by noctuid moths, sunbirds, hawk-moths, long-tongued flies, and many others.
- The corms (swollen underground roots that store food for the plant) were used for medical purposes, as poultices, and to facilitate the removal of thorns and splinters from the skin. For the treatment of colic in babies, a poultice made by a mix of dry ground corm and goat’s milk was used.

Have you heard this before?

- This species has been the source of inspiration for artists like Vincent Van Gogh and Claude Monet, and even for ragtime composed by Scott Joplin.
- To win the 1st National Spelling Bee in 1925, Frank Neuhauser had to spell “Gladiolus” correctly.



# Lily

*Lilium sp*

Family Liliaceae



- Common name is Lily although this name is used for many other flowers which do not belong to the same family and are not true lilies.
- Lilies are usually grown from bulbs and have many popular varieties.
- The flowers are very fragrant.
- Lilies are one of the oldest known cultivated plants. Ancients used them to make healing ointments and as food. All parts of the plant are edible. In modern herbal medicine, the bulb is used in treatment of ulcers, wounds, burns and external inflammation.
- Lily flowers are pollinated primarily by bees and moths.

## Interesting Facts:

- The fragrance can be preserved by soaking them in olive or almond oil.
- The white lily is considered a symbol of purity. The Catholic church has adopted this meaning and white lilies are often depicted in the paintings of the Virgin Mary.



# Shasta daisy

*Leucanthemum x superbum*  
Asteraceae family

- Shasta daisies are home for many pest eating insects such as ladybugs, and soldier beetles which keep pest populations in check.
- They attract butterflies, beetles and caterpillars which can also often be seen munching on the leaves.
- They require very little to no care.
- They can spread very fast and can take over your garden if variety is not chosen properly.
- The white petals and the disc are individual flowers.

Have you heard this before?

- They derived their name from the old English word "daeseage," meaning "day's eye."
- They make around 10% of flower population of our planet.



*“If the bee disappeared off the surface of the globe,  
then man would have only four years of life left. No  
more bees, no more pollination, no more plants, no more  
animals, no more man.”*

Albert Einstein



