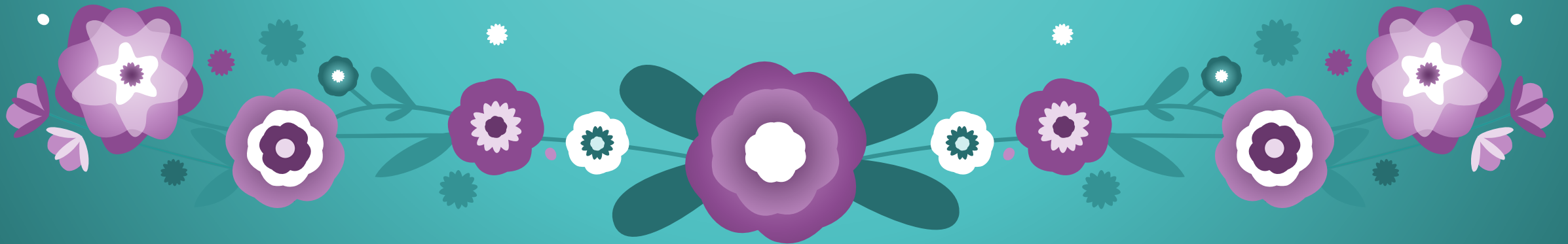


# How Does Pollination Work?



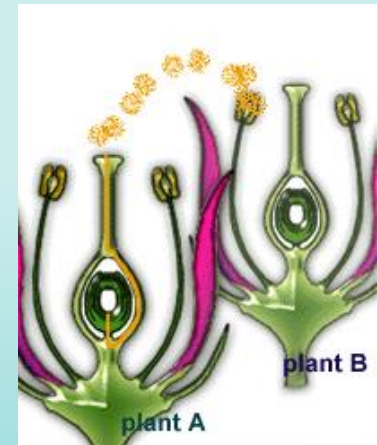


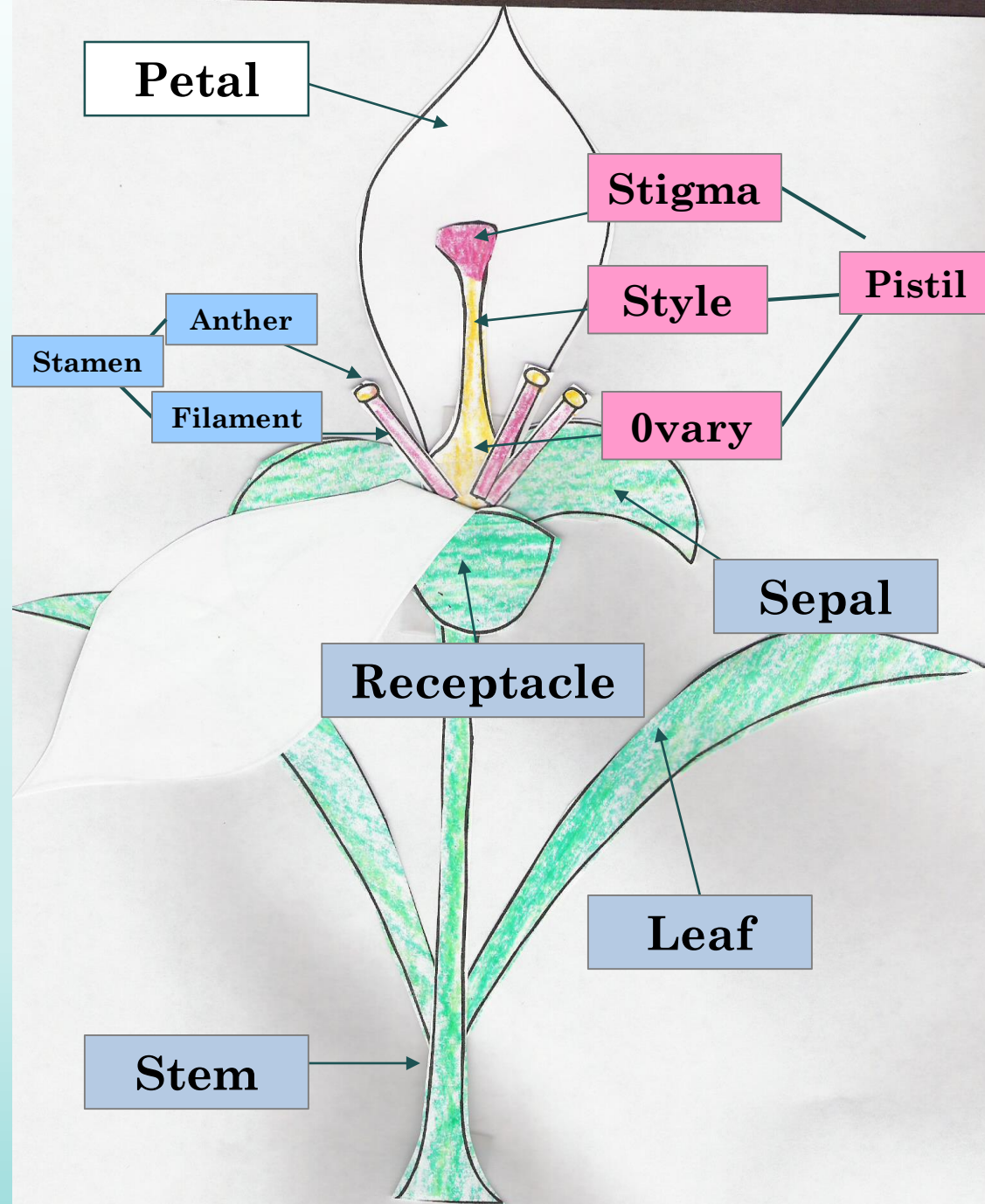
What is pollination?



# What is pollination?

- **Pollination** – the transfer of pollen from the anther of one flower to the stigma of another flower
- **Fertilization** – occurs when the male pollen unites with a female egg





## Stamen – male part

- Anther – makes pollen
- Filament – holds up anther
- Pollen – yellow powder, fertilizes eggs

## Pistil – female part

- Stigma – sticky, catches pollen
- Style – tube that pollen travels down
- Ovary – contains eggs

# What is pollination?

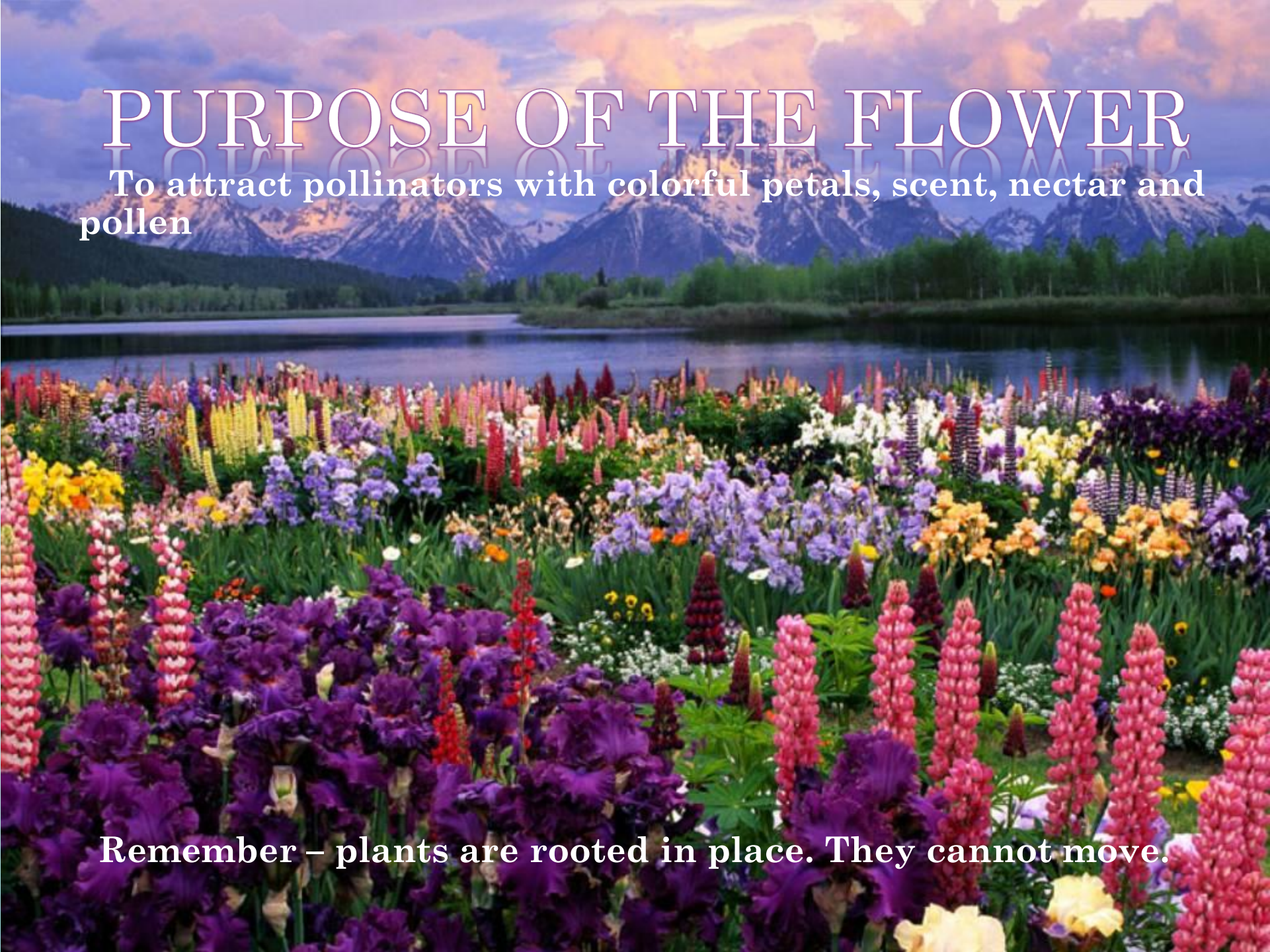
- Pollination is how plants reproduce
- At least 80% of crop plants require pollination
- About 1 out of every 3<sup>rd</sup> bite of food comes from the work of animal pollinators



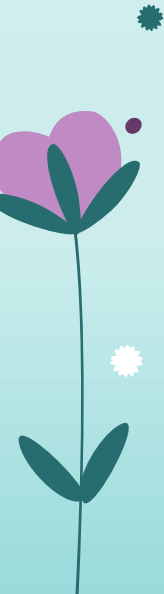
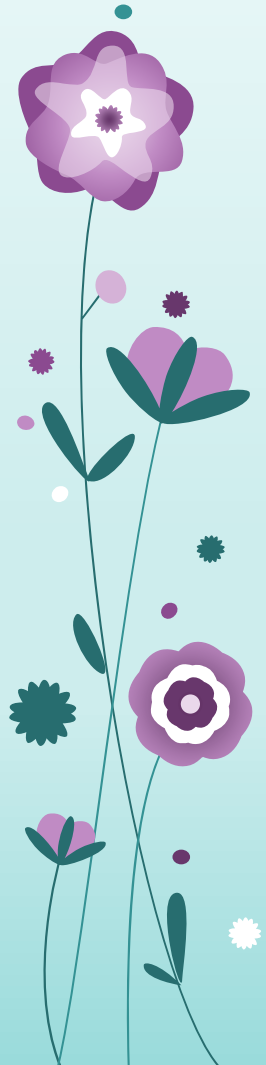


# PURPOSE OF THE FLOWER

To attract pollinators with colorful petals, scent, nectar and pollen



Remember – plants are rooted in place. They cannot move.





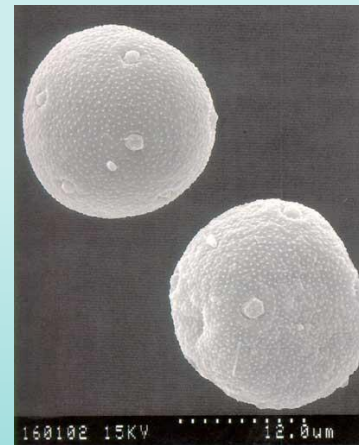
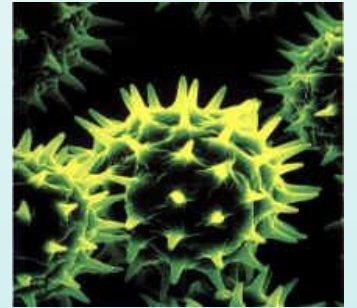
What is pollen?





# What is pollen?

- Powder that fertilizes the egg
- Insect-pollinated plants have sticky barbed pollen grains
- Wind-pollinated plants are lightweight, small and smooth





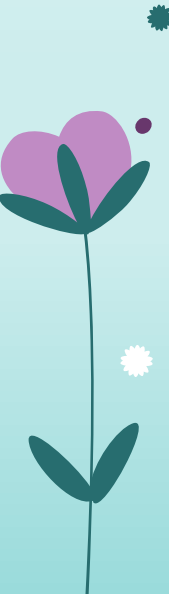
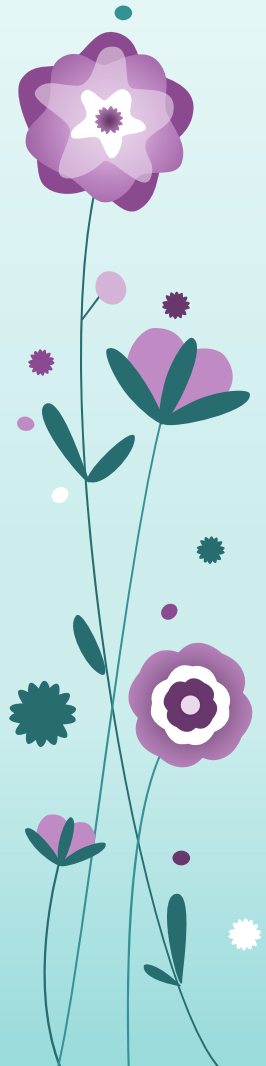


Who are the pollinators?

# Who are the pollinators?

## 1. Wind

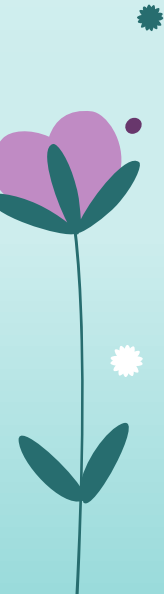
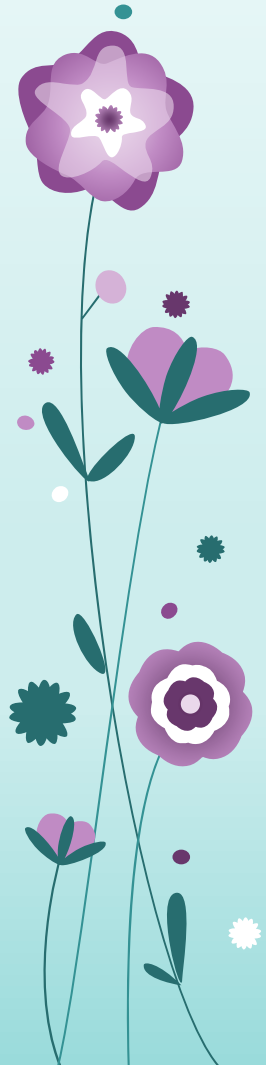
- About 12% of the world's flowering plants
  - Grasses, cereal crops, and many trees
- Small flowers with no bright colors, odors, or nectar
- Releases large amounts of pollen
- Stigma is feathery to help catch pollen from the wind



# Who are the pollinators?

## 2. Bees

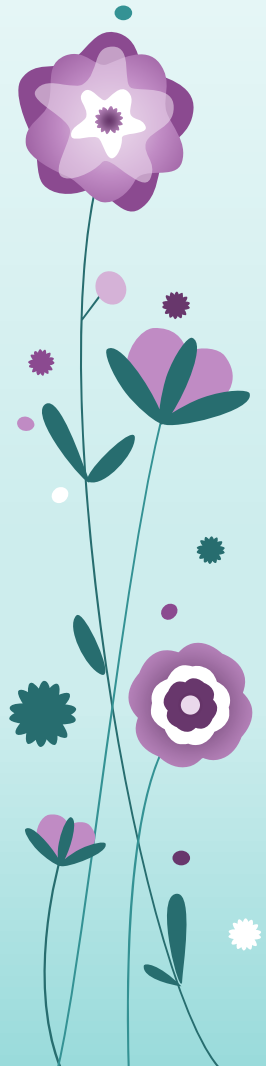
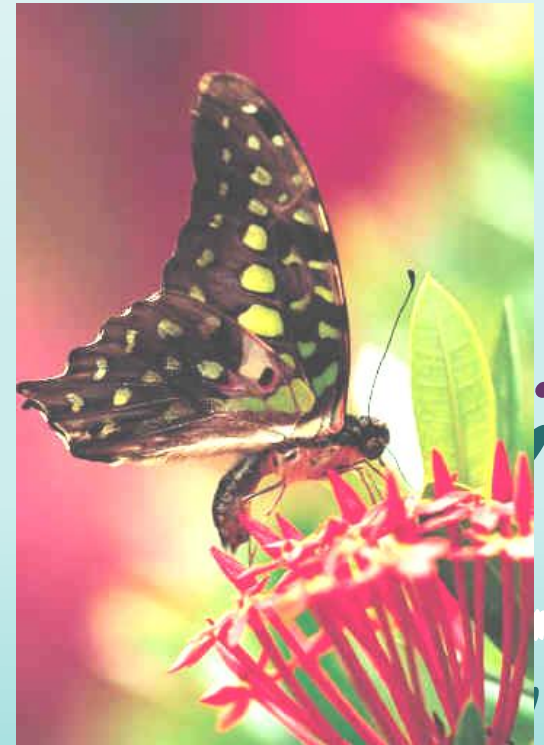
- Guided by sight and smell
- Sees yellow and blue colors, also ultraviolet light
- Prefer cup shaped flowers that have landing pads
- Pollinate during the day



# Who are the pollinators?

## 3. Butterflies

- Good color vision but poor sense of smell
- Sees bright colors like red, orange, and purple
- Flowers are usually shaped as a long tube





# Who are the pollinators?

## 4. Moths

- Good sense of smell and pollinate at night
- Flowers are usually white or pale and dull with sweet and strong odor



# Who are the pollinators?

## 5. Flies

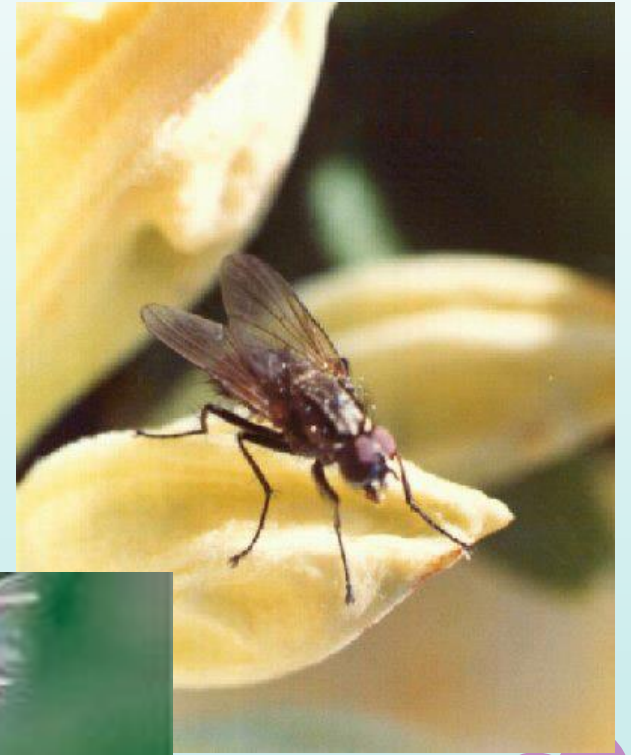
- Have a good sense of smell and good vision
- Likes rotten smells and pale to dark colors



# Who are the pollinators?

## 6. Beetles and Insects

- Good vision and a good sense of smell
- Flowers are dull in color but have very strong odor







**Corpse Flower**



# Who are the pollinators?

## 7. Birds

- Good sense of color like yellow or red
- Flowers usually do not have odor
- Pollen is large and sticky

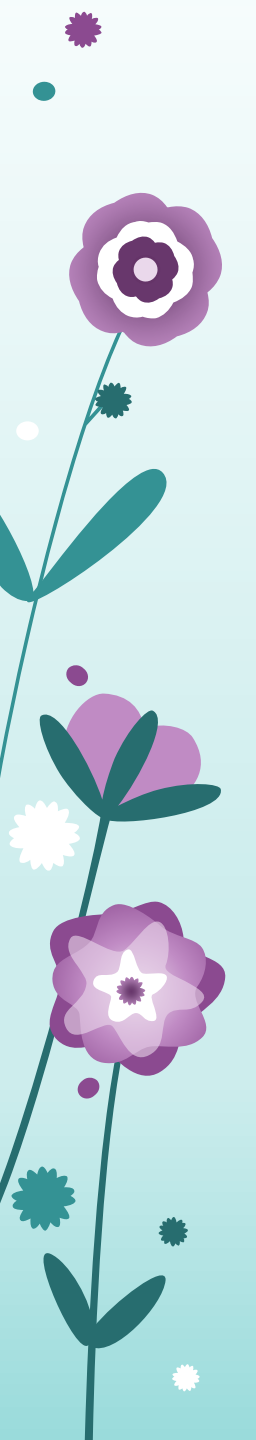


# Who are the pollinators?

## 8. Bats

- Pollinate at night so flowers are open at night, white and larger in size
- Prefer a strong, musty odor
- Flowers are bowl shaped





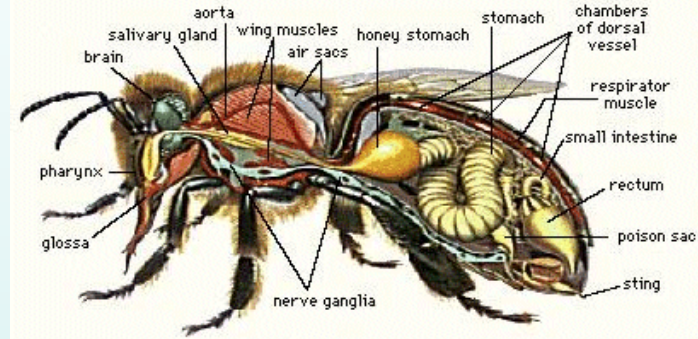
Who does the most  
pollination out of these  
listed?

Bees!



# Bee Facts

- Bees are responsible for 80% of all the pollination in the world.
- Honey bees have FIVE eyes!
- Bees can see ultraviolet light, which people can't
- Bees use their long, tube-like tongues like straws to suck the nectar out of the flowers and they store it in their "honey stomachs".
- Bees actually have two stomachs, their honey stomach which they use like a nectar backpack and their regular stomach. The honey stomach holds almost 70 mg of nectar and when full, it weighs almost as much as the bee does. Honeybees must visit between 100 and 1500 flowers in order to fill their honey stomachs.

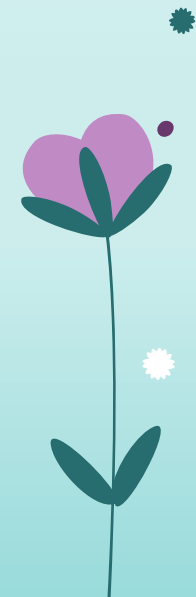
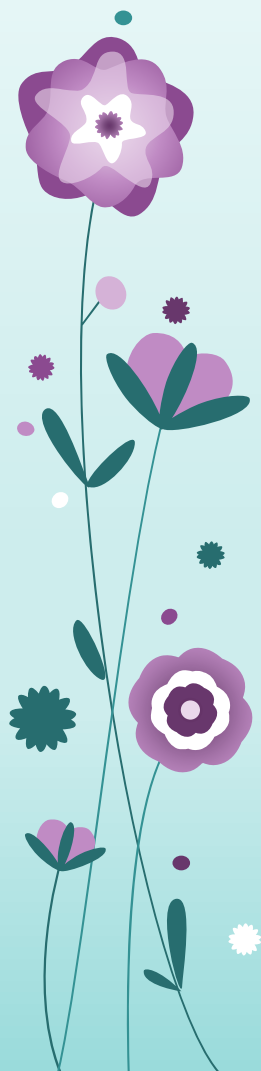


[Bee video](#)

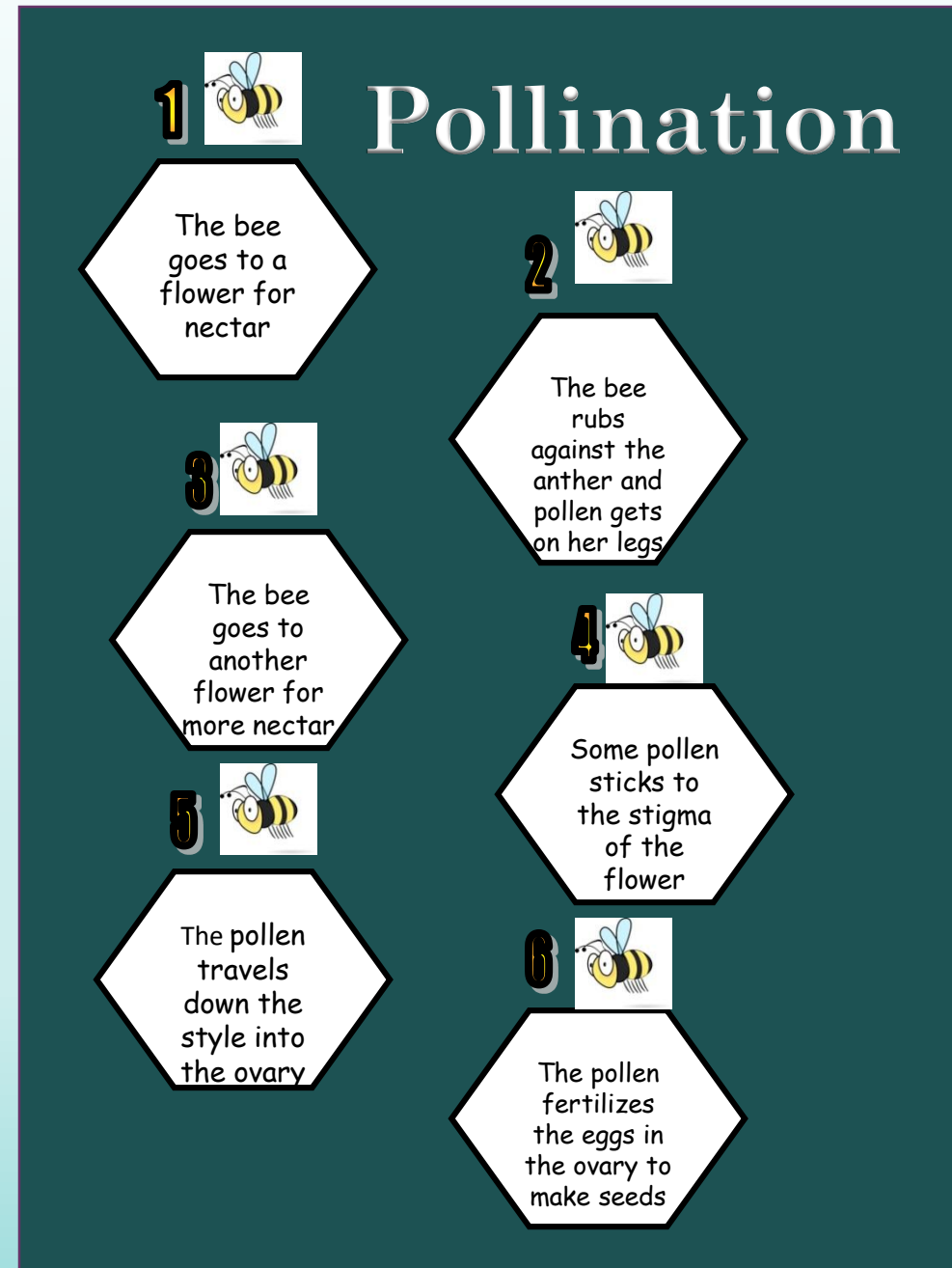


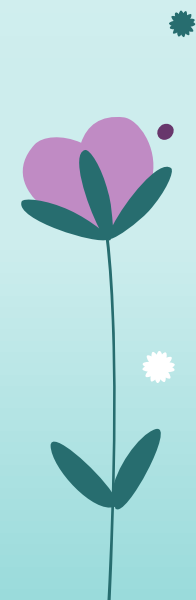
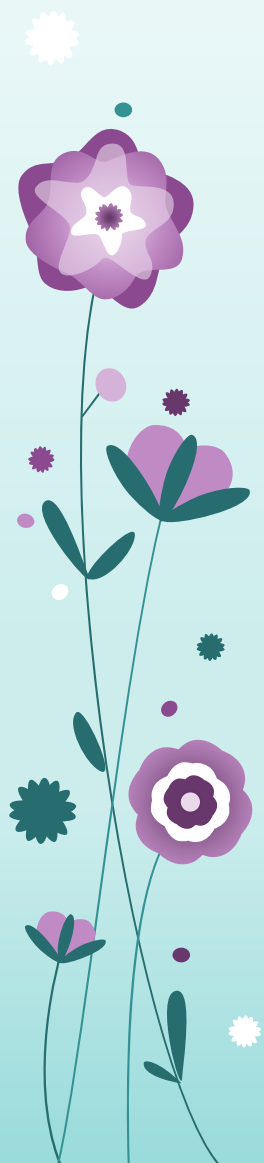
# Making Honey

- The honeybees return to the hive and pass the nectar onto other worker bees. These bees suck the nectar from the honeybee's stomach through their mouths.
- These "house bees" "chew" the nectar for about half an hour.
- During this time, enzymes are breaking the complex sugars in the nectar into simple sugars so that it is both more digestible for the bees and less likely to be attacked by bacteria while it is stored within the hive.
- The bees then spread the nectar throughout the honeycombs where water evaporates from it, making it a thicker syrup.
- The bees make the nectar dry even faster by fanning it with their wings.
- Once the honey is gooey enough, the bees seal off the cell of the honeycomb with a plug of wax.
- The honey is stored until it is eaten. In one year, a colony of bees eats between 120 and 200 pounds of honey.



1. The bee goes to a flower for nectar.
2. The bee rubs against the anther and pollen gets on her bee fur.
3. The bee goes to another flower for more nectar.
4. Some pollen sticks to the stigma of the flower.
5. The pollen travels down the style into the ovary
6. The pollen fertilizes the eggs in the ovary to make seeds





# Colony Collapse Disorder

- What would happen if the bees disappeared?







# What should we do about colony collapse disorder?

- Create a proposal for the National Science Foundation discussing your idea of how to solve the colony collapse disorder in the United States.
- Your proposal should describe the problem of CCD, how you would solve it, and what would be needed to do your proposal.

