



Royal Botanic Gardens **Kew**

THE GREAT POLLINATION INVESTIGATION

and how we get food from flowers

Deborah Hocking

With
POP-UPS
and **FLAPS**
to lift!





**THE
GREAT
POLLINATION
INVESTIGATION**





THE GREAT POLLINATION INVESTIGATION

A TEMPLAR BOOK

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I want to know All
about flowers.

They make the
world so lovely!

But I wonder, why are they
so bright and beautiful?

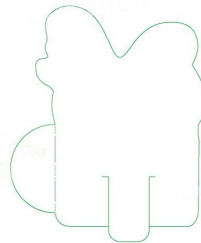
Why do they smell so sweet?

And why are bees and
other insects always
buzzing around them?

An amazing thing I've heard...



...is that flowers help make FOOD,
because of something mysterious called POLLINATION.



How do they do it?

Come on, let's find out! This is the
**Great Pollination
Investigation!**

*Take this bee and turn to the
back of the book to find out
how to make your very own
Pollination Wand!*

Pollination is
the process that
produces seeds and
the next generation
of plants.

Most of the food
people and animals
eat depends on
flowers in one way
or another.



First, let's look for CLUES.
There's some yellowish dust on this flower.
I wonder what that is. And what do all
these little parts inside a flower do?



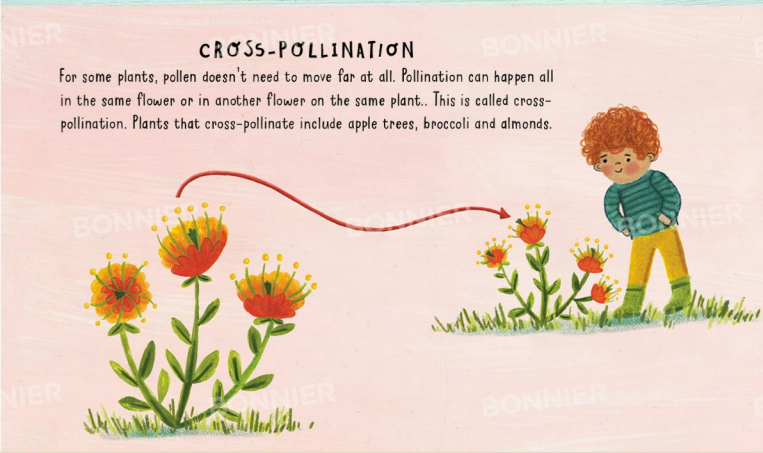
SELF-POLLINATION


Some plants move pollen from the anther of a flower to the stigma of another flower on the same plant. This is called self-pollination. Plants that self-pollinate include sugar snap peas, peanuts and tomatoes.



CROSS-POLLINATION

For some plants, pollen doesn't need to move far at all. Pollination can happen all in the same flower or in another flower on the same plant. This is called cross-pollination. Plants that cross-pollinate include apple trees, broccoli and almonds.





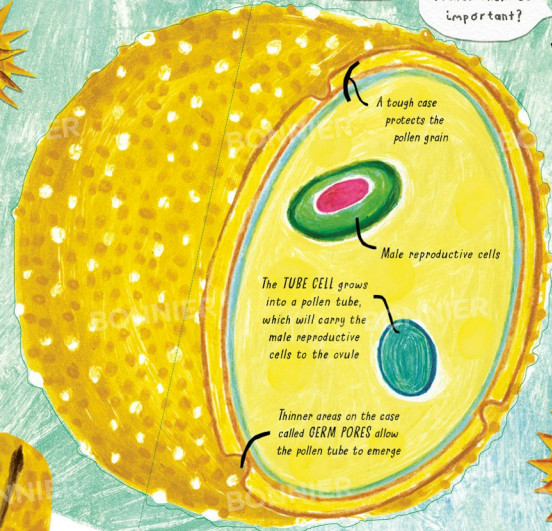
Let's discover more about pollen.

Under a microscope
we can see it's made
up of lots of teeny
tiny grains.

Pollen grains look different from one plant to the next.
Some are smooth, some are spiky!

Look at that one!
It looks just like a
pufferfish!

But what
makes them so
important?



But how does pollen make its journey
from one flower to another?
Let's investigate!

The way pollen moves around
can be quiet and peaceful.

Some garden crops, such as
tomatoes, aubergines and
peppers, are pollinated in
two ways.

And many of the most important crops people
eat also rely on wind to move their pollen along.

As well as 'buzz pollination' by
bees, the wind can gently shake
the flowers, causing pollen to fall
onto the stigma.

When we visit flowers
we make our bodies
'buzz' to vibrate their
blossoms and release
their pollen.

That's right!
Corn, wheat, rice,
oats and barley are all
pollinated by wind.

The flowers of
these plants are not
bright or showy.

The tiny anthers of wheat flowers
stick out to catch the wind.

They don't contain
nectar or have a
strong scent...

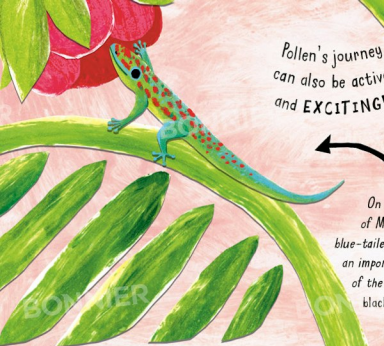
...since they
don't have to
attract us
pollinators.

Instead, they
make lots of super
light pollen...

...that floats
easily on a
breeze.

A bit
bring it
you ask me.



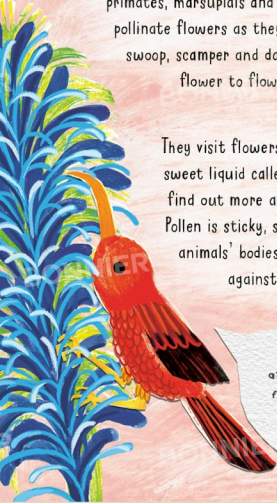


Pollen's journey can also be active and **EXCITING!**

On the island of Mauritius, the blue-tailed day gecko is an important pollinator of the *Ruizia blackburniana* plant.

Some birds, bats, rodents, primates, marsupials and lizards pollinate flowers as they jump, swoop, scamper and dart from flower to flower.


They visit flowers looking for a sweet liquid called nectar. (We'll find out more about that later.) Pollen is sticky, so it clings to the animals' bodies when they brush against the anthers.




We birds are attracted to bright flowers that have lots of nectar to drink.



To get enough food, hungry hummingbirds can visit up to 2,000 flowers in a day!




Flowers that attract bats often smell fruity, rotten or musty.



I take the prize for the world's largest pollinator!

The black-and-white ruffed lemur of Madagascar is the main pollinator of the traveller's palm. They can open the tough flowers with their hands to get to the nectar.



I know we're ALL important, but I must say, I'm the cutest.

Bush babies are small nocturnal primates that live in forests in sub-Saharan Africa. Along with bats, they pollinate the flowers of the baobab tree.



I beg to differ!

Flowers visited by rodents usually are close to the ground where these animals can easily reach them.



More than half of all flowering plants are pollinated by insects.

Mostly, pollination is bustling with buzzing energy!

We can watch pollinators at work right here in the garden.

Insects are the most important and numerous pollinators.

Bees make up the largest group of all pollinators. There are around 20,000 species of bees!

We're the bee's knees!

Only a handful of species make honey - the honeybees.

It's not just bees! Beetles, ants, flies, moths, mosquitoes, wasps and butterflies all pollinate.

The hard work of bees helps ensure we have delicious foods to eat such as apples, watermelon, almonds and many more. But bees are also essential to the ecosystems they live in, where they pollinate wild plants, providing food for wildlife.

Ahem... and slugs, thank you very much.

And worms, right?

Sorry, not worms.

What about me?

Well... maybe one day.

So many animals help plants out! But how do plants convince animals to pollinate their flowers?

They give the animal a reward they love to eat – a sugary liquid called **NECTAR**.

Can any animal pollinate, or just special ones?

Animals that pollinate are ones that can use the reward of pollen or nectar.

Some have special adaptations to help them collect pollen or nectar.

POLLEN BASKETS

Some bees, including honeybees, collect pollen in 'pollen baskets' made of special hairs on their back legs. They carry it back to the hive or nest to share with their colony.

BEAKS

Some birds, like hummingbirds, have long, thin beaks that help them to drink nectar from slender, tube-shaped flowers.

I can carry a third of my body weight in pollen!

TONGUES

Many pollinators have long tongues to reach nectar deep inside elongated flowers.

That's like a human having a 6-metre-long tongue!

Found in Australia, the honey possum is a picky eater and feeds only on pollen and nectar. It has brush-like bristles on its tongue to collect its food.

I don't think my tongue is very well adapted for pollination.

Us honeybees eat the pollen, too! It's full of nutritious protein.

Nectar is made in the **NECTARY**, usually found deep inside the flower. Pollinators brush past anthers and the stigma while looking for this sweet treat.

A 'bull's eye' pattern that only bees can see directs us toward the centre of the flower, where the nectar and pollen are.

A strong scent draws us right toward the flower.

Bright colours help us see the flowers well.

The lines on these petals are called **NECTAR GUIDES**. They show me where I need to go.

We know that lots of pollinators buzz around during the day. But do many animals visit flowers at night?

Yes! Some pollinators are **NOCTURNAL** – that means they are active at night. These animals keep the pollination process running round the clock.

Flowers that open at night often have a strong scent and are white or pale in colour so pollinators can see them more easily in the dark.

Animals that do this important night-time job include moths, beetles, bats, rodents and even one species of bee!

Bats are important pollinators for over 500 plants, including species of guava, mango, agave and wild banana.

Fewer animals pollinate at night, so there's less competition for the nectar and pollen.

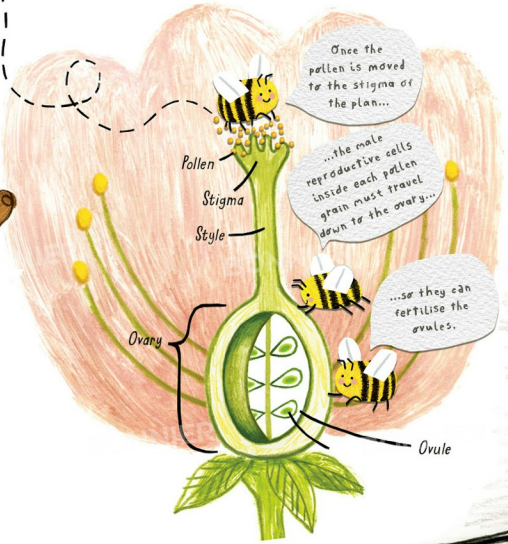
And fewer predators!

And some flowers only open at night, so they depend on nocturnal pollinators.



After pollination, something very important happens called fertilisation. Let's find out how this works.

FLOWER FERTILISATION



YUMMMM!





We've found out that so much goes into making the delicious fruits we eat.

Pollination is amazing!

Thanks to pollination, flowers turn into FRUIT.

And fruit makes our world so much sweeter!

But not all fruit is sweet. Aubergines, courgettes and cucumbers are all fruits. Can you think of any other non-sweet fruits?

Not all fruit is soft or juicy either. Some fruits have hard shells, like hazelnuts and chestnuts.

And some fruits are dry and need to be cooked before eating. Wheat, rice and oats are types of fruit!



Vegetables are also scrummy to eat. Are they fruits, too?

Vegetable plants flower and form seeds and fruit to reproduce but other parts of them are better to eat.

Luscious leaves like lettuce and spinach...

Gaps! I think I took a wrong turn.


...crunchy crowns like broccoli, cabbage and cauliflower...

...and savoury tubers like potatoes are just some of the amazing veggies we eat.



When we pop to the supermarket, it's amazing to think that almost all the foods you see depend on flowers and pollination in one way or another.





Back in the garden, we plant, and
wait, and watch the world around
us grow and blossom together.

Isn't it amazing to be part of
this wonderful, connected world?

