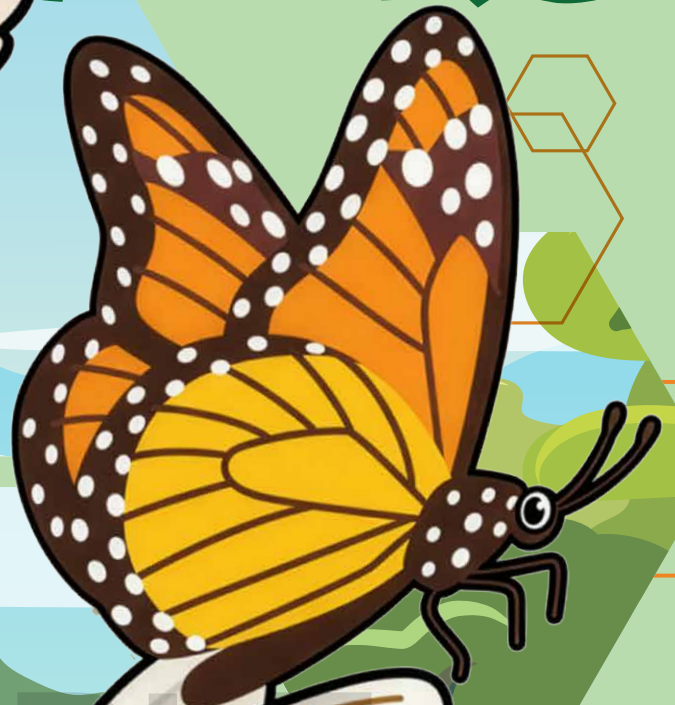


THE FASCINATING WORLD OF POLLINATORS



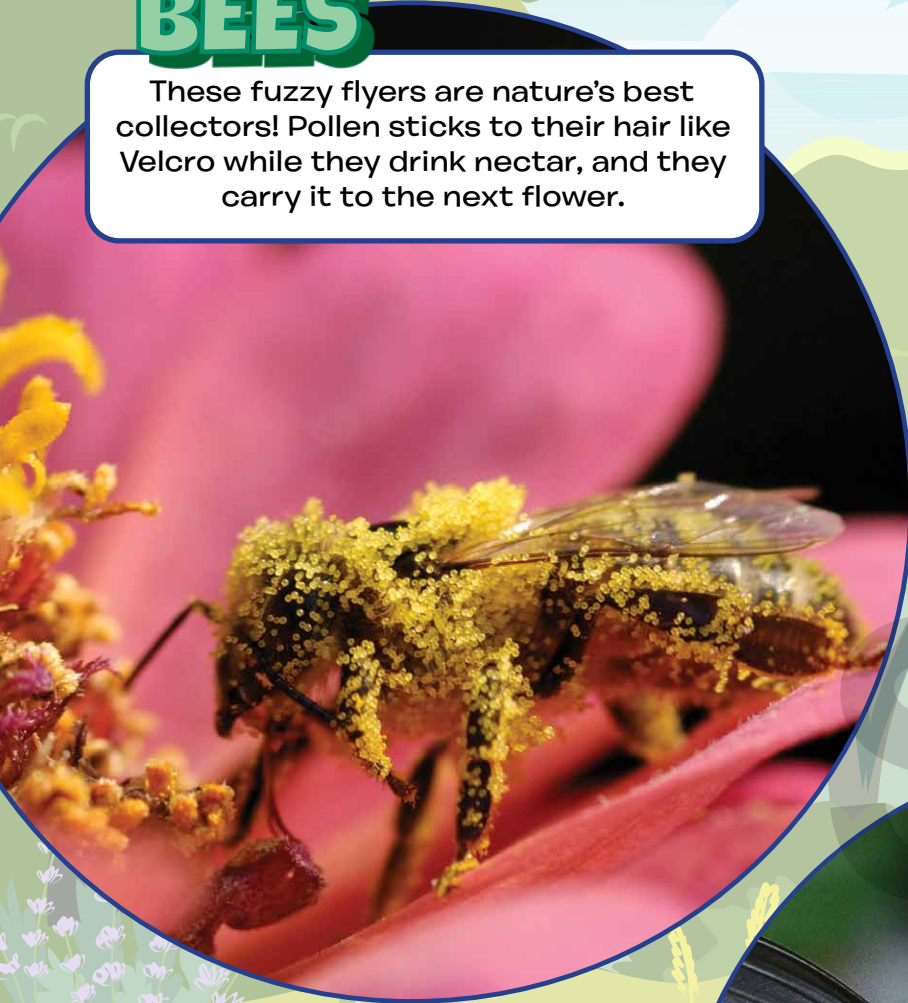
SAMPLE

NATURE'S SUPER SQUAD

Look outside at the trees and flowers. They look peaceful, right? But if you look closer, there is a busy world of workers buzzing around! They are doing the important work of transferring pollen from plant to plant.

BEES

These fuzzy flyers are nature's best collectors! Pollen sticks to their hair like Velcro while they drink nectar, and they carry it to the next flower.



Have you ever touched a flower and seen bright yellow dust on your fingers? That is pollen! Think of pollen as the "special ingredient" plants need to create seeds and fruit. But since flowers don't have legs, they can't visit each other to share this ingredient. That is why pollinators are the heroes of the garden. They act like nature's delivery drivers, moving pollen from one plant to another. If they stopped working, our plants wouldn't be able to grow the food we eat!

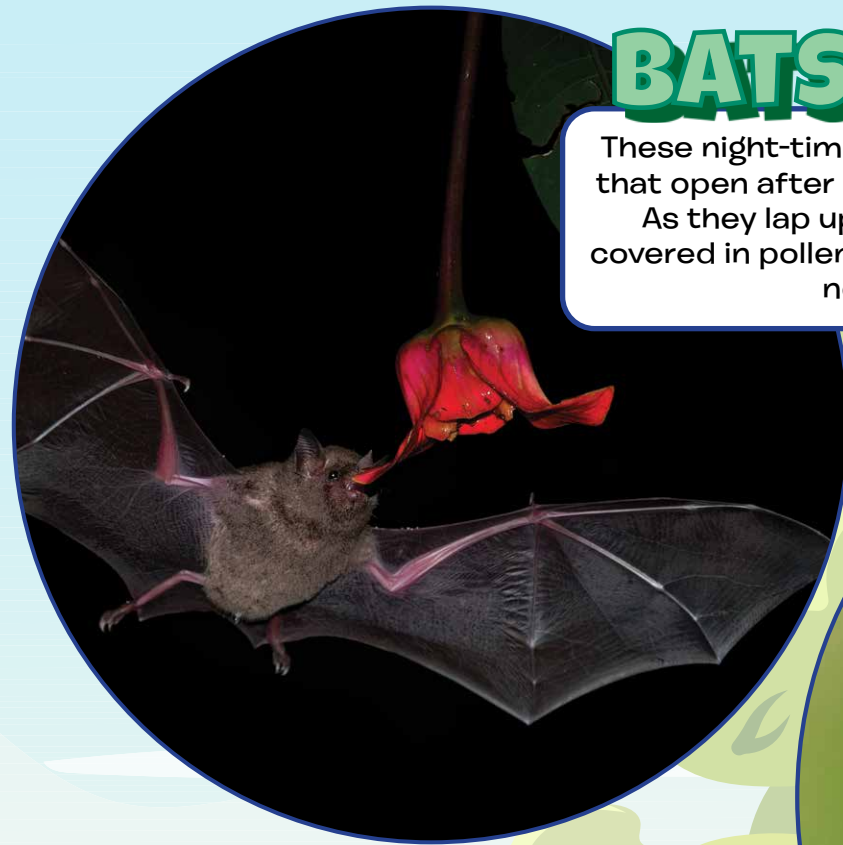
HUMMINGBIRDS

These tiny birds dip their long beaks deep into tube-shaped flowers to drink. Pollen brushes onto their foreheads and necks, giving them a "dusty hat" to wear to the next flower!



BATS

These night-time heroes visit big flowers that open after dark (like cactus flowers). As they lap up nectar, their fur gets covered in pollen that they drop off at the next bloom.



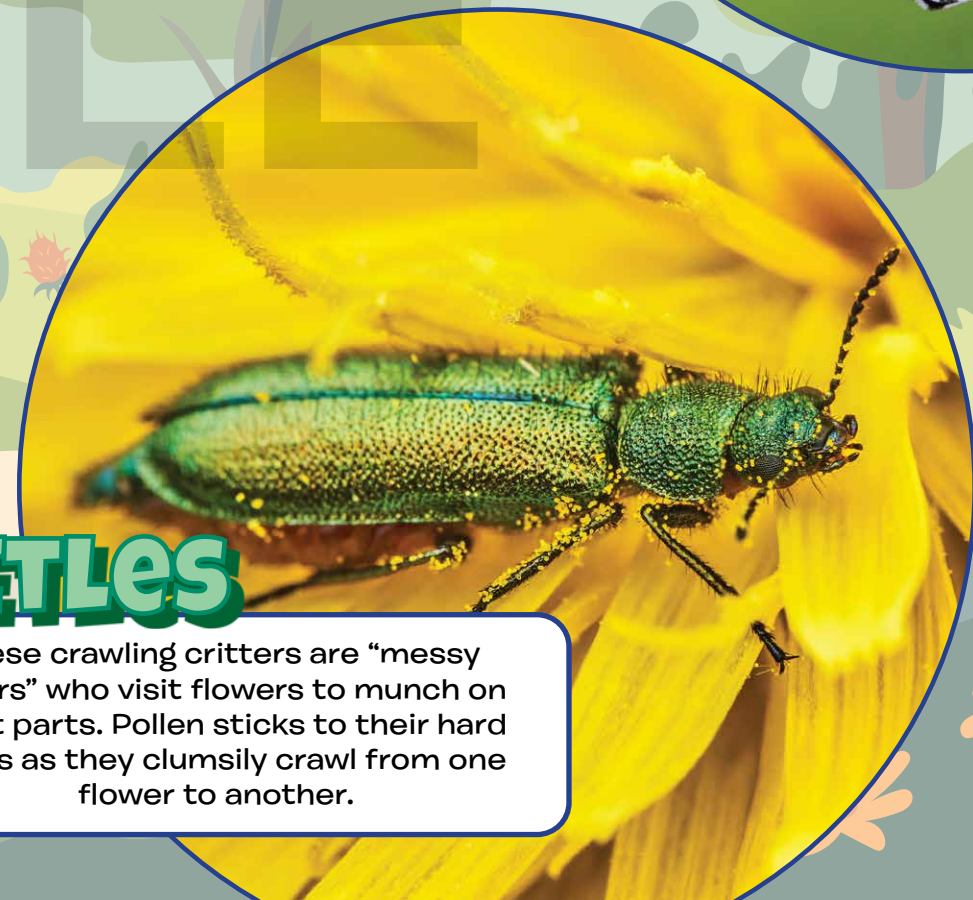
BUTTERFLIES

When they land on a flower to sip nectar with their long straw-like tongues, their legs touch the pollen. They carry this sticky dust on their legs and bodies as they flutter to a new spot.



BEETLES

These crawling critters are "messy eaters" who visit flowers to munch on plant parts. Pollen sticks to their hard shells as they clumsily crawl from one flower to another.



THANK A BEE (AND OTHER POLLINATORS) FOR YOUR LUNCH

Imagine walking into a grocery store, but the shelves are half empty. No strawberries, no almonds, no chocolate, and no watermelon. That is what our world would look like without pollinators! One out of every three bites of food you eat exists because of a pollinator.

Farmers rely on these insects to help their crops grow big and delicious. Here are five favorite foods that wouldn't be the same without them:



Apples

Apple trees have thousands of flowers, but they can't pollinate themselves. They need honeybees to visit different trees and mix the pollen. Without bees, the apples would be tiny, lumpy, or wouldn't grow at all!



Strawberries

Strawberries are special because they need to be visited by bees dozens of times. If a strawberry flower isn't pollinated enough, the berry will look shriveled and weird. It takes a whole team of bees to make a perfect, red berry.



Chocolate

Love chocolate bars? Thank a fly! The cocoa plant has tiny, complicated flowers that are too small for a bee. A microscopic fly called a "midge" is the only insect small enough to crawl inside.



Vanilla

Real vanilla comes from an orchid flower that only opens for one day! In the wild, it needs a specific bee to find it quickly. Without them, vanilla beans wouldn't grow, and ice cream would be a lot less tasty.



Pumpkins

Pumpkins have huge yellow flowers that are only open in the morning. A special "Squash Bee" wakes up before the sun to visit them. These busy bees make sure we have big orange pumpkins for Halloween!



Farmers Rent Bees, Too!

Did you know some bees travel for work? Farmers often rent thousands of honeybee hives and drive them across the country on big trucks to visit farms right when the flowers are blooming. These traveling bees help pollinate huge crops like almonds and cherries, and once the job is done, they hop back on the truck to head to the next farm!

WAIT... HOW MANY KINDS OF BEES?!

When you draw a bee, you probably use a yellow crayon and a black crayon. But did you know there are over 20,000 different types of bees in the world? In North America alone, there are nearly 4,000 species! The Honeybee is famous, but it is just one member of a very big, very colorful family!

Not Just Yellow

Some bees are shiny metallic green, bright blue, or even rusty red!



Mason Bee



Green Sweat Bee



Digger Bee



Leaf Cutter Bee

Tiny to Huge:

The smallest bee is as small as a grain of rice (the Perdita bee), while the Carpenter Bee is as big as a grape!



Perdita Bee



Carpenter Bee



Solo Flyers

Most bees don't live in hives or make honey. They live alone in the ground or in hollow stems.

HOW POLLINATION WORKS

We know pollinators are important, but what are they doing and how does that actually help the plant? It's all about a special delivery system called Pollination.

To make seeds (which turn into new plants), flowers need to share a yellow, powdery dust called pollen. But flowers can't walk over to their neighbors to say hello. They need help moving that dust around. So, they have to be smart. They use bright colors and sweet smells to trick insects into being their personal delivery drivers.

INSIDE A FLOWER

Pollen Grains

Pollen starts out inside the flower on delicate threads called filaments.

Pollinators

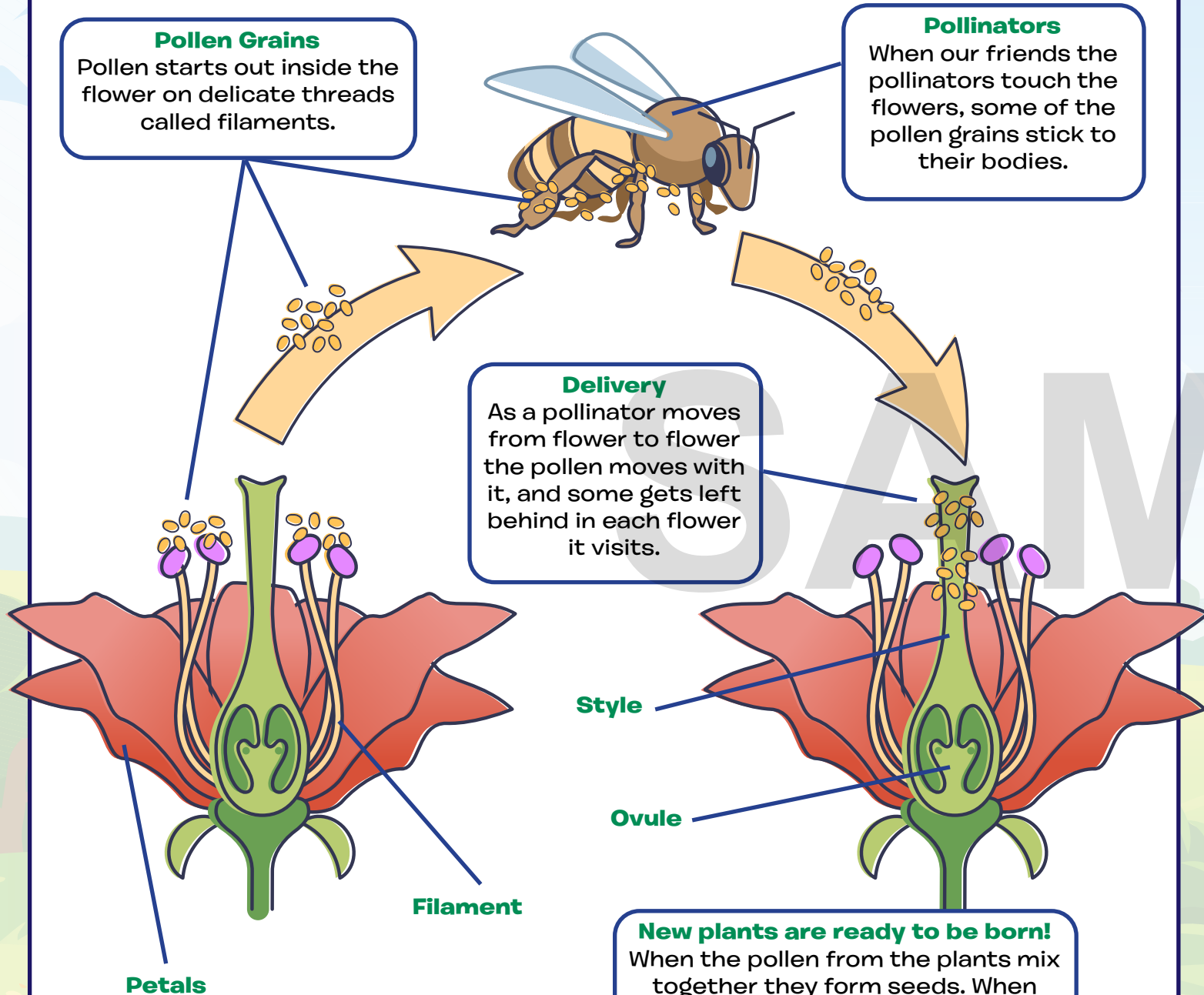
When our friends the pollinators touch the flowers, some of the pollen grains stick to their bodies.

Delivery

As a pollinator moves from flower to flower the pollen moves with it, and some gets left behind in each flower it visits.

New plants are ready to be born!

When the pollen from the plants mix together they form seeds. When the seeds are planted in soil and get enough water, they grow into brand new plants!



THE PERFECT INVITATION

Plants have a big problem: they can't walk around to find a partner. They are stuck in the ground! So, they have to be smart. They use bright colors, cool shapes, and sweet smells as advertisements to trick specific animals into visiting them. It isn't just random! Plants design their flowers to invite the specific guest they want.

SECRET SIGNALS (FOR BEES)

Did you know bees see colors differently than we do? They can't see the color red, but they are experts at seeing blue, purple, and yellow. Flowers also have secret patterns that humans can't see! Under UV light, many flowers have a glowing "bullseye" in the center. These act like landing lights at an airport, telling the bee: "Land Here! The food is this way!"



THE RED ALERT (FOR BIRDS)

Since bees can't see red, flowers that want to attract hummingbirds are usually bright red or orange. These flowers are often shaped like long tubes. A bee can't reach the nectar inside, but a hummingbird's long beak fits perfectly—like a key in a lock! Birds don't have a very good sense of smell, so red flowers usually don't smell like anything. They rely on color to do the talking.



THE NIGHT SHIFT (FOR BATS)

What about pollinators that fly at night? A bright color won't work in the dark! Plants that want to attract bats (like cactus or agave) have huge white or pale green flowers. These light colors reflect the moonlight so bats can find them. Since it is dark, these flowers release a super-strong, fruity smell that bats can sniff out from far away.



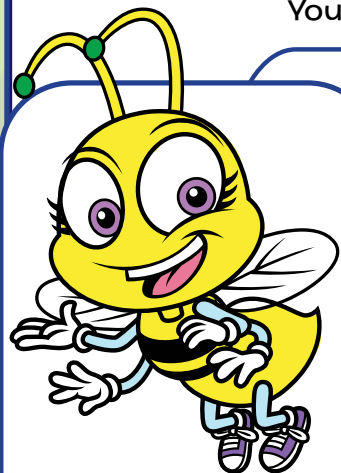
THE STINKY TRICK (FOR BEETLES AND FLIES)

Not all flowers smell like roses! Some beetles and flies love the smell of rotting food. Some flowers, like the huge Corpse Flower, smell like stinky socks or rotting meat. This tricks flies into landing on them because they think they found a tasty snack, but really, they are just picking up pollen!



THE FORAGER'S FLIGHT

This bee is a Scout. She needs to collect three essential supplies: **Water**, **Nectar**, and **Pollen** and return safely to the **Hive** to do her "Waggle Dance" to let her sisters know where the food is. Be careful! You must visit all **3 Checkpoints** but avoid the **Hazards**!



START

WATER: THE BIRDBATH

Science Fact: Bees don't just drink nectar! They need water to cool down the hive on hot days.



HAZARD: THE RAIN CLOUD

Oops! Bees can't fly in heavy rain. Their wings get too wet. Wait for the sun!



POLLEN: APPLE BLOSSOMS

Science Fact: Bees pack yellow pollen into the "baskets" on her legs to feed the babies.



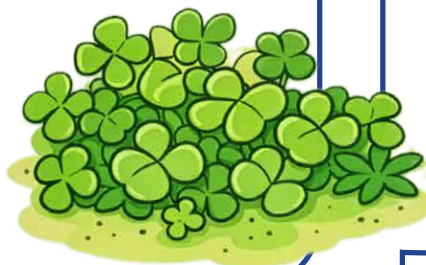
HAZARD: THE SPIDER WEB

Oops! Spiders like Crab Spiders hide in flowers to catch bees. Turn back!



NECTAR: CLOVER PATCH

Science Fact: Your bee needs energy! She drinks nectar here to fuel her flight home.



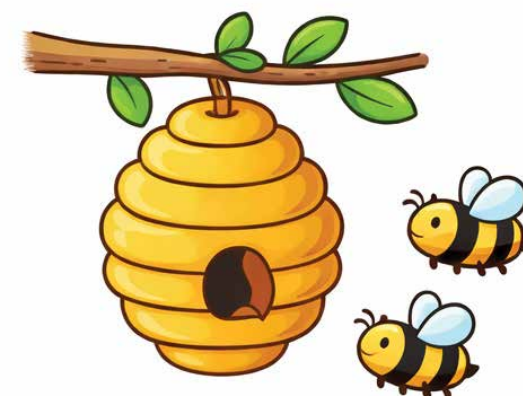
HAZARD: THE SPRAYED GARDEN

Oops! This garden has a "Pesticides" sign. It smells funny and makes the bee sick. Stay away!



THE HIVE AND THE WAGGLE DANCE

When your bee finishes this maze and gets home, she doesn't keep the secret to herself. She performs a special dance called the Waggle Dance. By wiggling her body and running in a figure-eight, she gives the other bees a map to show them exactly where to find the flowers you just visited!



END

THE MANY CHALLENGES THAT POLLINATORS FACE

Being a pollinator isn't just about flying around and drinking nectar. It is actually a very dangerous job! Lately, scientists have noticed that there are fewer bees and butterflies than there used to be. Here are some of the biggest challenges that our pollinator heroes have to fight every day.

THE HOUSING CRISIS (HABITAT LOSS)

Imagine if you came home from school, but your house was gone and replaced by a giant parking lot. That is happening to pollinators all over the world.

The Problem: We are building more shopping malls, roads, and houses. Even when we plant gardens, we often plant big green lawns.

Why it Hurts: A green grass lawn might look nice to humans, but to a bee, it looks like a desert. Grass has no nectar and no pollen. If a bee can't find a "flower hotel" to rest in, it runs out of energy and can't make it back to its hive.



THE INVISIBLE DANGER (PESTICIDES)

Farmers and gardeners use sprays called pesticides to stop bugs from eating their plants.

The Problem: These sprays are designed to get rid of pests (like mosquitoes or aphids), but they aren't smart. They can't tell the difference between a "bad" bug and a "good" bug.

Why it Hurts: When a bee lands on a flower that has been sprayed, two things can happen. It might get sick instantly, or it might get "brain fog." Scientists have found that some sprays make bees lose their memory—they forget where their hive is and get lost forever!



THE BULLIES (INVASIVE SPECIES & PESTS)

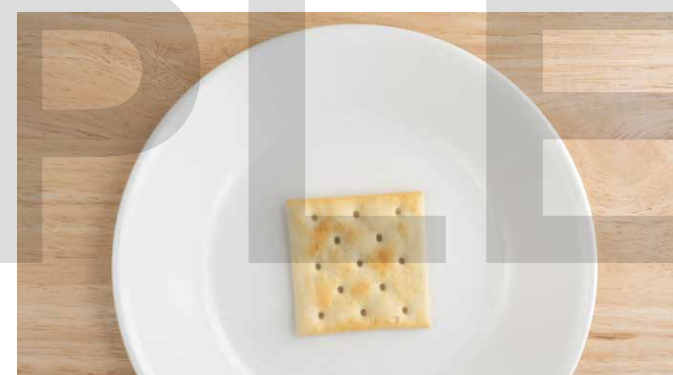
Pollinators have enemies in nature, too. But recently, new enemies have arrived that bees don't know how to fight.



The Vampire Mite: There is a tiny creature called the Varroa Mite that attacks honeybees. It latches onto the bee's back like a tick and weakens it. It's a vampire for bugs!

The Weed War: Sometimes, new plants from other parts of the world (called Invasive Plants) grow too fast and take over. They crowd out the native flowers that local bees need to eat, leaving them with nothing to snack on.

WHAT IS A "GREEN DESERT"

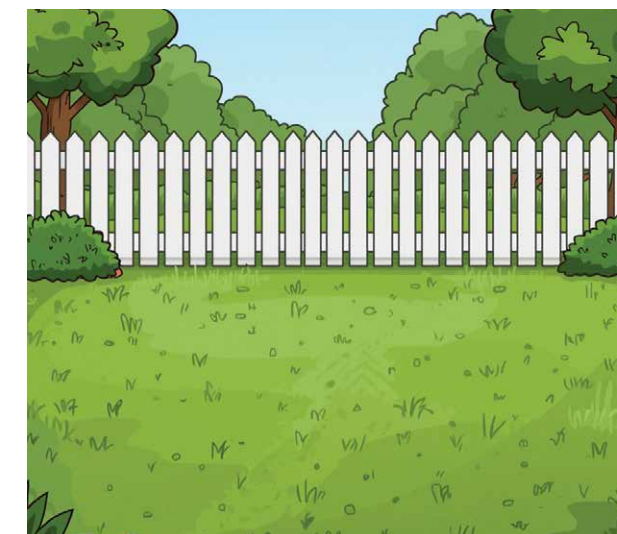


Imagine if the only food you were allowed to eat for breakfast, lunch, and dinner was plain crackers. You would get bored, and you wouldn't get the vitamins you need to grow strong. Many big farms practice Monoculture (Mono = One). They grow only one type of crop, like corn or wheat, for miles and miles.

For a bee flying over a cornfield is like flying over a desert. There is plenty of green, but there are no flowers to visit. This lack of variety makes bees weak and makes it harder for them to fight off diseases.

DID YOU KNOW?

Let's take a look at two environments, a back yard, and an overgrown field. Which do you think is a better home for pollinators?



Most people think a "messy" garden is bad, but for a pollinator, it is a mansion!

Hollow Stems: Old dried-up flower stems are where tiny mason bees lay their eggs.

Piles of Leaves: Butterflies often hide under piles of dead leaves to stay warm and safe from birds.

Bare Dirt: 70% of native bees dig holes in the ground to live. If we cover every inch of dirt with mulch or grass, they have nowhere to dig!

JOIN THE POLLINATOR SQUAD!

You Can Be a Hero! Pollinators have a tough job. They have to fly long distances, dodge storms, and find food in a world where flowers are disappearing. But the good news is that you can help them! You don't need a farm or a giant laboratory to save the bees. You just need a little bit of space and some creativity. Here are four ways you can become a Pollinator Hero today.

PLANT A "PIT STOP"

Bees and butterflies are like tiny race cars, they need to refuel constantly!

The Mission: Ask an adult to help you plant a "Pollinator Pocket" garden. Even a few pots on a balcony can help.

The Strategy: Pick flowers that are native to where you live (flowers that grew there before cities were built). These are the healthiest snacks for local bees. Try to pick flowers that bloom at different times so there is food in Spring, Summer, and Fall!

Things you'll need:



Plant the seeds and water them according to the instructions. Pretty soon you'll have a pollinator paradise!



BUILD A BEE BATH

Flying is thirsty work! But bees can't drink from a deep swimming pool or a birdbath because they might drown. They need a safe place to sip.

The Mission: Create a shallow water station.

How to do it:

Find a shallow dish (like a small plate or plant saucer)



Fill it with pebbles or marbles.



Add water just until the tops of the stones are dry. Now, bees can land on the stones and drink safely without getting their wings wet!



BEE A SCIENTIST

You can help real scientists track how pollinators are doing.

The Mission: Go on a "Bee Safari."

How to do it: Sit quietly near a flower patch for 10 minutes. Count how many different insects visit. Are there fuzzy bees? Shiny beetles? Butterflies? Write down what you see in the field notes table below. You can share what you find with apps like iNaturalist or Seek to help scientists map where the bugs are living.

Type of Insect	How Many?	Description
Bees		
Butterflies		
Beetles		
Spiders		
Other		

LEAVE THE LEAVES!



We usually think a clean garden is a good garden. But for pollinators, a messy garden is a cozy home!

The Mission: In the fall, don't rake up every single leaf.

The Reason: Many butterflies and bees spend the cold winter sleeping under piles of dead leaves or inside hollow dried-up flower stems. If you throw them away, you are throwing away their winter blankets!

SAMPLE