

THIS PRESENTATION IS INTENDED TO BE USED IN SECTIONS TO SUPPORT TEACHING ON THE TOPICS PRESENTED. ANY OF THE SLIDES CAN BE USED AS HANDOUTS. YOU CAN HIDE SLIDES IN POWERPOINT UNDER SLIDE SHOW COMMAND

SLIDE 1 This is a class about something called pollinators and how they help our plants to grow. Mr. Bee is one of the busiest pollinators and he will introduce us to some of his friends.

SLIDE 2 Part One – Pollinators and Pollination
Pollination is the way that plants make more plants. Some plants can pollinate themselves, but other plants need help to pollinate.

SLIDE 3 READ THE SCREEN HERE. THERE WILL BE MORE INFORMATION ABOUT WIND POLLINATION LATER. WE WILL NOT DISCUSS SELF-POLLINATING PLANTS IN THIS LESSON.

SLIDE 4 Butterflies, hummingbirds and bees are all pollinators. They all make our food grow. ASK CHILDREN TO RESPOND YES OR NO TO THE QUESTIONS. IF SOME SAY THEY DO NOT LIKE BEES, SHOW THE LAST POINT IMMEDIATELY AND TELL THEM THAT MOST BEES ARE TOO BUSY HELPING FOOD GROW TO STING THEM.

SLIDE 5 ASK CLASS TO NAME POLLINATORS THEY REMEMBER FROM OTHER DISCUSSIONS OR BOOKS. THEN CLICK THROUGH BULLET POINTS TO CHECK THEIR ANSWERS.

SLIDE 6 Here are some of the friends of Mr. Bee. Just about anything that does it's work or plays around plants can be a pollinator – even people. Name some of the pollinators you see circled on this picture.
POINT OUT ANIMALS LIKE MICE, OR CATS, OR DOGS, OR PEOPLE CAN POLLINATE BY ACCIDENT WHEN THEY COME IN CONTACT WITH A PLANT

SLIDE 7 Bees are made to pollinate. A bee has hairs all over its body, The pollen sticks onto the hairs. Bees eat pollen and feed it to their babies. Pollinators also get sweet nectar from the flowers to give them energy (nectar power).

Song (sung to the tune of "Heads and Shoulders: – Roots and Stems. Leaves and Flowers, Leaves and Flowers, (repeat twice), butterflies need nectar power, Roots and Stems, Leaves and Flowers, Leaves and Flowers, Leaves and Flowers.

SLIDE 8 Your teacher will help you try this experiment. Cheeto dust is not really pollen but it looks like pollen and is sticky like pollen.
SHOW ANIMATED EXPERIMENT ON SLIDE. THEN STOP AND TAKE THE TIME TO DO THE CHEETOS EXPERIMENT WITH THE KIDS. PUT THE CHEETOS IN A BOWL. HAVE PAPER FLOWERS WITH WHITE CENTERS TO SHOW TRANSFER OF POLLEN.

SLIDE 9 Every plant has special parts that help it make seeds. Pollen helps the plant make seeds. The Anther in the plant makes the pollen. The pistil in the plant leads to the eggs which grow into seeds.

SLIDE 10 USE THE ANIMATED SLIDE SHOW TO ILLUSTRATE AGAIN HOW THE BEE MOVES FROM ONE FLOWER TO THE NEXT SPREADING POLLEN. (STEPS 1 AND 2). BEFORE ADVANCING SLIDE POINT OUT THAT THE SEEDS FORM ONLY AFTER POLLINATION. THE SEED THEN SPOUTS AND GROWS TO MAKE ANOTHER PLANT THAT IS THEN POLLINATED AND GROWS.

SLIDE 11 Lots of flowers are built just to bring in the bees. They are like targets for the pollinators. Can you find the anthers and the pistons on these flowers?

SLIDE 12 EITHER BRING FLOWERS IN TO THE CLASSROOM, OR GATHER THEM WITH THE CHILDREN FROM THE GARDEN TO USE TO FIND ANTHERS AND PISTILS. HAVE THE CHILDREN TOUCH THE POLLEN AND EVEN MOVE IT FROM ONE PLANT TO ANOTHER LIKE A POLLINATOR. PEOPLE CAN BE POLLINATORS.

SLIDE 13 PART TWO – GARDENS FOR POLLINATORS

SLIDE 14 OPTIONAL SLIDE: FOR OLDER CHILDREN, COMPARE FLOWERS THAT ARE POLLINATED BY POLLINATORS WITH THOSE THAT ARE POLLINATED BY WIND. THE FLOWERS ARE FROM TOP TO BOTTOM. POLLINATOR POLLINATED – CELANDINE POPPIES, TURKS-CAP LILY, PASSION FLOWER; WIND POLLINATED- INDIAN GRASS, PUSSY WILLOW, RAGWEED

SLIDE 15 This is a good garden for pollinators because it has many flowers that attract many pollinators. The red bee balm attracts many kinds of pollinators. Do you know the name of the pollinators in the pictures. The last one is a moth that looks like a hummingbird (Hummingbird Moth).

THE PERFECT BUTTERFLY GARDEN. SHOW THAT ONE FLOWER CALLED “BEE BALM” IS A FAVORITE OF MANY DIFFERENT CREATURES THAT VISIT GARDEN BY SHOWING HIDDEN PICTURES (ADVANCE WITH MOUSE). GOOD POLLINATOR GARDENS ARE PROVIDE FOOD FOR LOTS OF POLLINATORS.

SLIDE 16 These are all important to help bees find good gardens to pollinate and grow. If we have good gardens near where food grows, there is more food for everyone. EXPLAIN THAT YOU WILL TALK ABOUT ALL THE THINGS THAT YOU NEED IN THE GARDEN AS YOU LOOK AT THE SLIDE SHOW.

SLIDE 17 Color is very important. Do you like color? So do pollinators. They come to gardens that have colorful flowers all year long. This is a good pollinator garden with lots of color.

SLIDE 18 LET THE CHILDREN TELL WHAT THEIR FAVORITE COLOR IS AND THEN EXPLAIN THAT POLLINATORS HAVE FAVORITE COLORS AS WELL.

SLIDE 19 Bees and butterflies like purple and pink flowers. Asters come in pink and purple. Butterflies are also attracted to orange. Bees especially will come to gardens where there are different shades of purple. They also like flat yellow centers that tell them where the pollen is found. This flower is an aster.

SLIDE 20 Hummingbirds like red plants. Many red plants have places for the hummingbird to stick its long beak to get nectar. This trumpet shape in any colored flower will attract Hummingbirds. USE MOUSE CLICK TO MOVE THROUGH THE PICTURES AND PLANT NAMES. SHOW THE ENTRANCE POINT FOR THE BEAKS AND POINT OUT THE TRUMPET SHAPE.

SLIDE 21 Some beetles also eat pollen and sip nectar. This is a special beetle called a goldenrod beetle. It loves yellow and orange flowers. It is colored yellow or orange to blend in with the flower it likes to eat. This keeps birds or spiders from seeing it and eating it. Other beetles prefer green or white flowers. GREAT BOOK FOR TEACHING ABOUT PREDATORS IS “BUGS FOR LUNCH”

SLIDE 22 MOTHS are a lot like butterflies but many of them come out at night to pollinate white or light colored flowers like this May Apple plant. The May Apple only blooms in Spring and so do these white moths. Can you see the moth? It is hiding from creatures that come out at night to find a good meal
MOVE THROUGH THE ANIMATION TO SHOW FLOWER, QUESTION AND THEN MOTH.

SLIDE 23 GIVE THE CHILDREN A PAD OF PAPER AND HAVE THEM GO INTO THE GARDEN AT OR NEAR SCHOOL TO LOOK FOR POLLINATORS AND WRITE DOWN WHAT COLORS THEY ARE FOUND ON IN THE GARDEN. OR LOOK AT IMAGES ONLINE OF DIFFERENT POLLINATORS TO SEE WHAT COLORS THEY ARE SHOWN TO LIKE. SEE HANDOUT FROM NATIONAL GARDENING ASSOCIATION FOR MORE INFORMATION ON ATTRIBUTES. (<http://www.kidsgardening.org/node/11941>)

SLIDE 24 Bees are special pollinators – this unit is entirely dedicated to bees - honeybees and native bees.

SLIDE 25 Bees like to eat pollen and feed it to their babies. When they do this they also help us grow food b pollinators pollinating plants. Bees are the best pollinators because they have tiny hairs that help collect the pollen – and there are so many of them. READ THROUGH POINTS. ASK IF THEY HAVE SEEN BEES IN THEIR GARDEN. THIS IS A GOOD TIME TO POINT OUT THAT BEES IN THE GARDEN ARE TOO BUSY TO BOTHER GARDENERS IF WE LEAVE THEM ALONE.

SLIDE 26 This bee will visit every tiny flower with every single pistil on this button plant looking for pollen.

SLIDE 27 What is your favorite fruit? Bees pollinate most of the fruits we eat. Without bees we would have no blueberries or any other fruits. This bee is making a hole inside the bloom to sip the nectar. Some little bees go inside the flower to get the nectar. DISCUSS WHICH IS BEST FOR POLLINATING – GOING INSIDE FROM FRONT OR MAKING A HOLE. GOING INSIDE IS BETTER BECAUSE THE POLLEN IS INSIDE. BEES WHO STEAL NECTAR AND BY-PASS POLLEN ARE CALLED ROBBER BEES.

SLIDE 28 BEES DIFFER IN MANY WAYS BESIDES SIZE AND COLORS. TWO OF THE BIGGEST DIFFERENCES ARE WHETHER THEY ARE SOLITARY OR SOCIAL INSECTS; AND WHERE THEY LIVE. THIS SECTION BRIEFLY INTRODUCES THE CHILDREN TO THIS CONCEPT.

SLIDE 29 Honey bees take their pollen and nectar back to their home to feed other bees and baby bees. They work together to raise families. THIS WOULD BE A GOOD TIME TO BRING IN A BEEKEEPER. WHILE THIS LESSON IS PRIMARILY ABOUT NATIVE BEES, HONEY BEES ARE VITAL POLLINATORS AND HAVE BEEN IN THIS COUNTRY SINCE THE 1600'S.

SLIDE 30 There are many kinds of bees. This is a little mason bee that lives all by itself in holes it finds in wood. It lays an egg in the hole and puts in lots of pollen for the baby bee to eat when it comes out of the egg. This bee came to this yellow flower to get pollen for its baby to eat after it hatches. IF POSSIBLE SHOW THE CHILDREN A MASON BEE HOUSE WITH HOLES FOR THE SOLITARY BEES. PLACE THE HOUSE IN YOUR SCHOOL GARDEN NEAR FRUIT OR EARLY BLOOMING FLOWERS. THESE HOUSES ARE RELATIVELY INEXPENSIVE ON-LINE OR CAN BE MADE FROM SIMPLE PATTERNS.

SLIDE 31 These bees are bumblebees. They buzz and buzz to help shake the pollen off the plant and gather it on their hairy bodies. They live together in the ground and fly out together to get pollen and nectar to take back to their babies in next in the ground. CLICK MOUSE TO SHOW THE IN-GROUND NEXT OF THE BUMBLE BEE. BEE POLLINATION IS SOMETIMES CALLED “BUZZ POLLINATION”.

SLIDE 32 Bees come out all year round – even on warm winter days. This very tiny bee comes out to pollinate spring flowers like crocuses. Point out the pollen on the anthers. It lives in sandy ground and lays its eggs there. YOU MIGHT WANT TO PLANT SOME CROCUSES IN THE FALL FOR THESE BEES IN THE SPRING.

SLIDE 33 Try this Go to the garden and look for bees. How many different kinds of bees can you find? Where do they live and lay eggs?

SLIDE 34 Nectar brings pollinators to a flower and gives them energy. Most pollinators only come to flowers for the nectar. Bees come to the flower for pollen for food and nectar for energy.

SLIDE 35 Butterflies love nectar. It gives them energy to fly around looking for places to lay eggs. Butterflies have long tongues to help them get out the nectar. They collect pollen on their feet. CLICK MOUSE TO SHOW CIRCLE AROUND TONGUE AND FEET

SLIDE 36 Some flowers are extra sweet so that they attract many pollinators. Nectar helps give pollinators energy. ADVANCE THROUGH MOUSE CLICKS TO SHOW THREE DIFFERENT POLLINATORS WHO VISIT PLANTS. THE MOUSE LIKES THE SEEDS FROM A PLANT BUT THE BEE AND HUMMINGBIRD NEED THE NECTAR. MICE POLLINATE WHEN THEY WALK THROUGH THE FLOWERS LOOKING FOR SEEDS. SMALL CHILDREN CAN PRETEND TO BE HUMMINGBIRDS AND BUTTERFLIES AND SIP NECTAR (JUICE) THROUGH STRAWS AS A SNACK.

SLIDE 37 HAVE THE CLASS WRITE DOWN ALL THE WAYS THEY SEE POLLINATORS SIPPING NECTAR. LOOK FOR PHOTOS OF POLLINATORS ONLINE.

SLIDE 38 **THIS SECTION IS FOR UPPER PRIMARY GRADE STUDENTS.** Native plants are better for pollinators. What is a native plant?

SLIDE 39 Native plants have been here along time just like native pollinators. MOVE THROUGH THE POINTS ONE AT A TIME. THE PHOTO AT THE END SHOWS A MONARCH AND TWO WOOD BEES POLLINATING AN AROMATIC ASTER.

SLIDE 40 REVIEW THE POINTS ON NATIVE PLANTS ONE AT A TIME

SLIDE 41 IF POSSIBLE HAVE A MILKWEED PLANT TO SHOW THE STUDENTS. THE IMAGE IS A FEMALE MONARCH BUTTERFLY LAYING EGGS..

SLIDE 42 These small caterpillars came from eggs laid by a butterfly on milkweed. This butterfly only lays its eggs on milkweed. Many pollinators pollinate milkweed.

SLIDE 43 MOVE THROUGH THE PICTURES ONE AT A TIME TO SHOW THE LIFE CYCLE OF A MONARCH BUTTERFLY. IF POSSIBLE RAISE A MONARCH IN THE CLASSROOM. REMIND STUDENTS THAT THE BUTTERFLY IS A POLLINATOR.

SLIDE 44 There are many types and colors of milkweeds.

SLIDE 45 Spicebush is another native plant. It blooms in spring for early pollin

SLIDE 46 One little caterpillar grows from eggs laid on Spicebush. THE TOP LEFT IMAGE IS OF A SMALL SPICEBUSH CATERPILLAR. IT ROLLS UP A LEAF AND HIDES INSIDE. THE CATERPILLAR GROWS TO BE ABOUT THE SIZE OF YOUR LITTLE FINGER BEFORE FORMING A CHRYSALIS AND BECOMING A BUTTERFLY.
ADVANCE THROUGH THE PHOTOS.

SLIDE 47 The black swallowtail butterfly lays its eggs on different plants in the same family. Wild Parsley is the native variety of the species. Golden alexander is in the same family as parsley and dill and is a native plant. THESE CATERPILLARS ARE EASY TO FIND IN THE GARDEN, OFTEN FOUND ON PARSLEY, DILL ,OR FENNEL. IF YOU HAVE A SCHOOL GARDEN BE SURE TO RAISE SOME OF THIESE PLANTS AND WATCH FOR TINY BROWN CATERPILLARS THAT ARE THE LARVA OF THE BLACK SWALLOWTAIL CATERPILLAR.

SLIDE 48 REVIEW OTHER POLLINATORS. IF TIME ALLOWS GO OUT TO GARDEN AND LOOK FOR POLLINATORS. FLOWERS ARE FROM LEFT ARE MIST PLANT, SPICEBUSH LEAF, AND LIATRIS.

SLIDE 49 Try this: plant 3 different native plants in your garden. Find out what pollinators like your plants?

SLIDE 50 All pollinators need our protection so they can do their work.

SLIDE 51 REVIEW THE POINTS OF THE SLIDE. EXPLAIN THAT SOME PEOPLE USE POISON ON PLANTS TO KILL INSECTS THAT EAT THE PLANTS. POISON ALSO KILLS POLLINATORS SO IT IS BETTER TO NOT USE POISON IF IT CAN BE AVOIDED. YOU MIGHT WANT TO ADD THAT POLLINATORS WILL LEAVE PEOPLE ALONE IF PEOPLE LEAVE THEM ALONE. THEY DO NOT LIKE TO BE TEASED OR TOUCHED. BEES WILL ONLY STING IF THREATENED OR IF SOMEONE BOTHERSTHEIR NEST. INVITE A BEE KEEPER TO THE CLASS TO TALK ABOUT HONEY BEES AND PROTECTION FOR THE BEES AND THE KEEPERS.

SLIDE 52 Remember all the POLLINATORS will benefit from a pollinator garden. See how many of these pollinators you can find in your garden. KEEP THIS CHART IN THE CLASS ROOM AND LOOK FOR THESE POLLINATORS WHEN YOU GO OUTSIDE TO THE GARDEN. KEEP A RECORD OF ALL THE POLLINATORS YOUR CLASS FINDS.

SLIDE 53 And by protecting pollinators you protect other valuable insects such as butterfly caterpillars.