FLOWER POWDER

BIO KEY

Arts and Crafts
Simulation
Plant Investigation

OVERVIEW

The youngsters use artificial bees and paper models of flowers to find out how bees transfer pollen from one flower to another.

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BACKGROUND

For many plants, the production of seeds that will grow depends on the transfer of pollen from one flower to another flower of the same kind. Wind and animals are usually responsible for this transfer.

Animals such as bees, hummingbirds, butterflies, and moths visit flowers to collect nectar (juice) or pollen (powder) for food. As they gather their food, these animals brush against the pollen-bearing parts of the flower and pick up pollen. In this way, the animals become agents in the transfer of pollen. For example, when a bee lands on a flower to gather food, pollen sticks to its legs, body, or head. When the bee goes to another flower for more food, some of the pollen picked up from the first flower sticks to the second flower. This process continues as the bee moves from flower to flower. When bees and other animals move pollen between flowers of the same kind, they are pollinating these flowering plants. ***Pollination*** is the transfer of pollen (male spores) from the stamens (male organs) to the pistils (female organs) of a flower. In this activity, your youngsters investigate pollen-moving agents and the pollen-covered structures of flowers.

CHALLENGE: FIND OUT HOW ANIMALS MOVE POLLEN FROM ONE FLOWER TO ANOTHER.

MATERIALS

For each team of two:

1 pollen board †
2 artificial bees †
1 set of paper flower shapes: dish, cone, and three-ounce paper cups* (See the "Flower Shapes" card.)
1 magnifying lens*
3 to 4 pieces of flagging* each about 30 cm long
1 zipper-lock bag*

For the group:

1 Flower-Powder Junk Box* containing: tape, cotton swabs, pipe cleaners cut into various lengths, cotton balls, yarn, glue, construction paper, clay, popsicle sticks, and toothpicks
scissors*
3 small containers of "pollen"* (one cornstarch and two different colors of tempera paint powder)
1 "Pollen Collectors" Equipment Card*
1 "Flower Shapes" card*

* Available from Delta Education.
† See the "Pollen Collectors" Equipment Card.

PREPARATION

Group Size. This activity works best with ten to twelve youngsters. If your group is larger, divide it into two smaller groups with separate leaders.

Time. Plan on forty to sixty minutes for this activity. *Flower Powder* works best during the spring and summer when flowers are abundant.

Site. Choose a site with at least three kinds of flowering plants. Test several flowers with a pollen board to make sure the flowers have pollen. (See the pollen-board procedure on the "Pollen Collectors" Equipment Card.) Select one plant with a lot of pollen, and flag it for

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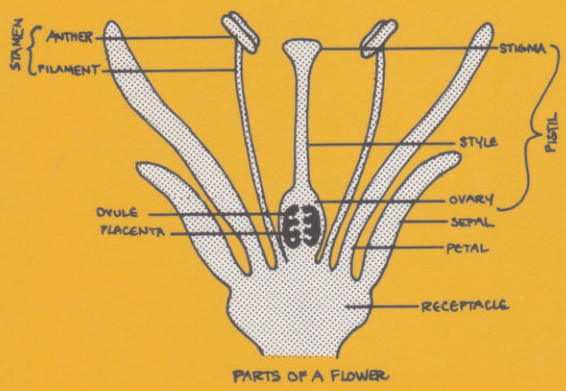
your demonstration at the beginning of the activity. For the flower-model construction, you will need a protected area out of the wind.

Materials

1. Flowers. Trace one dish and one cone shape (from the "Flower Shapes" card) on construction paper for each team of two, and cut out the shapes. Tape the cone sides together as illustrated on the "Flower Shapes" card.

2. Pollen Collectors. Make one pollen board and two artificial bees for each team. (See the "Pollen Collectors" Equipment Card.)

Safety. *Important!* Before starting the activity, caution any youngsters who are allergic to bee stings against working near flowers with bees on them.



PARTS OF A FLOWER

ACTION

1. Gather the youngsters around the flagged plant. *Gently* press one of its flowers against the pollen board, and show the group the results. Ask if anyone knows what the powder on the board might be. If no one knows, tell them that the powder is pollen and that flowers need pollen to make seeds that will grow. Add that, for many plants, the pollen from one flower must be moved to another flower of the same kind to make seeds that will grow.

2. Explain that flowers have pollen only at certain times so some flowers may not contain pollen today.

3. Show the youngsters how to use the pollen boards. Caution the youngsters against picking or damaging the flowers while collecting pollen.

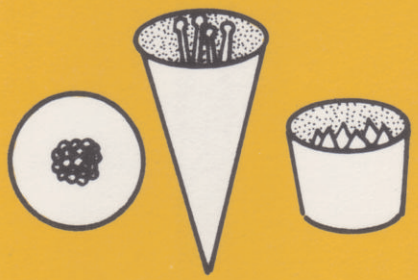
4. Divide the group into teams of two, and give each team one pollen board and three or four pieces of flagging.

5. Challenge the youngsters to find plants with flowers that contain pollen by using the pollen boards and the press technique that you have just demonstrated. Encourage the teams to collect different kinds of pollen on their boards and to flag the plants that have pollen-bearing flowers. Explain that they can use different areas on their boards for each kind of flower that they test.

6. After about five minutes, ask the teams to display their pollen boards and to point out the different flowers from which they collected pollen.

Making Model Flowers

1. Show the group the disk, cone and paper-cup flower shapes.



2. Ask the teams to find a flagged plant that has flowers resembling one of the paper shapes. Tell the teams to look very closely at the real flowers to see what parts or structures in the flower have pollen on them. Give each team one magnifying lens and one set of flower shapes. Send the teams out to hunt.

3. Spread out the craft materials. After the youngsters have hunted for five minutes, call the teams together. Challenge each

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team to construct pollen-bearing structures like those on the real flower they studied and then make a model of the flower by attaching the structures to the appropriate paper shape. Tell the youngsters that you will add the "pollen" to the paper flowers after they are completed.

4. Allow at least twenty minutes for the teams to make their pollen-bearing structures and to attach them to the paper flowers.

5. As the teams complete their flower models, ask them to point out the parts of the model that correspond to the real-flower, pollen-bearing parts. Carefully add "pollen" (tempera paint powder or cornstarch) with a popsicle stick to each paper flower at those places. Use a different color of "pollen" for each of the three shapes. Display the finished paper flowers in one area.

Discovering How Animals Transfer Pollen

1. Mention that bees visit flowers to collect pollen and sweet juices (nectar) for food.

2. Give each team one artificial bee, and tell the kids to "buzz" or visit several of the paper flowers as if the "bees" were collecting food.

3. Ask the kids what happens to the "bees" when they visit the paper flowers. (The "pollen" sticks to the bee's body.) Then have the kids describe what happens to the pollen in the flowers as the "bees" move from flower to flower. (The "pollen" gets mixed up.) Tell the youngsters that flowers must receive pollen from the same kind of flower to make seeds or fruits. This is a good time to introduce and define pollination. (See the "Background" section.)

4. Now challenge the teams to take their "bees" to *real* flowers. Ask them to notice where on the "bee" bodies the pollen sticks as they visit different kinds of flowers. Also ask them to look for insects other than bees on the flowers. Give each team a zipper-lock bag (for collecting insects) and a clean artificial bee. Send the teams out to hunt.

5. After the teams have had a sufficient time to hunt, call them back to share their discoveries.

WHAT DO YOU THINK?

1. Besides insects, what else could move pollen from one flower to another? (Wind, water, larger animals.)

2. What might happen to plants if we killed all the insects with poisons? How could we be affected?

3. Could we artificially pollinate flowers? What problems might we have?

The last thing to do: Ask the group to release the insects near the plants where they were collected and to collect their flagging.

BRANCHING OUT

1. Some flowers have shapes that are adapted to the feeding parts of certain animals. Give each youngster a 5-cm-long piece of pipe cleaner to use as an "animal," such as a butterfly or hummingbird, with a long, thin mouth part. Challenge the teams to find out whether their "bees" or "long-mouthed animals" are better suited to gathering food from the flowers.

2. Some animals have certain color preferences. Challenge the kids to find out if bees, hummingbirds, or other animals that visit flowers seem to have color preferences.

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POLLEN COLLECTORS

Equipment Card

POLLEN BOARD

MATERIALS FOR ONE BOARD:

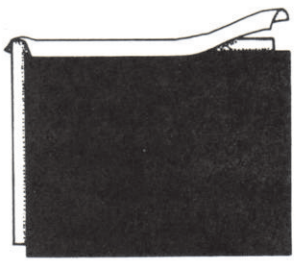
1 piece of cardboard*, 10 cm x 15 cm
1 piece of black velveteen* or corduroy*, 10 cm x 15 cm
masking tape*

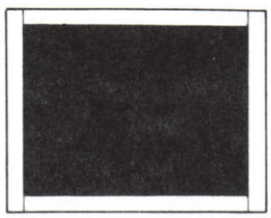
* Available from Delta Education

MAKING THE POLLEN BOARD:

1. Place the black material on top of the cardboard.

2. Cover the edges of the cardboard and material with masking tape.

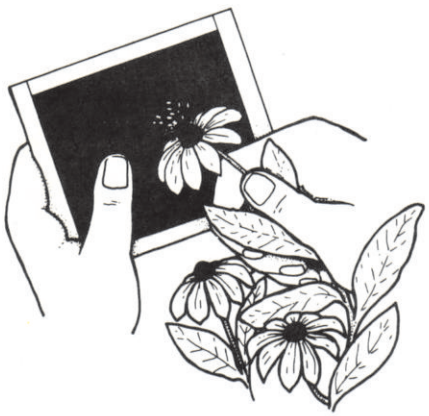




USING THE POLLEN BOARD:

1. Grasp a flower gently by its stem.

2. Hold the pollen board in your other hand, and gently rub or press the flower against the board. Do not smash or pick the flower.



ARTIFICIAL BEE

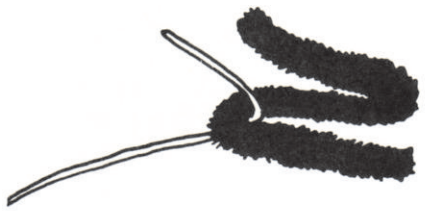
MATERIALS FOR ONE BEE:

1 4-6 cm piece of black pipe cleaner* (called "chenille" at craft and hobby stores)
1 20-cm length of thin wire*
white paper
black felt pen*
rubber cement*

* Available from Delta Education.

MAKING THE BEE:

1. Bend the pipe cleaner into thirds to form a "Z" shape. Flatten the shape.



2. Thread the thin wire through one of the loops formed in the flattened pipe cleaner. Twist the wire together and then wrap it around the end of the pipe cleaner.

3. Cut out a tiny piece of paper this big □. Make two dots on it with the pen and glue the "eyes" to the end opposite the wire. ⚃

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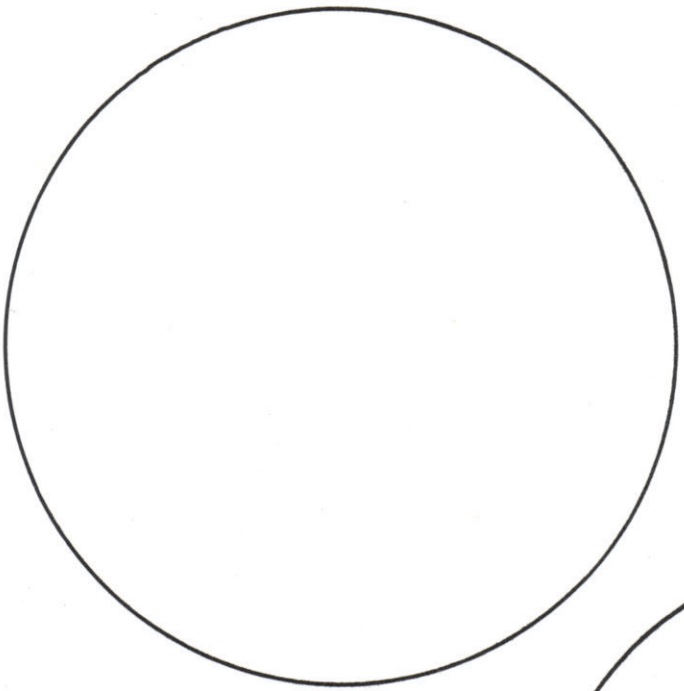
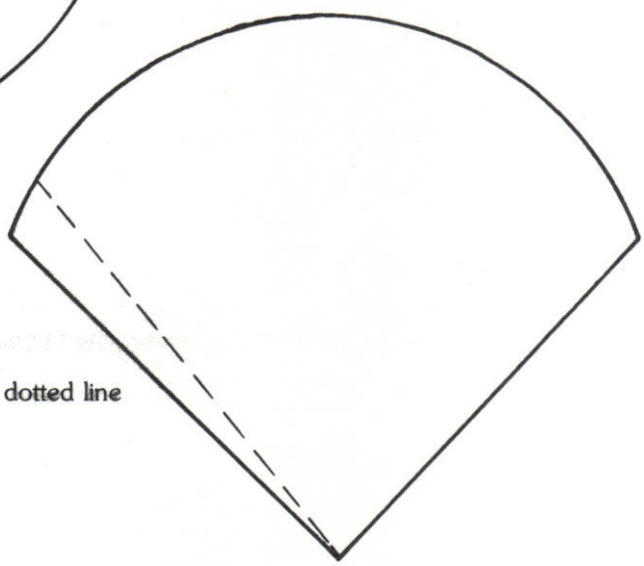
FLOWER SHAPES





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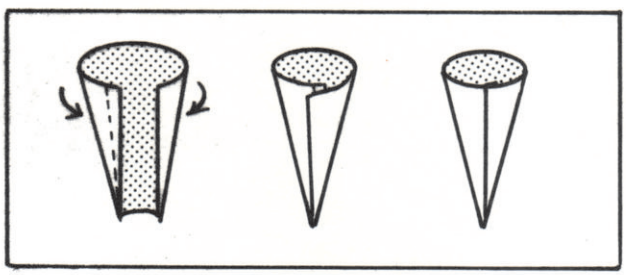

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