Flowers: Graph & Graph Again

Ages 5-13

This activity introduces basic statistical skills — recording, organizing, and evaluating data.

Children observe a beautiful array of flowers and graph the flowers according to various attributes. The group compares the graphs to see how the same data set can give very different information, depending on how it is organized.

What You Need

For Each Person

- 2 flowers of the same kind
- journal
- pencil and crayons

For the Group

- transparent tape
- large paper plate
- mixed bouquet of flowers
- 3 databoards
  - "Attributes" list
  - "Attribute Categories" chart
  - several sheets of paper
- colored marking pens

Getting Ready

Locate an area of the garden with a wide variety of blossoms, or provide a generous mixed bouquet of flowers from which each youth can select two flowers of the same kind for graphing and a third for the Attribute Train. Try to have a mix of at least 10 different kinds of flowers available that vary in size, colors, and structure.
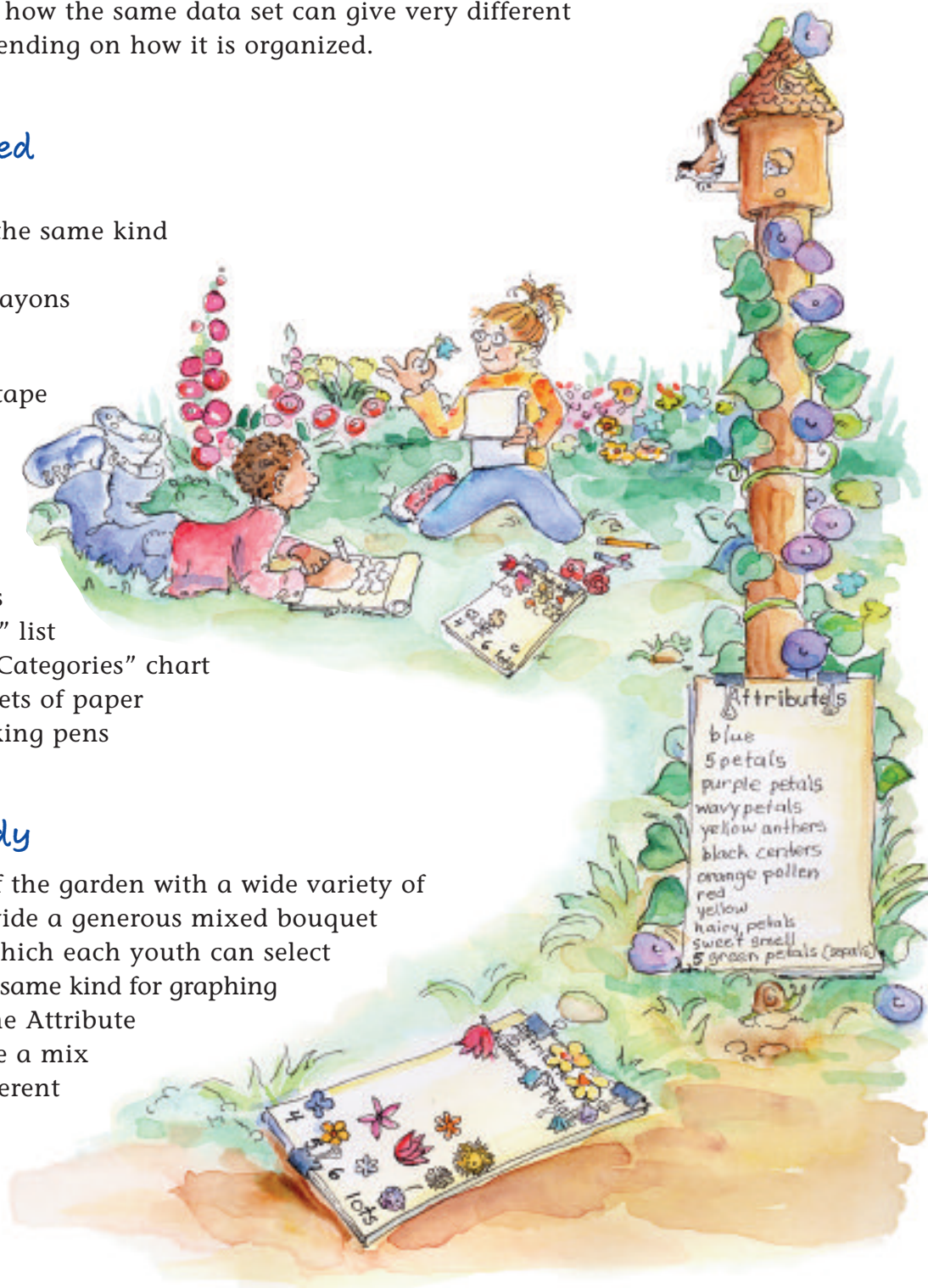
Here We Go

1. In the garden have the children look around them and describe what they notice about flowers. What colors are they? How big are they?

2. Show the group the flowers they will use in this activity. Let them closely observe several different kinds of flowers. Then have each person carefully choose two flowers of the same kind. Ask everyone to keep one flower and place the other flower on the paper plate for use later in the activity.

3. Distribute journals and crayons, and have each person carefully observe his or her flower and draw it.

4. While the youth are making their drawings, ask observation questions and talk about the flower's attributes (size, shape, edges, color, and how the flower grows on the plant). Encourage them to write three observable characteristics of their flowers next to their drawings.

5. As they finish their drawings, have the youth pair up and compare their flowers. They should find at least two things that are the same and two things that are different about their flowers.

Flowers on a Graph

1. Ask the children to describe one special attribute of their flowers while you list it on the databoard titled "Attributes." Their descriptions are often quite detailed, such as "pale pink and lavender petals." Accept their observations, and if they need to be shortened slightly, check with the child to make certain you have captured the nature of the observation.

2. Title a second databoard, "Attribute Categories" and referring back to the list, have volunteers help you organize the descriptions into "major attributes" (main groups) such as size, color, number of petals, and "subgroups of the attributes" such as size — big, medium, small; color — red, yellow, blue, white; number of petals — 3, 4, 5, more than 10. This is the chart the group will refer to during the graphing activities. See illustration.

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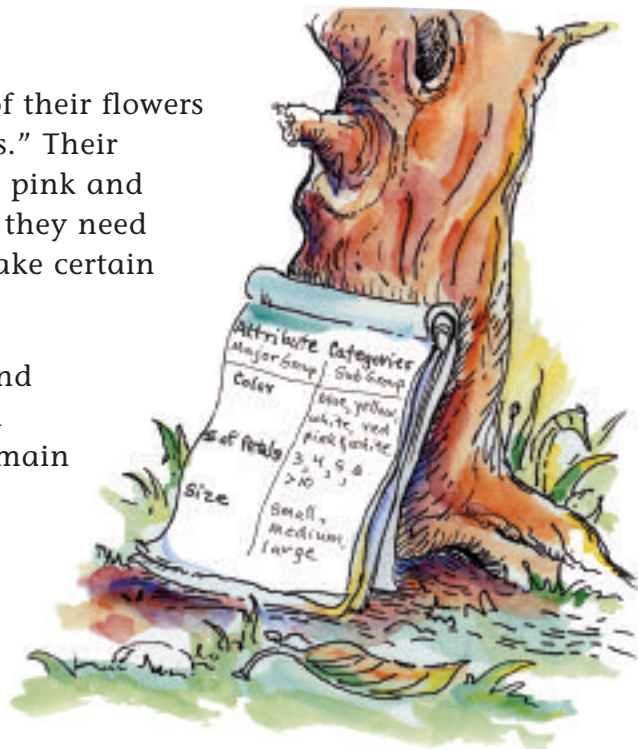
3. Place the first databoard, with a clean piece of paper on it, on a picnic table or on the ground. Have youth place their flowers on the databoard.

4. Invite a volunteer to suggest a major attribute, such as number of petals, and write this at the top of the databoard. Ask volunteers to sort the flowers into groups by number of petals.

5. Draw a line near the bottom of the databoard, leaving a little space to label the colors. Assist the group to graph the flowers into columns by petal color.

6. When the graph is complete, have the youth make true statements about the flowers. Assist by asking:
   ❀ How many flowers have 4 petals? (choose an example from your graph)
   ❀ How many more 5-petal flowers than 4-petal flowers are there?
   ❀ How many flowers are there altogether?
   ❀ What is the most common number of petals per flower in our collection?
   ❀ What is a good title for this graph?

7. Tape the organized flowers to the paper so that youth can compare this graph with other graphs that are created later.

Graphing Again

1. Make a second graph next to the first one, using the third databoard and the second flower each student placed on the plate. Using another attribute, such as size, have them sort and graph the flowers in a different way. You will see how data organized differently impacts how it is interpreted.

2. Again, encourage youth to make true statements about a size graph, such as:
   ❀ Which group has the most flowers?
   ❀ How many flowers are medium in size?
   ❀ What other observations can you make about this graph of flowers?
   ❀ How many flowers are there altogether?
   ❀ From this graph can we say there are always fewer large (or small) flowers? [No, this statement is true for this collection of flowers, but another collection of flowers could look completely different.]

3. Ask the group to compare the two graphs:
   ❀ What is the same about each graph?
   ❀ What does each graph tell us about our flowers?
   ❀ Who might be interested in the results of these graphs?

lots of blue petals, pink center

blue petals, 6 petals, smells sweet

yellow, pointy petals, lots of petals

5 petals, yellow, soft

red, 5 petals, soft

All Aboard the Attribute Train

Smells sweet 6 petals red

1. Create an attribute train. Have each child select a new flower. Have one child place a flower on a new data sheet, and describe as many visible attributes as possible. He may say, "It's red. It has five petals shaped like feathers. All the petals look the same."

2. Ask if someone has a flower that matches one of those attributes. For example, someone may have a red flower that can become part of the train. The attribute of red color connects the two flowers.

red, shaped like a bell, smells sweet

3. Have this child identify the connecting attribute of red color as she tapes it next to the first flower. Then have her describe several other attributes about her flower. She may say, "The petals are big and small. There are yellow hairs in the middle, and there are many, many petals."

4. Continue until all the youth have placed one flower after another in the train and described the connecting attribute.

5. If you have time, return to the first flower and see if the children can remember the observable characteristic that flowers next to each other share.

More Math in the Garden

More Graphing Provide children with edible leaves or nuts and seeds to graph in a similar way.

Abstract Graphs Have older youths make abstract graphs based on the flower graphs already made. See examples at right.

Concrete: actual flower

Pictoral: drawing represents a flower

Abstract: an "X" represents a flower