

GROUPING & GRAPHING

Curious George, Dog Counter

When Curious George goes to a dog show, nine dogs follow him home. He gets things under control by sorting them into groups: big dogs, small dogs, and hairy dogs.



Key Math Concepts

- Objects have attributes.
- Objects can be classified by their common attributes.
- Graphs can be used to compare and analyze data.

Math Skills

- Sorting objects by their common attributes
- Defining the sorting “rule”
- Graphing sorted objects (concrete graphs)
- Graphing data (picture graphs, bar graphs)
- Discussing graphs, comparing quantities

Materials and Tools: colored yarn or chalk; sets of small objects to sort (such as multicolored counting cubes, coins, beads, buttons, toy animals), paper plates or containers, masking tape, digital camera, collage materials, glue, student nametags (see page 22), paper

Curious George Episodes: *Curious George, Dog Counter* (also available as a book), *Door Monkey*

Reproducible Activity Sheets: pages 24–25

You may tape Curious George episodes off-air and share them with children for up to one year. For information on the book version of *Curious George, Dog Counter* and the DVD (available in 2007), see page 36.

Begin the Investigation

1. Build on children’s prior knowledge. Ask children, *Does anyone have a dog or know someone who has a dog? What does that dog look like?* Write the attributes children name on a web chart. Ask questions to engage the others in comparing and contrasting, for example: *What kinds of tails do your dogs have? Does anyone else know a dog (with a curly tail)? What color is that dog? What are its ears like?*

2. Group and count. Ask children: *Which do you like better, big dogs or little dogs?* Ask children who like big dogs best to line up. Together count the children in that group and write the number. Ask children who like little dogs best to form another line. Count that group. If any children are still seated, ask them what group they belong to. Children who do not like any dogs, or who like big and little dogs the same, can form their own lines and be counted.

3. Watch the episode. Introduce the video by telling students that one day, Curious George goes to a dog show. As children watch the episode, have them describe the dogs they see (big, yellow, has curly hair, etc.) Circle the attributes that appear on your web chart and add any new items.

COLORS yellow, brown, black and white	SIZE big, little, medium
TAILS long, short, curly, straight, skinny	FUR long, short, curly, soft, prickly

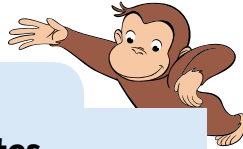
DOGS



Developmental Learning
Children develop grouping and graphing concepts and skills in stages, progressing gradually from the concrete to the more abstract. The explorations in this unit are arranged sequentially, with the easier activities first. Choose and adapt activities according to your students’ skill levels.

4. Discuss. Talk about the story. Help children focus on the math content by asking: *How did Curious George sort the dogs? How did that make counting the dogs easier?* Talk about the “Curious Kids” video clip. Ask: *What did the children sort and organize in their classroom? How did they sort the objects? What could we sort and organize in our classroom?*

Curiosity Lab 1: Grouping



Key Math Concepts

Objects have attributes.
Objects can be classified by their common attributes.



Investigate

Sorting Ourselves

These grouping explorations can be done in the classroom or on the playground. Have fun and encourage creative, divergent thinking as children suggest different ways to sort themselves.

1. Choosing sorting rules.

Tell students that they are going to think of different ways to sort themselves into groups. Give a few examples: *Everyone who is wearing red, stand over here. Everyone who is NOT wearing red, stand over there.* Let students suggest ways to sort themselves: by appearance, by clothing, by things they like, or things they have done. They can group themselves in different locations or stand inside of large “sorting circles” made of yarn. Outdoors, you can draw large sorting circles with chalk.

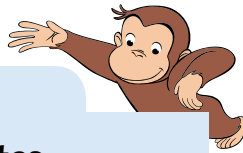
2. Who belongs where?

In some sorts, everyone will belong to one group or the other, for example, children with pockets and children without pockets. In other sorts, some children will belong to one group, some will belong to both, and some will belong to neither: for example, children who have a sister and children who have a brother; children with buttons



and children with zippers. Invite students to do creative problem solving. They may choose to create new groups: children with both, children with neither. You can also use this opportunity to model Venn diagrams, overlapping the yarn or chalk circles. Kids who belong to both groups stand in the section where the two circles overlap.

Grouping



Key Math Concepts

Objects have attributes.
Objects can be classified by their common attributes.



Sorting Objects

Introduce and practice sorting objects in a group setting, then provide lots of opportunities for independent and small group experiences at learning centers. Change the objects frequently to provide different criteria for sorting and to maintain the students' interest. Encourage children to label their sorted collections. The [books](#) listed at the end of this unit can provide inspiration for lots of new sorting experiences.

1. Group by a common attribute.

Display multicolored cubes or counters, or coins (pennies, nickels, and dimes). Ask children to describe the materials, and then ask, *How do you think Curious George might sort these objects?* Together, sort the objects as suggested. Progress to collections that can be sorted in many different ways. Ask students to describe the objects in the collection, for example, beads that are big, little, round, square, red, yellow, etc. Write their responses, then use this attribute list as a resource as you ask students to suggest ways to sort the collection. Emphasize that there is no one correct method—these are all great ways to group or sort.

2. “Guess My Rule” game.

Have students watch as you select objects that share an attribute (perhaps one that the students have not used in their own sorting) out of a collection. Challenge students to figure out your sorting rule. After playing several rounds, invite student volunteers to lead the game.



3. “Mystery Object” game.

Place a set of objects in front of a small group of children. Ask a player to choose one as a mystery object. Others will ask “yes or no” questions: *Is it blue? Does it have wheels?* With each “no” answer, players remove all the objects that *cannot* be the chosen object, until they solve the mystery!

4. Introduce sorting circles and labels.

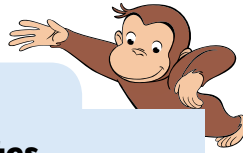
Introduce sorting mats or containers such as box tops, paper plates, or plastic deli platters with dividers. Help children determine how to label and place each group of objects on the mats. Label samples might include: *little buttons with 2 holes, big buttons with 4 holes, etc.*

5. Sorting dogs.

Distribute the [All Sorts of Dogs](#) activity sheet. Have children cut out the cards. Give directions, focusing on different attributes of the dogs. Say: *Hold up a big dog. Hold up a dog without spots.* Ask: *Is everyone holding up the same dog you are? Why or why not?*

Have children choose a way to sort the dog pictures, then have them share their reasoning.

Grouping



Key Math Concepts

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Sorting Across the Curriculum

Sorting station.

Set up an area where students can sort toys, buttons, shells, rocks, erasers, cards, beans, bottle caps, etc., in different ways. Encourage children to label their groupings and share their work with the class.

Science and engineering explorations.

Objects can be sorted according to the results of an experiment, for example: things that roll and things don't roll, things you can stack and things you can't stack, things that float and things that sink. Help children consider and discuss what the objects in each group have in common.

Sort by initial letter sound.

Collect objects or pictures of objects that begin with three initial letter sounds. Provide sorting circles or columns that are labeled with the letter representing each sound (see photo).

Dramatic play center.

Have children set up a store or a zoo, sorting and labeling objects on shelves or placing toy animals in labeled enclosures. Watching the episode *Curious George, Door Monkey* may inspire new dramatic play ideas.

Curious George, Door Monkey

A group of packages are delivered to the lobby. George unwraps them. (He just can't resist!) He finds golf balls in one, tennis balls in another... Soon the lobby is filled with balls. George needs to return each type of ball to the correct package.



Classification collages.

Provide a collection of collage materials, small recycled objects, and glue. Invite children to sort out one group of materials—for example, things that are yellow, things with holes, or things made of wood—and create a collage or sculpture from that collection and give it a title that describes how it was sorted, for example “My Yellow Picture”.

Curiosity Lab 2: Graphing

Key Math Concept

Graphs can be used to compare and analyze data.



Investigate

The following graphing activities follow a developmental order: concrete graphs, picture graphs, and finally abstract bar graphs. Students need to have lots of experiences making and interpreting concrete graphs before they can move on to more symbolic levels. Encourage students to make observations about the completed graphs. Ask questions to help them make additional comparisons. Photographing concrete graphs will help you discuss the results and make comparisons at a later date.

Concrete Graphs: People

1. Create a People Graph.

Place a line of tape on the floor as a baseline. For your first graph, choose a question with easy-to-see attributes and just two choices, for example: *Are you wearing long sleeves or short sleeves? What color is your hair: black or not black?* Let students help you create labels for the rows. Have the first student stand behind the label representing his or her answer. Other students with the same answer can line up behind. Repeat, until all students are standing in a row.

2. Interpret the graph.

Ask: *Do more kids have short sleeves or long sleeves? How do you know? How many kids do NOT have long sleeves? How do you know?* If students are having trouble “reading” the People Graph while they are in their rows, you may want to divide the class and have half the class form a People Graph and the other half “read” it.

3. Make more graphs.

Many of the sorting criteria that your students used in Curiosity Lab 1 can be used as graphing criteria. Try some of these People Graph ideas:

- Appearance/Age: *What color are your eyes? How old are you?*
- Yes or no?: *Do you have the letter e in your name? Do you like spiders?*
- Either/or: *Do you want to go to the gym or the playground? Are you a girl or a boy?*
- Choices: *Which of these books do you like best? What's your favorite ice cream flavor?*

As soon as possible, encourage students to pose their own graphing questions. You may want children to predict which answer will be the most common, then compare their prediction with the completed graph.

Graphing

Key Math Concept

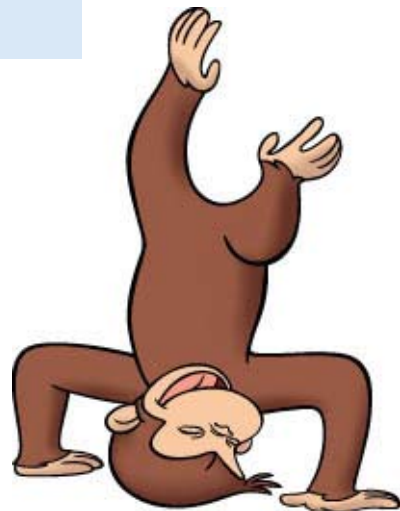
Graphs can be used to compare and analyze data.



Concrete Graphs: Objects

Create a graphing mat. Use masking tape to make four parallel columns, each containing about ten spaces. You will place objects in these spaces to create concrete graphs. The size and location of your graphing mat will depend on the objects your students are using.

During a graphing activity, you may run out of space or need an extra column. This is a good opportunity for students to problem solve! Ask: *What shall we do?* Lengthen or add new columns, as students suggest. You can graph shoes, mittens, crayons or colored blocks (to represent favorite colors), or any of the toys or school supplies you used in the Grouping activities. Here is an example, using shoes.



1. Construct a shoe graph.

Ask students to take off one shoe and place it in front of them. Give them time to look at the shoes. Ask: *How can we sort our shoes?* (Velcro, laces, slip-on, etc.) Write and place a label in front of each column, then have children take turns placing their shoe on the graph. As the first child places a shoe, note aloud that it is placed in the first space in the column, right by the label (or help the child correct the placement). Later you might say: *Look, Ravi has put his shoe in the very next space, one shoe per space. That's exactly right!*

2. Interpret the graph.

Ask questions such as: *What do you notice about this graph? Are there more shoes with laces or Velcro? How do you know? Did you have to count? Why or why not? Are there fewer slip-on shoes or shoes with laces? How many shoes have buckles?* Ask higher-order thinking questions as well: *If you owned a kids' shoe shop, would you put more tie shoes or Velcro shoes in your store? Why? If we did this graph tomorrow, do you think we would have the same results? Why or why not? How can we save the results of this graph so we can try it again tomorrow and see if it's the same or different?*

Graphing



Key Math Concept

Graphs can be used to compare and analyze data.



Picture Graphs with Nametags

Create sturdy nametags with each child's photo and name. Students can use these nametags to make many different graphs—maybe one a day!

1. Transitioning from concrete to representational.

After completing an Object Graph with students' pencils, shoes, or favorite colors, observe that sometimes when we make graphs we can't put the object itself on the mat, so we use pictures instead. Replace each child's object with his or her nametag. This direct substitution may help students make the transition more easily.

2. Graphing with nametags.

Try some of these ideas. Invent others with your students.

- How do you get to school? (*Write categories across the bottom: Walk, Car, Bus.*)
- What's your favorite food? (*Students will dictate the categories to list across the bottom.*)
- When is your birthday? (*List the names of the months across the bottom of the graph.*)
- What's the first letter of your name? (*List letters across the bottom of the graph.*)

Discuss each completed graph: *What do you notice about the graph? How do most kids get to school? Do more people like ice cream or pizza? Who has the same birthday month as you? How many kids have names that begin with S?*

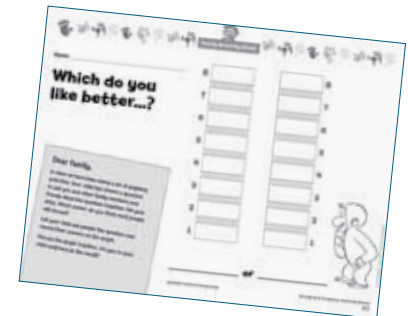
Abstract Bar Graphs

1. Class bar graphs.

On chart paper, draw a blank bar graph like the one on the Family Activity Sheet. Write a "Which do you like better...?" question at the top of the graph and draw or write an answer choice at the bottom of each column, for example. *Which do you like better, oranges or bananas?* Students will color in a square or write their initials on a sticky note and attach it to a square above the answer of their choice. Discuss the completed graph. *Which choice is the most popular? How can you tell? How many people like bananas better?* Do class bar graphs often with the class. Display the graphs so the students can continue to discuss them.

2. Student bar graphs.

When children are ready to work more independently, distribute copies of the [Which Do You Like Better?](#) family activity sheet. Have children suggest their own questions, drawing or writing their answer choices at the bottom of the columns. Children can complete their graph by polling classmates, or they can take the graph home and gather answers from family and friends.



I Love Dogs

Dogs, dogs,
I love dogs.

Big dogs, little dogs
Fat dogs, skinny dogs
Poodles, pugs, and shepherd dogs
Just to name a few.

Curly tails or pointy tails
Little stubby puppy tails
Happy thumping wagging tails
I love dogs, don't you?



Book List

Books about Sorting

Armstrong-Ellis, Carey. *Prudy's Problem and How She Solved It*

Giganti, Paul. *How Many Snails?*

Jocelyn, Marthe. *Hannah's Collections*

Murphy, Stuart J. *Dave's Down-to-Earth Rock Shop*

Pluckrose, Henry. *Sorting*

Reid, Margarette. *The Button Box. (Also: A String of Beads)*

Williams, Linda. *Grandma's Button Box*

Books about Graphing

Leedy, Loreen. *The Great Graph Contest*

Murphy, Stuart J. *Lemonade for Sale (Also: The Best Vacation Ever)*

Extend with Literature

"I Love Dogs." Copy the poem on chart paper and read it aloud, pointing at the words. Repeat, inviting children to clap each time they hear the word "dogs" and stamp each time they hear the word "tails." Use the pattern of this poem to write a similar class poem about a group of animals or things that your students particularly like.

Wrap Up the Investigation

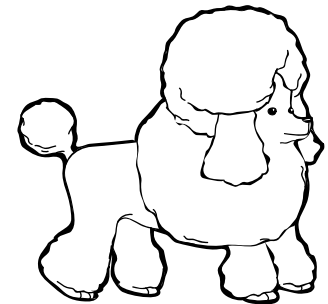
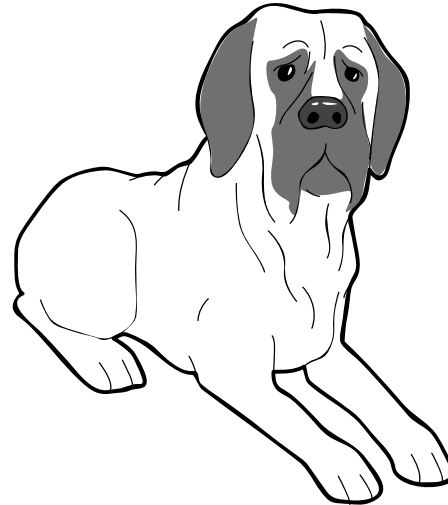
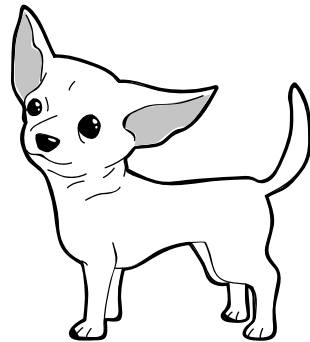
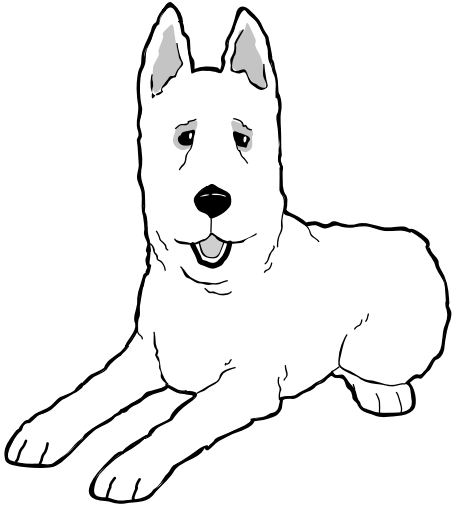
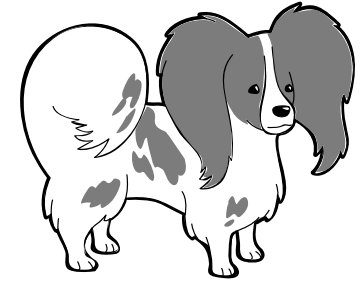
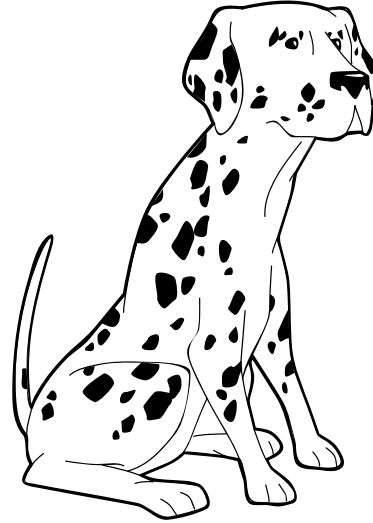
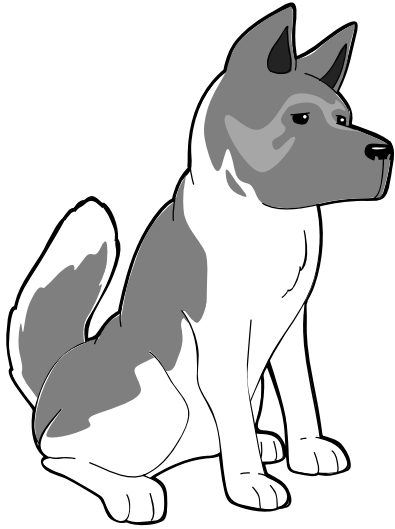
Review, reflect, and expand.

Gather some of the graphs (or photos of the graphs) that students made during this investigation and ask: *How is this graph different from that one? What does this graph tell us? If we did this graph activity today, would the results be exactly the same? Why do you think so?*

Sorting and graphing are skills that children can use across the curriculum as they pose questions, conduct surveys or experiments, then record and interpret the results. Adapt the activities suggested in this unit and integrate into your social studies, science, and language arts curricula.



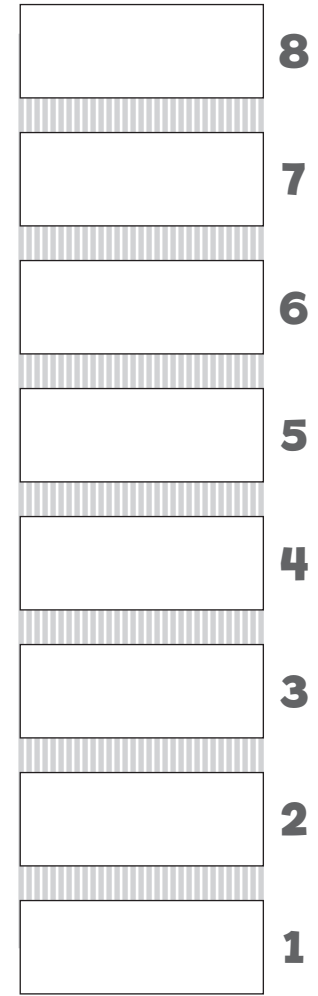
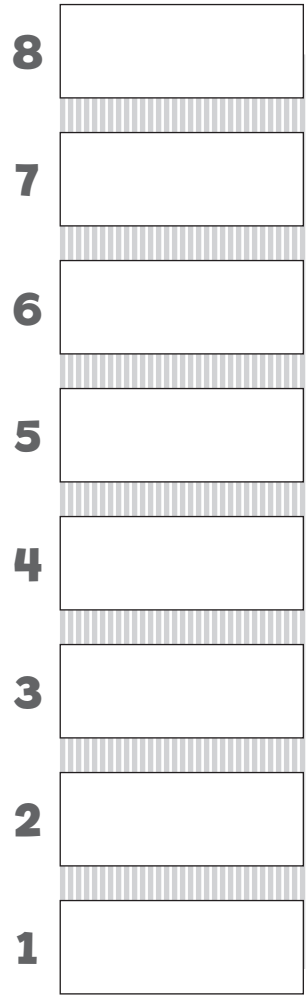
All Sorts of Dogs





Name: _____

Which do you like better...?



_____ **or** _____

Dear Family,
 In class we have been doing a lot of graphing activities. Your child has chosen a question to ask you and other family members and friends. Read the question together. Ask your child, "Which answer do you think most people will choose?"
 Let your child ask people the question and record their answers on the graph.
 Discuss the graph together. Are you or your child surprised at the result?

