

DATA AND PROBABILITY

Grade 2

BIG IDEA (1): Formulate questions that can be addressed with data and collect, organize and display data to answer them

CONCEPT	EXPECTATION	EXAMPLE
A Formulate questions	Pose questions and gather data about themselves and their surroundings	<p>TEACHER NOTES:</p> <p>“The main purpose of collecting data is to answer questions when the answers are not immediately obvious. Students’ natural inclination to answer questions must be nurtured. At the same time, teachers should help them develop ways to gather information to answer these questions so that they learn when and how to make decisions on the basis of data.”¹</p> <p>Students will formulate and answer questions from pictographs (graphs that use pictures or symbols to show data) and bar graphs (a graph that uses the height or length of rectangles to compare data) constructed from objects or pictures brought from home or the classroom. Students will answer and formulate questions relating to greater than, less than, how many more, how many less, and total. Students will begin developing the concept of each picture representing more than one item illustrated in a key.</p>

¹ National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics* (p. 109). Reston, VA: Author.

CONCEPT	EXPECTATION	EXAMPLE
B Classify and organize data	Sort and classify items according to their <u>attributes</u> and organize data about the items	<p>The teacher will select items in the classroom or school for students to sort and classify. Students will be able to articulate the common attributes of a given set of objects. Students should be challenged to reorganize the same set of objects by different attributes. Introduce attribute blocks. Students will be able to choose blocks with one to three different attributes and articulate the differences.</p> <p>TEACHER NOTES: “Organizing data into categories should begin with informal sorting experiences, such as helping put away groceries. These experiences and conversations that accompany them focus children’s attention on the attributes of the objects and help develop an understanding of ‘things that go together,’ while building a vocabulary for describing attributes and for classifying according to criteria.”²</p>














DEFINITION:

attribute—a characteristic or distinctive feature—such as shape, size, color—of an object or given set of objects.³

² National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics* (p. 109). Reston, VA: Author.

³ Eather, J. A. *A math dictionary for kids*. Retrieved June 5, 2004, from www.amathsdictionaryforkids.com.

CONCEPT	EXPECTATION	EXAMPLE
C Represent and interpret data	Represent data using pictures and bar graphs	<p>Problem: Before beginning this activity, tape a large sheet of grid paper to the wall or door so that students can easily reach it. Distribute a sheet with a picture of an ice cream cone (see below) to each student. Ask each student to choose their favorite flavor of the ice cream from the five flavors provide and color their ice cream the color of their favorite flavor using the following color choices for each flavor: brown (chocolate), pink (strawberry) yellow (banana), white (vanilla), or orange (orange).</p> <div data-bbox="795 570 984 758" data-label="Image"> </div> <p>After students have colored the ice cream to match their favorite flavor, they should cut out the picture of the ice cream cone from the sheet and glue it to the graph on the grid paper. After all the students have glued pictures of their cones on the graph, the teacher can ask various questions about the data in the graph.</p> <p>Note: Other ideas for student graphing include favorite cartoon character, food, fruit, etc.</p>

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		<p data-bbox="747 277 1801 418"> Problem: The following graph shows the favorite ice cream flavors of second graders at Wonderland Elementary School. Explain to students that the key shows that each cone represents two students. </p> <p data-bbox="978 472 1331 500" style="text-align: center;"> Favorite Ice Cream Flavors </p> <table border="1" data-bbox="795 516 1514 1052" style="margin-left: auto; margin-right: auto;"> <tbody> <tr> <td data-bbox="795 516 1020 646">Banana</td> <td data-bbox="1020 516 1514 646">  </td> </tr> <tr> <td data-bbox="795 646 1020 781">Chocolate</td> <td data-bbox="1020 646 1514 781">  </td> </tr> <tr> <td data-bbox="795 781 1020 915">Strawberry</td> <td data-bbox="1020 781 1514 915">  </td> </tr> <tr> <td data-bbox="795 915 1020 1052">Vanilla</td> <td data-bbox="1020 915 1514 1052">  </td> </tr> </tbody> </table> <p data-bbox="831 1089 1035 1149" style="text-align: center;">  = 2 students </p> <p data-bbox="747 1227 1661 1255"> Then ask students the following questions, based on data in the graph: </p> <ol data-bbox="747 1263 1570 1365" style="list-style-type: none"> 1. How many students chose chocolate as their favorite flavor? 2. What is the least favorite flavor? 3. How many students chose strawberry? 	Banana		Chocolate		Strawberry		Vanilla	
Banana										
Chocolate										
Strawberry										
Vanilla										

CONCEPT	EXPECTATION	EXAMPLE
		<p>Answers:</p> <ol style="list-style-type: none"> 1. Fourteen students 2. Vanilla 3. Eight students <p>TEACHER NOTES:</p> <p>Students should create and interpret simple pictographs (graphs that use pictures or symbols to show data) and bar graphs (graphs that use the height or length of rectangles to compare data). “Younger students might count pockets (Burns, 1996). They could survey their classmates and gather data by listing names, asking how many pockets, and noting the number beside each name. Together, the class could create a large graph to show the data about all students by coloring a bar on the graph to represent the number of pockets for each student. In second grade, however, students might decide to count the number of classmates who have various numbers of pockets. Their methods for gathering the information, organizing it, and displaying the data are likely to be different because they are grouping the data differently—three students have two pockets, five students have four pockets, and so on. They will have to think carefully about the meaning of all the numbers—some represent the value of a piece of data and some represent how many times the value occurs.”⁴</p>

⁴ National Council of Teachers of Mathematics. (2000). *Principles and standards for school mathematics* (p. 109–110). Reston, VA: Author.