Student Guide

Workshop: Problem Solving with Data
(SG pp. 44–49)
Questions 1–15

I. **A.** Categorical

  B. Numerical

2.

Favorite Types of Books
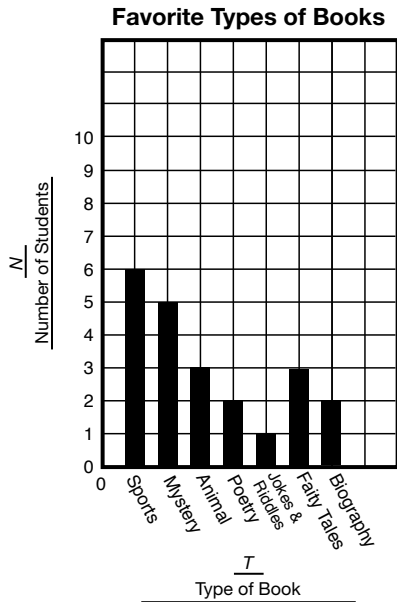
3. Book Package Two; Possible response: The first book package does not have any biographies or jokes and riddle books. It also has more Poetry Collections than Mystery Books, Animal Stories, or Fairy Tales and the students liked Animal Stories and Fairy Tales better than Poetry Collections. The third package has books about transportation and no one in the class chose this kind of book as a favorite, and it is missing jokes and riddles books. The second book package has all the types of books kids like and has more than enough of each type so students will have choices about what to read.

4. Possible response: My book package would include 20 books about sports, 20 Mystery Stories, 10 Animal Stories, 10 Fairy Tales, 8 Poetry Collections, 8 Biographies, and 4 Jokes and Riddle Books. I decided on my book choices so each student will have some choices of books that they can read. If everyone has a book and someone finishes his or her book early there will still be some choices for them in the type of book they like to read.

After looking at the survey results, Romesh decided to organize his data using these two variables: Number of Students (*N*) and Type of Book (*T*). He decided to define the values for Type of Book as: Sports Books, Mystery Books, Animal Books, Poetry, Jokes and Riddles, Fairy Tales, and Biographies.

Favorite Types of Books

T Type of Book	N Number of Students
Sports Books	6
Mystery Books	5
Animal Books	3
Poetry	2
Jokes and Riddles	1
Fairy Tales	3
Biographies	2

Favorite Types of Books

★●■1. **A.** Is Type of Book a numerical or categorical variable?

  B. Is Number of Students a numerical or categorical variable?

★●■2. Use a piece of *Centimeter Graph Paper* to make a bar graph to represent the data Romesh collected.

Did you
• title your graph?
• label the axes with the variables?
• scale the axes to use space wisely?
• center the bars on the lines?

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★●3. Mr. Moreno is at the bookstore buying books for his classroom. He can choose among three book packages. There are 100 books in each book package.

Use the graph and data table of the students' favorite types of books, to choose the book package Mr. Moreno should purchase. Explain how you decided which book package Mr. Moreno should purchase.

Book Package One
30 Books about Sports
30 Poetry Collections
20 Animal Stories
10 Fairy Tale Collections
10 Mystery Stories

Book Package Two
24 Books about Sports
24 Mystery Stories
15 Animal Stories
15 Fairy Tale Collections
10 Biographies
10 Poetry Collections
2 Jokes and Riddles

Book Package Three
20 Books about Sports
20 Mystery Stories
15 Books about Transportation
15 Fairy Tale Collections
10 Animal Stories
10 Biographies
10 Poetry Collections

■4. Mr. Moreno is at the bookstore buying books for his classroom. He can choose 80 books to make a book package. Use the graph and data table for the students' favorite types of books to design a book package that Mr. Moreno should purchase. Explain how you decided how many of each type of book Mr. Moreno should purchase.

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★●■5. Irma read that, on average, ten and eleven year olds watch about 24 hours of television each week. She wanted to see if her class was typical so she asked her classmates to keep track of the amount of television they watched in a week. She collected and organized the information in a data table.

Hours Watching Television

H Number of Hours Watching Television in a Week (hours)	N Number of Students
16	2
17	3
18	0
19	4
20	2
21	3
22	1
23	0
24	6
25	1

A. What two variables did Irma choose to study?

B. Are the variables categorical or numerical?

★●■6. Use a piece of *Centimeter Graph Paper* to make a bar graph of Irma's data in Question 5.

★7. How many students watch 20 or fewer hours of television each week? Show how you decided.

●■8. How many total hours of television did Mr. Moreno's class watch during the week data was collected?

★●■9. **A.** What is the median number of hours the students spent watching television in a week?

B. What is the mode number of hours students spent watching television in a week?

★●10. Which number, the median or the mode, do you think is a better representation of what is a typical number of hours watching television? Explain your thinking.

■11. Does the data that Irma collected show that the students in her classroom are typical when compared to the research that Irma read about television viewing? Explain how you decided.

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5. A. Number of Hours Watching Television in a Week and Number of Students

B. both are numerical

6.

**Hours Watching Television**
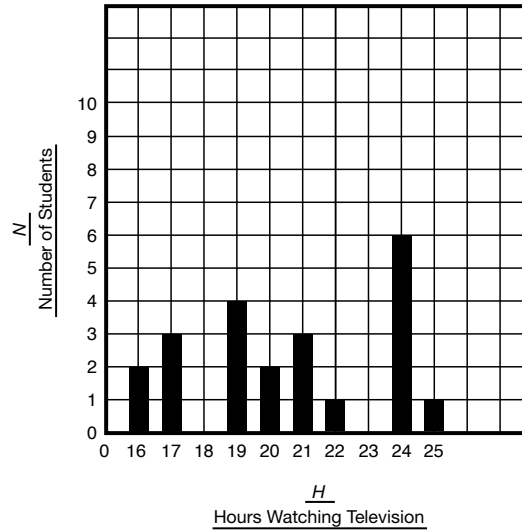
7. 11; Possible response: I used the graph. I added the total number of students for all the bars with a value of 20 hours or less.

8. 453 hours

9. A. $20\frac{1}{2}$ hours

B. 24 hours

10. Possible response: I think the median is better because half the kids watched $20\frac{1}{2}$ hours or more and half watched $20\frac{1}{2}$ hours or less. Also, since only 7 students out of 22 total students watched 24 or more hours, 24 is not really typical.

11. Possible response: If you use the mode to show what is typical then her class would be considered typically. If you used the median then her class watches about $3\frac{1}{2}$ hours less each week when compared to what the research said was typical.

12.

Book We Read Over Summer

Number of Books Read
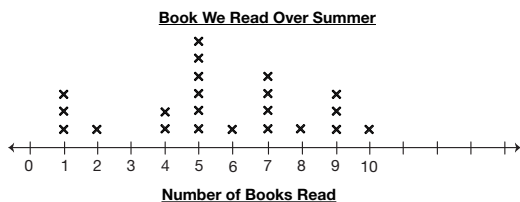
13. 5 books; Possible response: I used the line plot. First I counted the number of Xs on the line plot and found there were 22, so I know the median will be between the 11th and 12th X. Then I started counting the Xs from the beginning of the line plot until I got to the 11th X. It was in the stack of Xs for 5 books. I did the same thing from the other end of the line plot. The 11th X counting back was also in the stack for 5 books, so the median number of books read over the summer was 5.

14. 10 students

15. 122 books. Possible response: I used the data table. To find the total books read, first I multiplied the number of students in each row by the number of books they read.

Number of Books Read	Number of Students	Books × Students
1	3	$1 \times 3 = 3$
2	1	$2 \times 1 = 2$
3	0	$3 \times 0 = 0$
4	2	$4 \times 2 = 8$
5	6	$5 \times 6 = 30$
6	1	$6 \times 1 = 6$
7	4	$7 \times 4 = 28$
8	1	$8 \times 1 = 8$
9	3	$9 \times 3 = 27$
10	1	$10 \times 1 = 10$

Then I added all the of products to find the total number of books read:

$3 + 2 + 0 + 8 + 30 + 6 + 28 + 8 + 27 + 10 =$ 122 Books

★■12. Jerome wanted to find out how many books his classmates finished reading over the summer. He organized his data in a data table.

Books Read Over the Summer

B Number of Books Read	N Number of Students
1	3
2	1
3	0
4	2
5	6
6	1
7	4
8	1
9	3
10	1

Use the *Line Plot Paper* to make a line plot representing Jerome's data.

Did you
• title your plot?
• label the points on the line?
• lable the line to show what the number mean?

★■13. What is the median number of books students read over the summer? Explain how you found your answer.

★14. How many students read more than five books over the summer?

■15. What is the total number of books that students in Mr. Moreno's class read over the summer? How did you decide?

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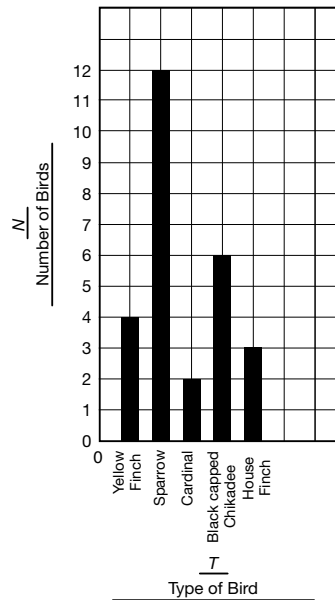**Homework (SG pp. 50–51)**
Questions 1–3

I. 120

2. **A.** 27

   B. 17

   C. Possible response for median: I think the median is a better average because it is closer to the middle between 17 baskets and 33 baskets, and also half the boys made 27 or less baskets and half made 27 or more baskets.

   D.

Baskets Made in 15 Minutes
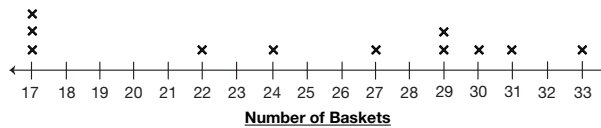
3. **A.** Type of Bird is categorical and Number of Birds is numerical.

   B.

   C. Possible response: I think that a sparrow will be the next bird at the feeder because it is the most common bird she saw.