Blanca and Irma did their survey. They studied the kinds of shoes the students in their class wore the first day of school. This is what they found:

Kind of Shoes

K Kind of Shoe	*N* Number of Pairs of Shoes
Gym Shoes	5
Flats	9
Lace-up Boots	2
Sandals	4
Flip-flops	7

Discuss

1. **A.** Do you think Blanca's data will help convince her mother that flats are okay for school? Why or why not?
    B. Would a graph help? If so, how?

2. What is the most common kind of shoe in Blanca's class?

3. If you surveyed your class, how do you think the data would compare with Blanca's?

4. What kind of shoes do you think are most popular in your school?

Variables are things that change or vary in an experiment or survey. The two main variables in Blanca and Irma's survey are Kind of Shoe and Number of Pairs of Shoes. The kinds of shoes vary from gym shoes to flip-flops.

The possible outcomes for each variable are called **values.** Gym Shoes, Lace-Up Boots, and all the kinds of shoes listed in the first column of the data table are values of the variable Kind of Shoe. The number of pairs of shoes varied from 2 to 9 pairs. We can say that 2, 4, 5, 7, and 9 are values of the variable Number of Pairs of Shoes.

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5. What else can you study about the way people look and the way they dress? Make a list of variables you can study. List two or three values for each variable. Make a table like the one shown.

Variables and Possible Values

Variables	Values
Kind of Shoe	Gym Shoes, Lace-up Boots, Flats, Flip-flops
Number of Pairs of Shoes	0, 3, 5
Shirt Color	White, Red, Plaid
Height	56 in., 58 in.

Numerical variables are variables with values that are numbers. Number of Pairs of Shoes and Height are numerical variables. **Categorical variables** have values that are not numbers. Kind of Shoe and Shirt Color are examples of categorical variables.

6. On the data table you made for Question 5, write an *N* beside the numerical variables and a *C* beside the categorical variables.

Eyelets

In this lab, you will answer a certain question about how the students in your class dress for school using the TIMS Laboratory Method. This method is very much like the method scientists use in their investigations.

Usually, an investigation begins with a question. For this investigation, we ask the question: *How many eyelets are on students' shoes in your class?*

7. Look around your classroom. Talk with a partner to answer the questions below. Be ready to explain your thinking.
    A. What do you think is the most common number of eyelets?
    B. How many pairs of shoes have 0 eyelets? 5 eyelets? 8 eyelets? Why do you think so?
    C. Estimate the total number of eyelets in the class.

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Student Guide

Eyelets Labs (SG pp. 3–7)
Questions 1–19

1. **A.** Yes. The data show that the most popular type of shoe is flats.
    B. Answers will vary. However, a graph would show that the tallest bar is for flats.

2. Flats.

3. Answers will vary.

4. Answers will vary.

5.* Data tables will vary. Some possible responses include:

Variables	**Values**
Color of Hair	blond, brown, black, gray, red
Color of Eyes	blue, green, brown
Number of Buttons on Clothes	0, 1, 2, 3

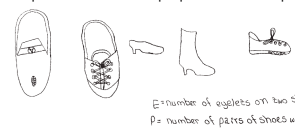6.* Answers will vary. For the possible responses listed above:

Variables	**Values**
Color of Hair	blond, brown, black, gray, red
Color of Eyes	blue, green, brown
Number of Buttons on Clothes	0, 1, 2, 3

7.* **A–C.** Answers will vary.

*Answers and/or discussion are included in the lesson.

8.* A. Students' pictures will vary. See the *Student Guide* for a sample picture.

B. See Figure 3 in Lesson 1 for a sample data table.

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9.* See Figure 4 in Lesson 1 for a sample graph.

The answers to *Questions 10–14* and *17–19* are based on the sample data in Figures 3 and 4 in Lesson 1.

10. A.* 3 pairs of shoes

B.* 0 pair of shoes.

C.* 6 pair of shoes.

11. A.* 0 eyelets.

B.* The Number of Eyelets with the tallest bar is the mode.

12. A.* 0, 12, 16, 20, 24, 28, 32, 36.

B.* They are all even. They are all multiples of four.

13.* No. Although 14 is even, it is not a multiple of four.

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*Answers and/or discussion are included in the lesson.

14. Describe the shape of your graph.
   A. How many bars are on your graph?
   B. Are the bars all about the same height or are some bars much taller than others?
   C. Are the tallest bars at the beginning, middle, or end of the graph?
   D. Why do you think your graph has the shape that it does?

15. Describe the Eyelets graph for a professional basketball team in uniform. How many eyelets would team members have? Why do you think so?

16. Describe the Eyelets graph if you collected data at the beach. Would the tallest bars be at the beginning, middle, or end of the graph? Would there be many bars or just one or two? Why do you think so?

17. What is the total number of eyelets in your class? How do you know?

18. Estimate how many eyelets are on all the shoes of all the fifth-grade students in your school. Explain how you made your estimate.

19. What would the graph look like if you gathered data from all the fifth graders in your school? How would it be different from your class graph?

The TIMS Laboratory Method

You will use the TIMS Laboratory Method many times this year. In this lab, you used the TIMS Laboratory Method to study the number of eyelets on the shoes of the students in your class. There were four steps:

• **Draw.** The investigation started with a question. The question was made clearer by identifying variables that could be counted or measured. A picture showed what the experiment was about.
• **Collect.** You used data tables to organize the data.
• **Graph.** A graph showed patterns in the data more clearly than the table.
• **Explore.** You answered questions about the lab and thought about what might make things turn out differently.

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14. **A.*** 8 bars.
    B.* some bars are taller than others.
    C.* The tallest bars are at the left and in the middle on the graph.
    D.* See discussion in the Lesson.

15.* Answers will vary. Possible responses include: The graph would show more people with a larger number of eyelets. Basketball players are tall and have large feet. Large feet need larger shoes and larger shoes have more eyelets. Most players would have over 28 eyelets. So there wouldn't be any small number of eyelets shown.

16. Answers will vary. Possible responses include: The tallest bars would be at the beginning because sandals usually don't have eyelets. There would be a few bars since some people would wear shoes with eyelets.

17.* 412 eyelets.

18.* Answers will vary. One possible response is: If one class has 412 eyelets and there are 4 fifth-grade classrooms in the school, then there are about 1600 eyelets.

19. The shape of the graph would be the same as our graph but all the bars would be taller.

*Answers and/or discussion are included in the lesson.
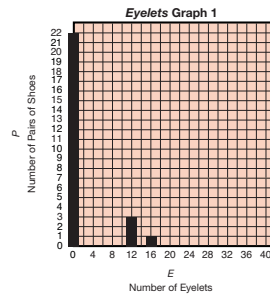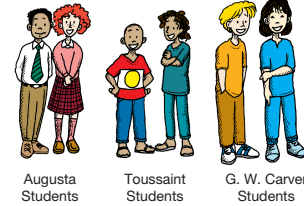
Homework (SG pp. 8–9)
Questions 1–4

1. Graph 1 goes with Toussaint School because many of the students wear sandals with no eyelets. The bar for zero is the tallest bar. Graph 2 goes with Augusta Academy because the students wear uniforms and the same shoes. So, there is one bar for boys with 16 eyelets and one for girls with no eyelets. (See the illustration in the *Student Guide.*) Graph 3 goes with G.W. Carver School because students wear a variety of shoes. The bars are all over the graph showing the variety of shoes.

2. Graph 1: The mode is 0 eyelets.
   Graph 2: The mode is 0 eyelets.
   Graph 3: The mode is 28 eyelets.

3. Answers will vary. Graph 3 is most like the sample graph in Figure 4 of Lesson 1 because the bars are spread across the graph.

4. Possible response: Adult might have larger shoes and therefore more eyelets. The graph will probably lock like Graph 3 but represent larger numbers like 20–40 eyelets.
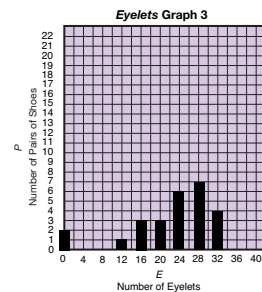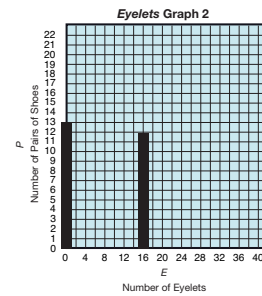
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Teacher Guide - Page 1

Name _____ *Date* _____

Pockets at St. Crispin's

One day, the students in Mrs. Judd's fifth-grade class at St. Crispin School counted the pockets on their clothes. The table on the left shows their data.

To understand this data, you must know that the students at St. Crispin's wear uniforms. The girls wear white blouses and plaid skirts; the boys wear dark blue pants and light blue shirts.

I. Make a bar graph of the data.

Students per Number of Pockets

N Number of Pockets	S Number of Students
0	0
1	5
2	6
3	0
4	0
5	12
6	0
7	0

2. How many students are in Mrs. Judd's class?
_____
Show or tell how you know.

3. What is the mode? _____

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Teacher Guide - Page 2

Name _____ *Date* _____

4. Describe the shape of the graph.

A. How many bars are on your graph?

B. Are all the bars about the same height or are some bars much taller than the others?

C. Which is the tallest bar?

D. Why do you think the bars on the graph are where they are?

5. Describe how the pocket graph might change if the girls wore pants instead of skirts.

Pockets at St. Crispin's Feedback Box	Expec-tation	Check In	Comments
Make a bar graph using numerical data. [Q# 1]	E4		
Find the mode of a data set. [Q# 3, 4C]	E6		
Read a table or bar graph to find information about a data set. [Q# 2, 4A–C]	E7		
Model real-world situations with bar graphs. [Q# 4D, 5]	E8		

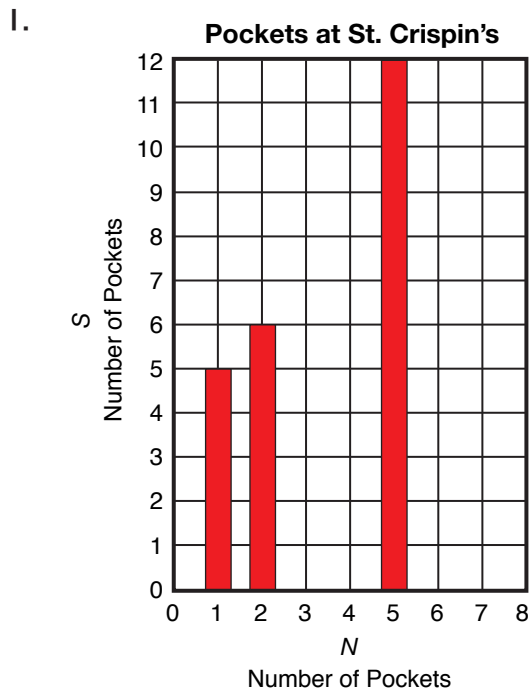|	Yes . . .	Yes, but . . .	No, but . . .	No. . .
MPE5. Show my work. I show or tell how I arrived at my answer so someone else can understand my thinking. [Q# 4–5]				

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Teacher Guide

Pockets at St. Crispin's (TG pp. 1–2)
Questions 1–5

I.

Pockets at St. Crispin's (bar graph: N = Number of Pockets vs S = Number of Pockets; bars at 1 = 5, 2 = 6, 5 = 12)

2. 23 students. Explanations will vary. Students may use a variety of strategies to add $5 + 6 + 12$. One possible mental math strategy is $5 + 6 = 11$, $12 + 10 = 22$, $22 + 1 = 23$.

3. 5 pockets

4. Descriptions will vary.

A. There are 3 bars on the graph.

B. Each bar is a different height

C. The tallest bar is for 5 pockets.

D. Answers will vary. One possible description is: Since students wear uniforms, then the number of pockets depends on the style of uniform each student wears. For example, five pockets may be a boy wearing pants and a dress shirt. The pants could have two side pockets and one rear pocket. The shirt could have two front pockets. A girl could wear a skirt with no pockets and a shirt with one or two pockets.

5. The girls' clothing would have more pockets. The bars representing 1 or 2 pockets would be shorter. More students would have 3, 4, or 5 pockets and so there would be more bars and a higher bar for 5 pockets.