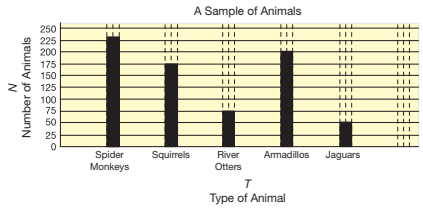
Here is the graph of the Robinsons' data.



Discuss

1. What variables do the letters *T* and *N* stand for?
2. What variable is on the horizontal axis (↔)?
3. What variable is on the vertical axis (↕)?
4. At the beginning of the experiment, the Robinsons chose **values** for the variable Type of Animal. Two of these values are Spider Monkeys and Jaguars. What are the other values for this variable?
5. What values for the variable Number of Animals did the Robinsons record in their data table?
6. Look at the vertical axis on the graph the Robinsons made to display their data. How did they scale this axis? Why do you think they chose to do it this way?
7. What is the most common animal in the sample? Least common?
8. Predict which two animals are the most common in the whole population.

Conduct a similar experiment using a bean population instead of different animals in the rain forest. Use the *Kind of Bean Lab* pages in the *Student Activity Book* and the TIMS Laboratory Method. Pull a sample of beans from a container and count the number of each kind of bean. Use the data to predict which kind of bean is the most common and which is the least common in the bean population.

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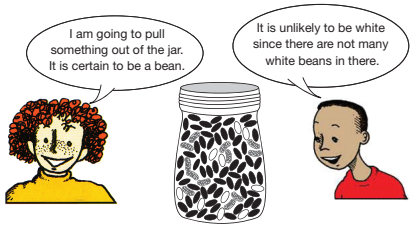
A Sample of Beans: Impossible, Unlikely, Likely, and Certain

Some things are **certain.** You know they will definitely happen. Other things are **likely.** They will probably happen, but they might not.

Still other things are **unlikely.** They can happen, but they will not happen very often. Finally, some things are **impossible.** They can never happen.



Discuss

After you have completed the *Kind of Bean Lab*, discuss the questions below.

9. Imagine you pull out one bean from the bean population container. What type of bean are you most likely to pull out? Use your data to predict. Be ready to explain your thinking.
10. Now test your prediction by pulling out one bean and returning it.
    - **A.** Was it the type you predicted?
    - **B.** Discuss with your class what happened when other groups pulled one bean. Did every group pull the bean that was most likely?
    - **C.** If an event is likely, will it happen every time? Most of the time?

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Student Guide

Kind of Bean (SG pp. 10–11)
Questions 1–10

1. Type of Animal *(T)* and Number of Animals *(N)*
2. Type of Animal
3. Number of Animals
4. * squirrels, river otters, armadillos
5. * 230 spider monkeys
   175 squirrels
   75 river otters
   200 armadillos
   50 jaguars
6. The Robinsons scaled their graph by 25. They chose this so they could show all the data, since the smallest value was 50 for jaguars and the largest value was 230 for spider monkeys.
7. spider monkeys are most common, jaguars are least common
8. spider monkeys and armadillos are most common
9. * See lesson.
10. * See lesson.

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

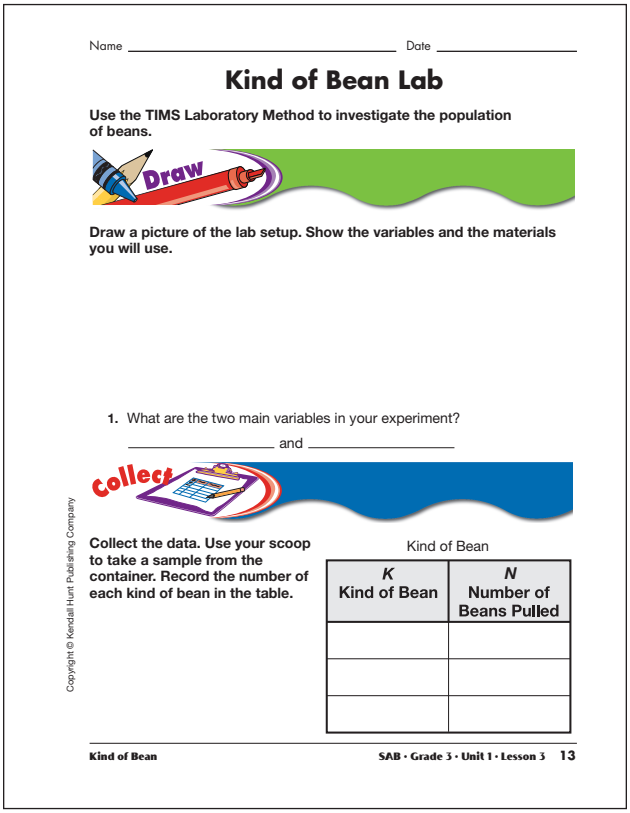
Student Activity Book

Kind of Bean Lab (SAB pp. 13–18)
Questions 1–13

Answers to questions are based on the sample student picture and graph in lesson 3.

1. Kind of Bean (*K*) and Number of Beans (*N*)
2. **A.** black bean **B.** 170 black beans
3. **A.** navy bean **B.** 40 navy beans
4. 130 more black beans than navy beans.

   Answers will vary. One possible response: I used my math facts. I know that 17 – 4 = 13. So 170 – 40 = 130.
5. 280 beans in the sample
6. Explanations will vary. One possible response: Add the number of beans recorded in the data table.



Name _____ Date _____

Kind of Bean Lab

Use the TIMS Laboratory Method to investigate the population of beans.

Draw

Draw a picture of the lab setup. Show the variables and the materials you will use.

1. What are the two main variables in your experiment?

   _____ and _____

Collect

Collect the data. Use your scoop to take a sample from the container. Record the number of each kind of bean in the table.

Kind of Bean

K Kind of Bean	*N* Number of Beans Pulled

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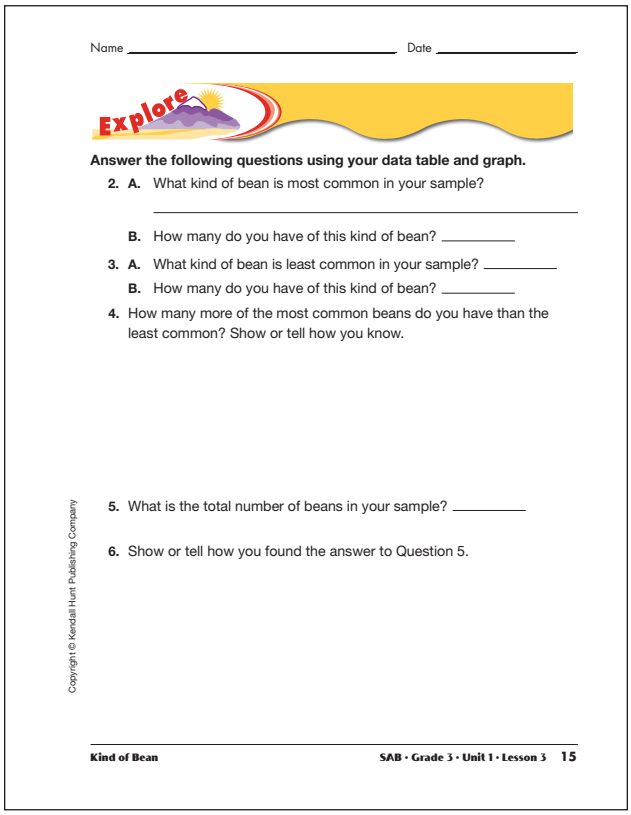

Name _____ Date _____

Explore

Answer the following questions using your data table and graph.

2. **A.** What kind of bean is most common in your sample?

   _____

   B. How many do you have of this kind of bean? _____
3. **A.** What kind of bean is least common in your sample? _____

   B. How many do you have of this kind of bean? _____
4. How many more of the most common beans do you have than the least common? Show or tell how you know.
5. What is the total number of beans in your sample? _____
6. Show or tell how you found the answer to Question 5.

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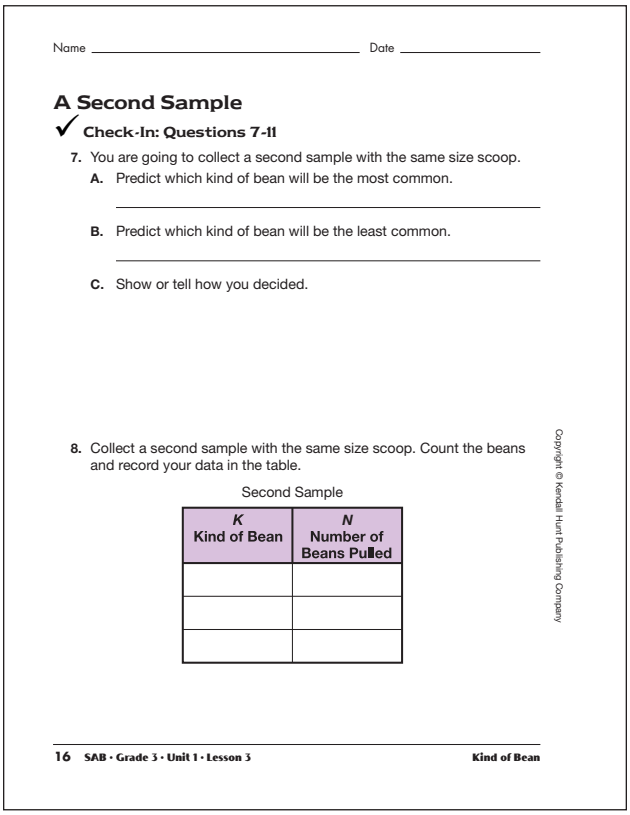

Name _____ Date _____

A Second Sample

✓ **Check-In: Questions 7-11**

7. You are going to collect a second sample with the same size scoop.

   A. Predict which kind of bean will be the most common.

   _____

   B. Predict which kind of bean will be the least common.

   _____

   C. Show or tell how you decided.
8. Collect a second sample with the same size scoop. Count the beans and record your data in the table.

Second Sample

K Kind of Bean	*N* Number of Beans Pulled

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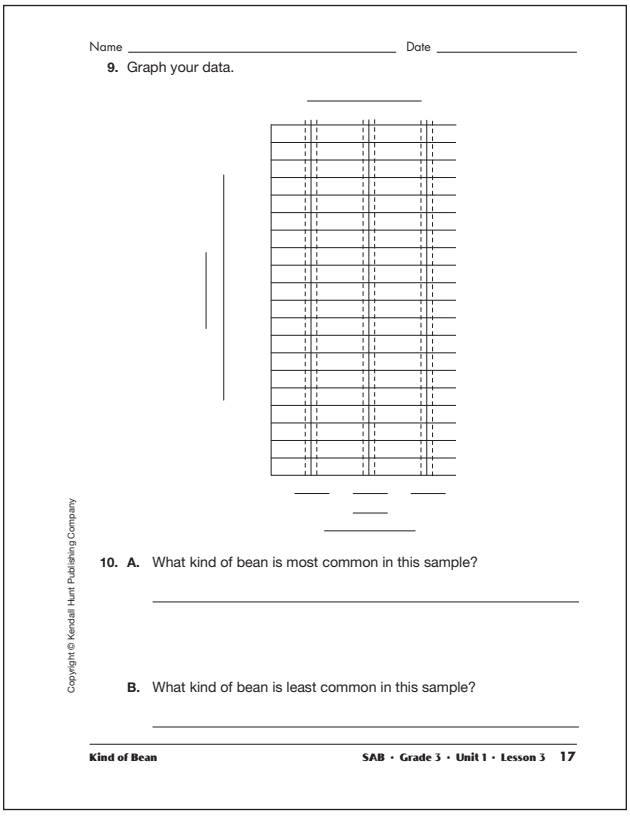

Name _____ Date _____

9. Graph your data.

10. A. What kind of bean is most common in this sample?

_____

B. What kind of bean is least common in this sample?

_____

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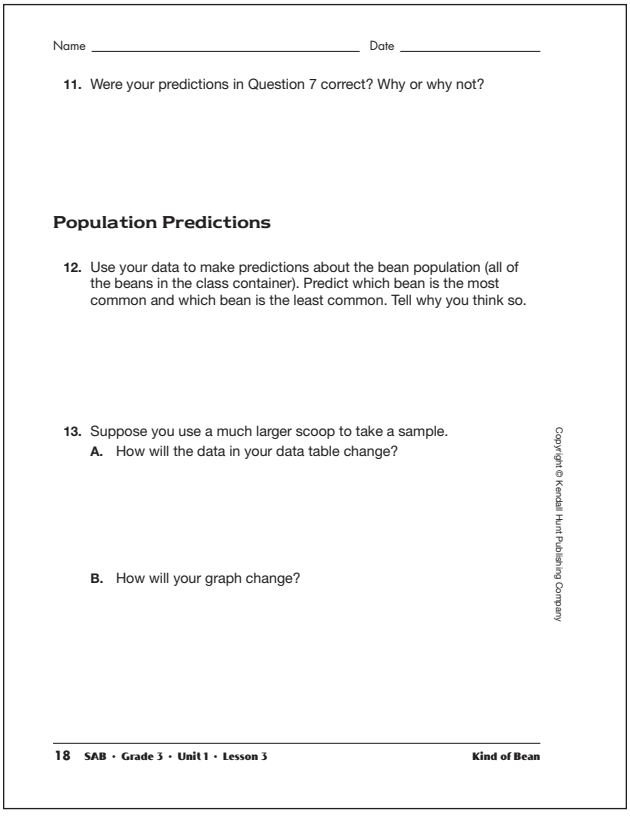

Name _____ Date _____

11. Were your predictions in Question 7 correct? Why or why not?

Population Predictions

12. Use your data to make predictions about the bean population (all of the beans in the class container). Predict which bean is the most common and which bean is the least common. Tell why you think so.

13. Suppose you use a much larger scoop to take a sample.

A. How will the data in your data table change?

B. How will your graph change?

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7. A.* black bean **B.*** navy bean

C.* Explanations will vary. One possible response: Since 170 black beans were pulled the last time and only 40 navy beans were pulled, I think that will happen again. I think maybe there are more black beans in the container.

8. Answers will be based on the second sample.

9. Graphs will vary but should accurately show the data in the data table.

10. Answers will be based on the second sample.

11.* Answers will vary.

12. Answers will vary. One possible response: The most common bean in the container is the black bean. The least common bean is the navy bean. In the data from my sample, the number of black beans is about twice the number of pinto beans and there are about four times as many black beans as navy beans. The bean population in the container is similar to that of my sample. A possible recipe is: 200 black beans, 100 pinto beans, and 50 navy beans.

13. A.* Answers will vary. One possible response: The number of each type of bean in the sample would increase. The most common kind of bean in the sample would probably be the black bean and the least common, the navy bean.

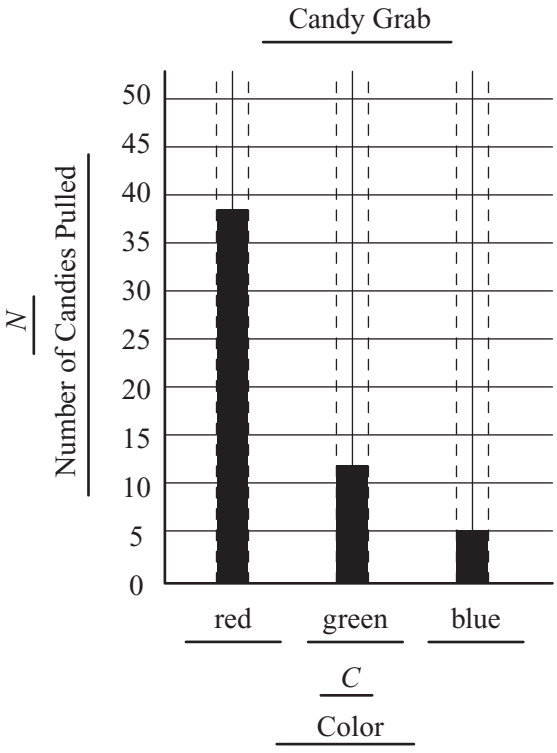
B.* The bars would all be taller, but the black bean bar would still be the tallest. The navy bean bar would still be the shortest.

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

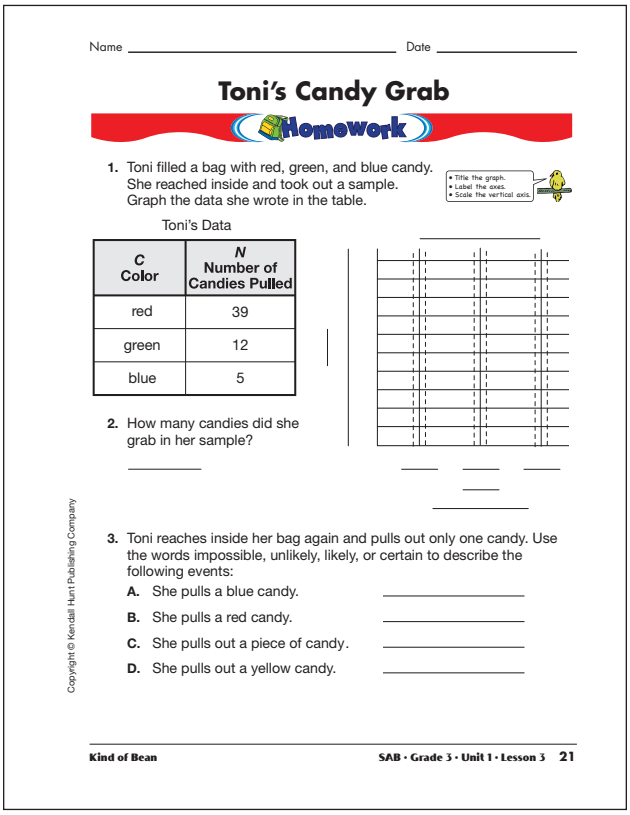
Toni's Candy Grab (SAB p. 21)
Questions 1–3

1. Look for the following:
   - title of graph (e.g., Sample of Candy, Handful of Candy, Sampling);
   - labeled axes (Color on the horizontal axis along with the three colors, red, green, and blue; Number of Candies Pulled on the vertical axis); an appropriate scale on the vertical axis;
   - the heights of the bars should match the data in the table.

   Possible Graph:



2. 56 candies
3. **A.** unlikely
   B. likely
   C. certain
   D. impossible



Name _____ Date _____

Toni's Candy Grab

Homework

1. Toni filled a bag with red, green, and blue candy. She reached inside and took out a sample. Graph the data she wrote in the table.

• Title the graph.
• Label the axes.
• Scale the vertical axis.

Toni's Data

C Color	N Number of Candies Pulled
red	39
green	12
blue	5

2. How many candies did she grab in her sample?

_____

3. Toni reaches inside her bag again and pulls out only one candy. Use the words impossible, unlikely, likely, or certain to describe the following events:
   - **A.** She pulls a blue candy. _____
   - **B.** She pulls a red candy. _____
   - **C.** She pulls out a piece of candy. _____
   - **D.** She pulls out a yellow candy. _____

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