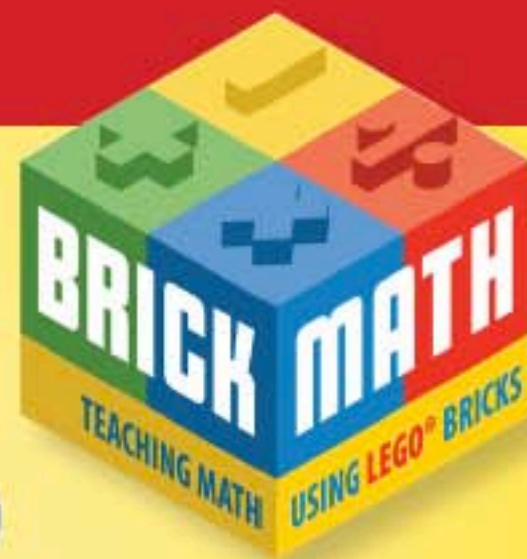
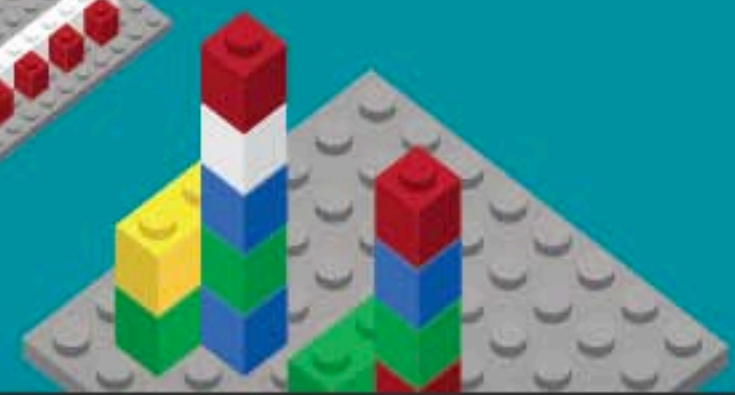
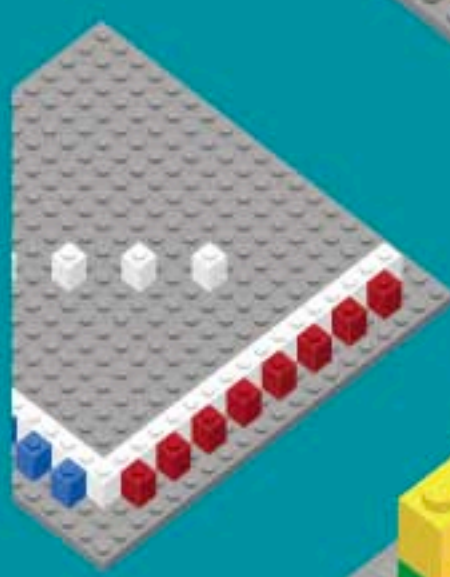
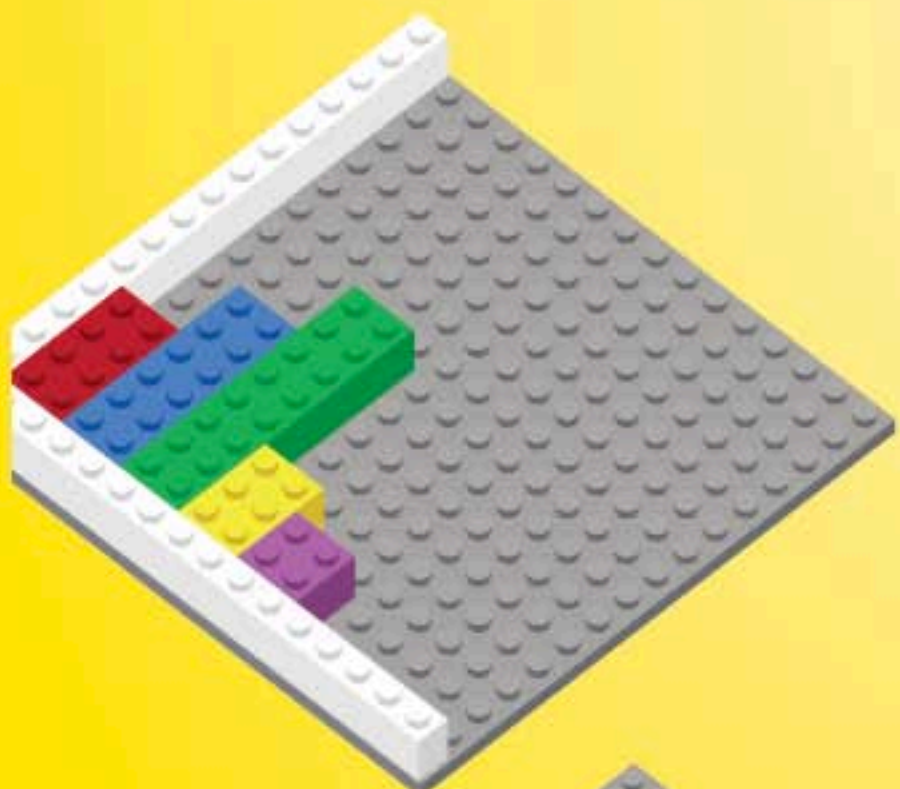


TEACHER EDITION



DATA AND STATISTICS

USING LEGO® BRICKS



Dr. Shirley Disseler

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USING LEGO® BRICKS

Dr. Shirley Disseler



Data and Statistics Using LEGO® Bricks—Teacher Edition

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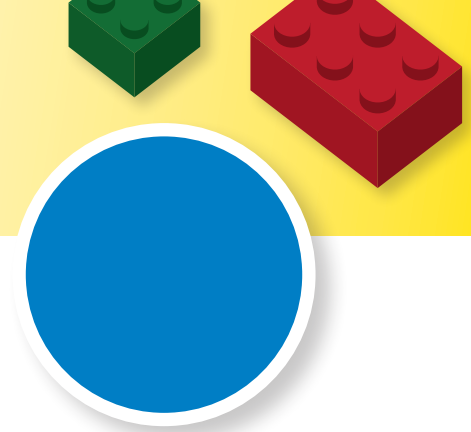
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- Suggested Brick Inventory
- Student Assessment Chart
- Baseplate Paper



SUGGESTED BRICKS

Size	Number
1x1	40
1x2	20
1x3	4
1x4	4
1x16	1

Note: Using a baseplate helps keep the bricks in place. One baseplate is suggested for these activities.

REPRESENTING AND INTERPRETING DATA (UP TO THREE CATEGORIES)

Students will learn/discover:

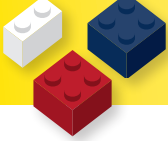
- How to show data sets with bricks
- How to analyze data in a topic for up to three categories

Why is this important?

Students begin to use data as a way to answer questions and solve problems. As early as kindergarten, students learn to gather simple data points using real-life concepts such as favorite ice cream flavors or numbers of right-handed and left-handed students in a class. Learning ways to represent data starts the understanding to build graphs, analyze data using graphs and tables, and make predictions based on data. Data is an integrative skill that blends into sciences, economics, and many other subject areas.

Vocabulary:

- **Data point:** An identifiable element in a data set, or one piece of data about one specific topic
- **Analyze:** Examine and make sense of information to answer questions and solve problems
- **Data set:** A group of numbers or data points around a specific topic
- **Frequency table:** A table that shows the number of times something occurs in a set of data
- **Category:** Topic for which data is collected



How to use the companion student book, *Data and Statistics Using LEGO® Bricks—Student Edition*

- After students build their models, have them draw the models and explain their thinking in the Student Edition. Recording the models on paper after building them with bricks helps reinforce the concepts being taught.
- Discuss the vocabulary for each lesson with students as they work through the Student Edition.
- Use the chapter assessments in the Student Edition to gauge student understanding of the content.

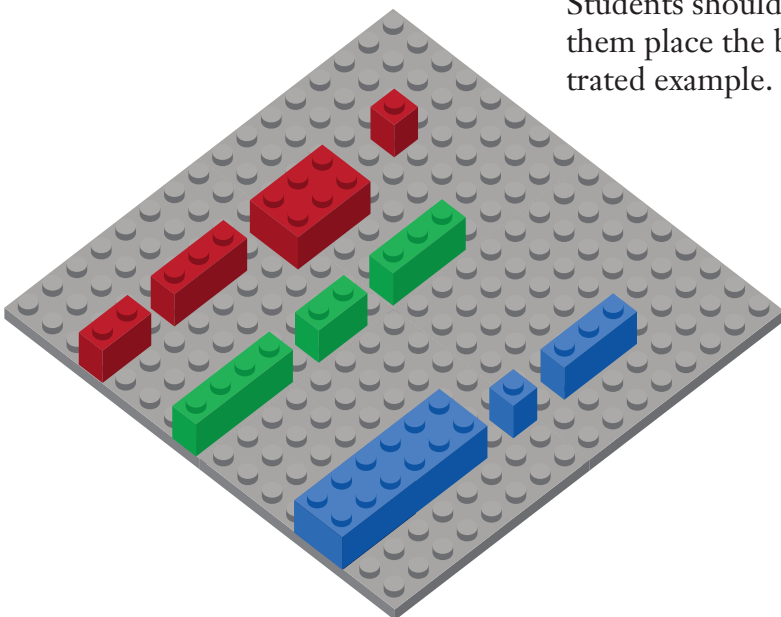
Part 1: Show Them How

Discuss the term *data*. Ask students, “What do you think of when you hear the word ‘data’?” (*Possible answers include:* numbers, information, or amount of things in a set)

Discuss the definitions of *data* and *data set* with students. *Note:* At this point in the understanding of data sets, students are not ready for the term “axes.” This lesson is the precursor to learning about the x and y axes.

Discuss the term *category* with students. Discuss that it refers to the topic for which data is being gathered. Provide examples such as colors, animal types, etc.

Have students build a data set using the category *color*. Students should choose any 10 bricks with 3 colors. Have them place the bricks with like colors in rows as in the illustrated example.





Ask students:

- Which color has the most studs? (*Answer:* in this example, blue has the most studs, with 16)
- Which color has the least number of studs? (*Answer:* in this example, green has the least studs, with 9)

Ask students what it means to analyze data. (*Answer:* to make sense of data and use it to answer questions) Tell students that when they look at data and make comparisons, they are analyzing the data set.

Introduce the terms *data point*, *data set*, and *analyze* using the brick model you have created.

- Explain that each color represents a *data set* about a specific color.
- Explain that each stud within each set represents a *data point*.
- Explain that when they compare the number of data points in each color's data set, they are *analyzing* the data.

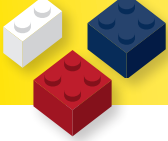
Problem #1: Pose the following scenario: Grayson is taking a survey about the number of people that like to go to certain places for fun. He gave students three choices: mountains, beach, or amusement parks.

- Red will represent people who like amusement parks
- Blue will represent people who like the beach
- Green will represent people who like the mountains

There are 24 students in the class.

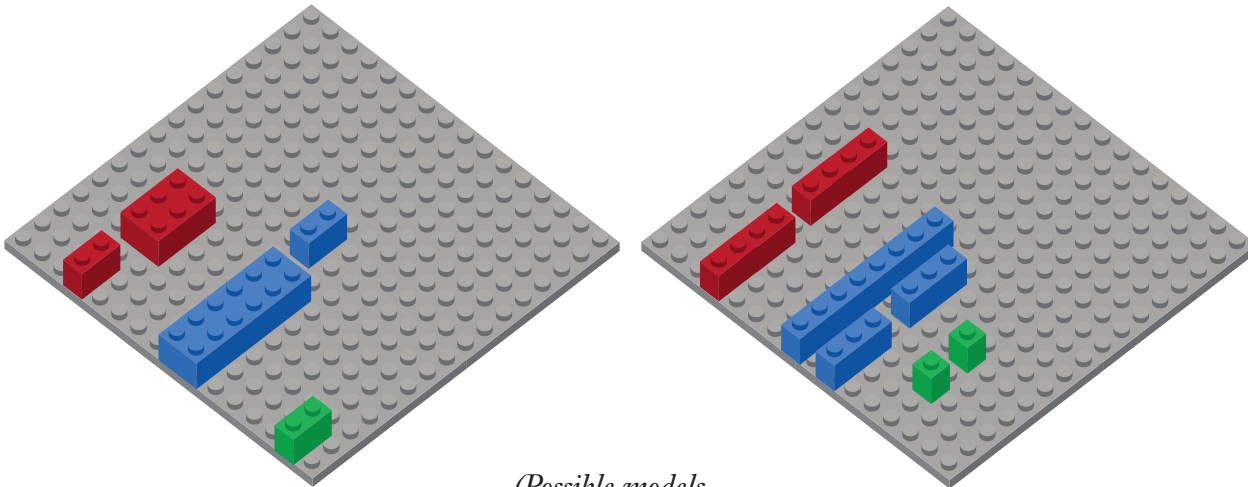
This is the data Grayson received:

8 people like amusement parks
14 people like the beach
2 people like the mountains



Build a model of the data and analyze the data using the questions below.

Note: This is a good opportunity to see if/how students create the numbers using one-to-one correspondence and various brick sizes.



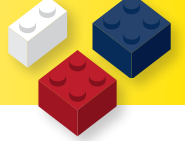
*(Possible models,
many solutions are
appropriate.)*

Ask students the following questions:

- Which data set has the most data points? (*Answer:* beach, because there are more blue studs than red or green studs)
 - Which place is liked the least by the students? (*Answer:* mountains, because only 2 students like it, as shown with 2 green studs)
 - How many people like to go to amusement parks? (*Answer:* 8, as shown with 8 red studs)
- How many data sets are there? (*Answer:* 3)

After students can identify data points and number of data sets, introduce the symbols $<$, $>$, and $=$. Show students how to use data points to write numerical sentences.

Say: Let's write a math sentence that shows that there are fewer people who like the mountains than the beach. (*Answer:* $2 < 14$) *Note:* You can tell students that this can be generalized in later math to mean that for every 2 people who like the mountains, there are 14 who like the beach. In upper grades, students will use a ratio format to analyze data.

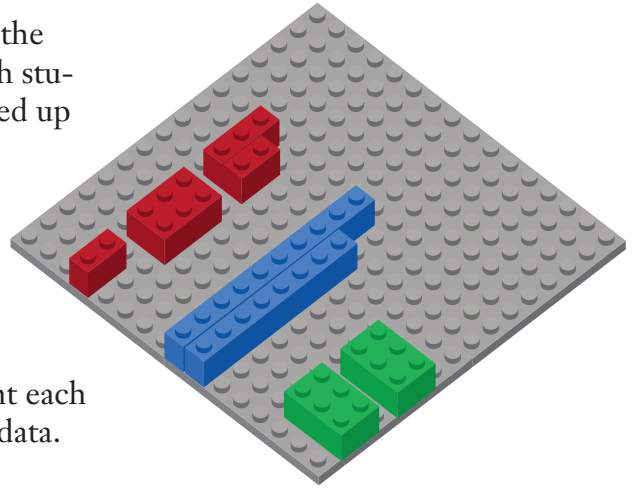


Problem #2: Have students build a model of this scenario:

Three types of sports are available for sign-ups at the local YMCA: soccer, baseball, and swimming. Each student can sign up for only one sport. Students signed up as follows:

- Soccer 13
- Baseball 18
- Swimming 12

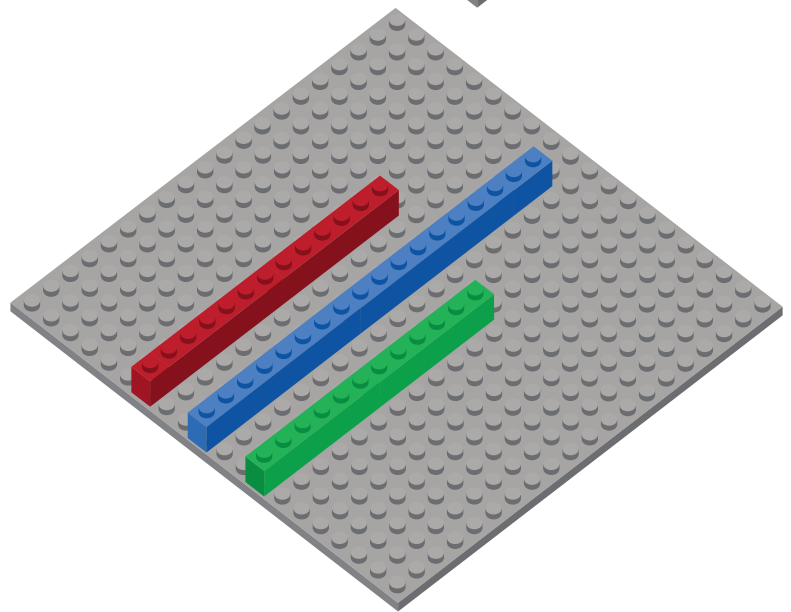
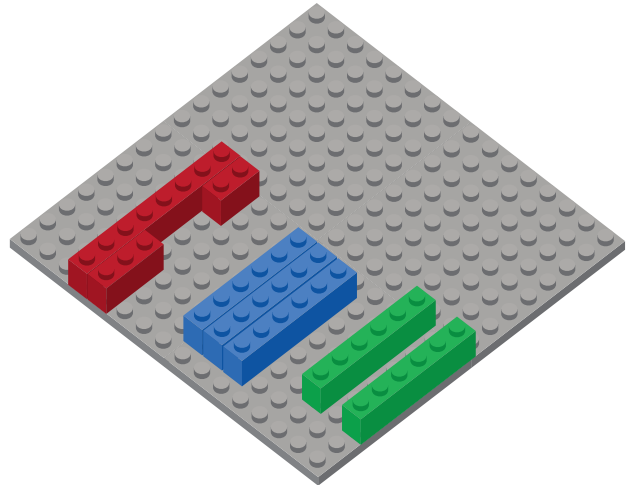
Have students choose a different color to represent each of the sports and build a brick model to show the data. Have students share their models with classmates.

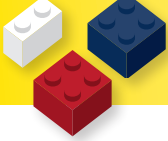


Possible answers:

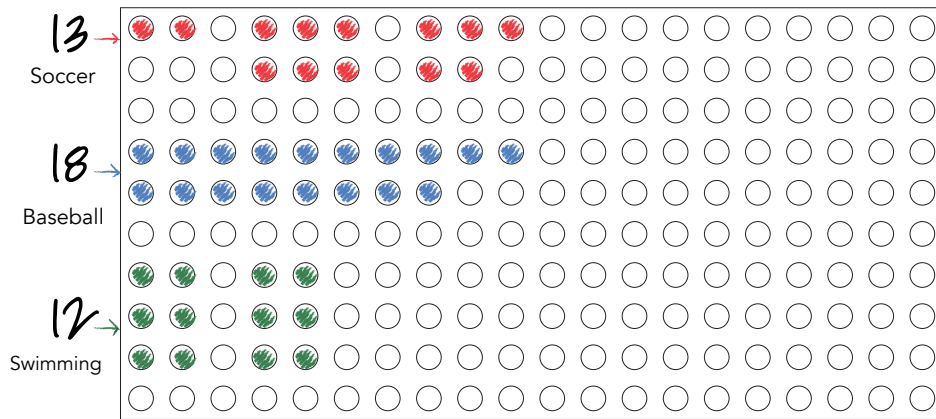
- Red = soccer
- Blue = baseball
- Green = swimming

There are many ways to model the numbers in the problem. Three possibilities are illustrated.





Have students draw and label the data sets on baseplate paper.



Ask students the following questions:

- Can you write a math statement about this data?
(Possible answers include: $12 < 18$; $18 > 12$; $13 < 18$; $18 > 13$; $13 > 12$; $12 < 13$)
- What can you say about this data set? (Possible answers: more people signed up for baseball than any other sport; the least number of people in a sport is swimming)
- How many more people like soccer than swimming?
(Answer: 1)
- How many more people like baseball than swimming?
(Answer: 6)

Part 2: Show What You Know

1. There are 30 people at the pool for a swim meet. Twelve people are wearing blue swimsuits, ten people are wearing white swimsuits, and the rest are wearing red swimsuits.

Build a model that shows the data sets. Draw your model and label the data sets.

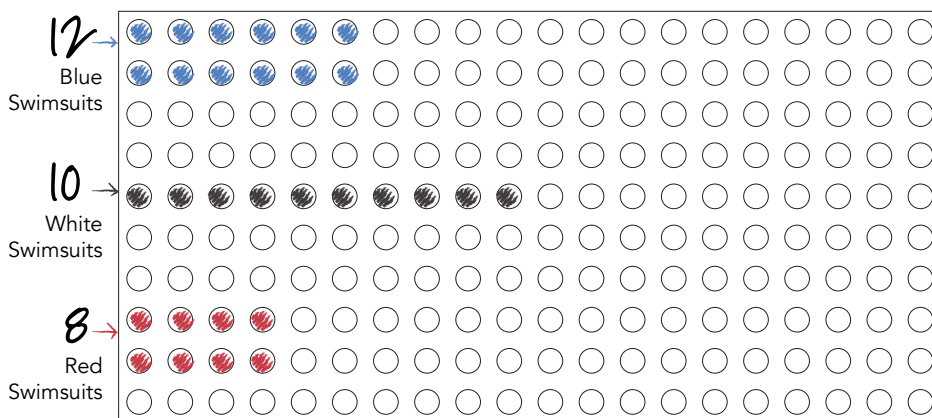
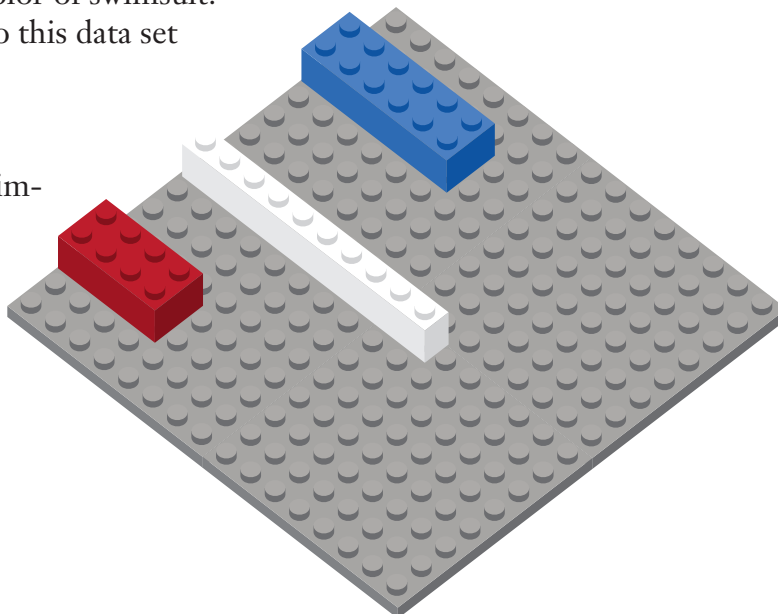


Answer the following questions:

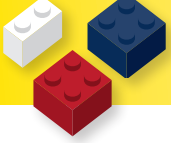
- How many more people are wearing white swimsuits than red swimsuits?
- Which data set shows the favorite color of swimsuit?
- Write a math sentence that relates to this data set using $<$, $>$, or $=$.

Possible solution:

- 2 more people are wearing white swimsuits than red swimsuits
- the blue data set shows the favorite swimsuit color
- $12 > 10$; $12 > 8$; $10 > 8$; $8 < 10$;
 $8 < 12$



2. Jason’s mom bought him a bag of candy to share with his class. It had three types of candy in it. Jason needs to know how many of each kind there are in the bag so he can decide how to share it with everyone. In the bag there are 22 lollipops, 20 pieces of taffy, and 24 gum-balls. Help Jason analyze this data.



Steps:

1. Determine a color to represent each type of candy.
Note: Student choices will vary.
2. Build a model. *Note:* Models will vary based on color and brick choices.
3. Draw and label the model.
4. Answer the questions.
 - a. How many pieces of candy are there in all?
 - b. Which type of candy is most represented in the bag?
 - c. How many more lollipops are there than pieces of taffy?
 - d. Write two comparison statements about the data and write a matching math sentence.

Answers:

- a. 66
 - b. gumballs
 - c. 2
 - d. Answers will vary; example: The number of pieces of taffy is less than the number of pieces of gumballs;
 $20 < 24$
- 3.** Survey 15 people about a topic of your choice that has no fewer than 3 choices.

Build a model of your data. Explain your model to a partner.

Draw and label your model.

Write 3 comparison statements about your data. Write the corresponding math sentences.

Answers will vary.