

# Validity of Claims

CA Content Standard 6SDAP2.5: Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.



## BEHIND THE SCENES BACKGROUND INFORMATION

### Objective

Students will evaluate the validity of claims regarding data in graphs and identify graphs that best present a set of data under different circumstances.

### Vocabulary Terms

**Bar graph:** A type of graph using vertical or horizontal bars to indicate relationships among data

**Data:** Information about a situation, group, or event

**Graph:** A data display using ordered pairs, bars, lines, circles, or pictures

**Line graph:** A graph with a horizontal and vertical axis that represents data as a continuous line or curve

### Materials

- student books, pages 23–29



## SETTING THE STAGE OPENING ACTIVITY

approximately 5–10 minutes

### Have students analyze two different data displays of the same data.

- Have students open their books to page 23 (T41).
- Give students a minute to respond to the prompt: “Which graph do you think Maya should choose? Why is this better than the other graph?”
- Have students share their responses. Students should make reference to details in the graphs to support their choices.
- Emphasize that both graphs represent the same data, yet they make the data appear very different.

### Opening Activity Answers

*Maya should choose the bar graph. She should not choose the line graph because it gives the appearance of sharp decreases in the number of community service projects.*



**Have students analyze the choice they made in the Opening Activity.**

- Have students turn to page 24 (T42) and follow along as you read through the text.
- Direct students' attention to the graphs from the Opening Activity. Discuss what the graphs have in common, such as titles and axes labels. Make sure students understand that both of the graphs display the same information.
- Read through the next two paragraphs of text with students. Emphasize that even though the two graphs represent the same data, they can lead people to very different conclusions.



***If students are confused about how the same data can lead to two different conclusions, explain that given an unlimited amount of time, people would probably draw the same conclusions from any graph of the data. However, time is always limited, and people do not always notice every detail in a graph. Therefore, first impressions are critical.***

- Guide students through the scaffolding questions.

Which graph would you use if you were Maya's campaign manager? Explain your reasoning. *I would use the bar graph because it shows that under Maya's leadership, a good number of service projects were completed each year.*

Which graph would you use if you were Maya's opponent's campaign manager? Explain your reasoning. *I would use the line graph because it shows that under Maya's leadership, there were several decreases and an overall drop in the number of service projects completed from year to year.*



***Students may suggest alternative graphs that are more positive or negative toward Maya's campaign, but which may not represent the data accurately. Remind students that when choosing between two graphs to represent a set of data, it is important to verify that the data is correctly and completely represented in both graphs.***

**Comparing Two Bar Graphs**

- Read through the text with students, and review the two bar graphs. As a class, identify the features that are the same and different in the graphs. Remind students that the jagged line on the y-axis indicates that some values have been skipped.

- Guide students through the scaffolding questions.

*What is the same in the two graphs?* *The titles, the axis labels, and the values that the bars represent*

*What is different in the two graphs?* *The range of values on the vertical axis*

*If you had only seen the graph on the right, what would your first impression of School C have been? Would this impression have been correct?* *I would have felt that almost no students tried out for basketball at School C. This would have been incorrect.*

- Emphasize that both graphs are correct and represent the same data. Yet, a difference in axis scale leads to completely different interpretations, which may even be incorrect. Explain that both of the graphs could be useful under different circumstances.
- Guide students through the remaining scaffolding questions. Student answers will vary.
 

*Describe a situation in which the graph on the left would be preferable. This graph would be preferable if the school district wanted to show that its high school basketball programs are popular.*

*Describe a situation in which the graph on the right would be preferable. This graph would be preferable if the coach at School A wanted to show that his program attracts more interest than the programs at the other schools.*

### Comparing Two Line Graphs

- Read through the text and direct students' attention to the two line graphs. Guide students through the scaffolding questions.
 

*Is the data the same in both of the graphs? Yes*

*What else do the graphs have in common? Titles and axes labels*

*What is different about the graphs? The range of values on the vertical axis*

*If you were a college administrator, which graph would you use to convince people that the college is not having a serious enrollment problem? I would use the graph on the right, because the drop appears less severe than in the graph on the left.*



**Struggling students may benefit from additional practice on this problem. Ask them if they can think of a person who would be better off using the graph on the left. One possible answer is a higher administrator, who could use the graph to argue that the admissions department needs to do a better job.**



### SHOW TIME INDEPENDENT PRACTICE

*approximately 20 minutes*

**Have students complete the Independent Practice activity in pairs or small groups.**

- Have students turn to page 27 (T45).
- Read the directions aloud and be sure that students understand the activity.

**Give students approximately 15 minutes to complete the activity.**

- As students work, circulate and ask them to explain their thinking. Redirect students as needed by asking them questions about their work. Effective questions might include the following:
 

*What do the titles and labels tell you about the information that is being displayed?*

*Is there another way to draw the graph that would make the data look steeper or flatter?*

*What conclusions can you draw from each graph?*
- Bring the class together and have students share their responses.
- Have students refer to the graphs to support the choices they made.