# Two-Way (Frequency) Tables

**UNDERSTAND** Data can be classified as being either quantitative data or categorical data. **Quantitative data** involve numbers that usually result from measurement. Temperature, height, cost, and population are examples of quantitative data. **Categorical data** take on values that are names or labels. Gender, profession, and nationality are examples of categorical data.

When researchers collect data, they often ask more than one question. Comparing the results of those questions can reveal relationships among the data. To compare two categorical variables, you can enter the frequencies for each category into a **two-way frequency table**.

The two-way frequency table below displays the results of a survey that examined the relationship between gender and video game play. The table shows **joint frequencies** and **marginal frequencies**.

| | Play Daily | Play Occasionally | Total |
|---|---|---|---|
| **Boys** | 16 | 8 | 24 |
| **Girls** | 4 | 12 | 16 |
| **Total** | 20 | 20 | 40 |

Joint frequencies are in the body of the table.

Marginal frequencies are in the "Total" row and "Total" column.

Sometimes you are less interested in the actual frequency count than in the percentage of data values that fall into each category. These percentages are the **relative frequencies**. When

Suppose the table above represents a middle school art class' responses to the question "How often do you play video games on WiiU, PS4, or the Xbox One?"

1. How many people are in the class?

2. How many girls are in the class?

3. How many boys played video games daily?

4. What percent of girls played video games daily?

5. What percent of daily players were girls?

6. Do you see an association between gender and video game use in this survey?

Francine is evaluating three driving schools. She asked 50 people who attended the schools whether they passed their driving tests on the first try.

| | Pass | Fail |
|---|---|---|
| Al's Driving | 卌 卌 IIII | 卌 III |
| Drive Time | 卌 卌 I | 卌 II |
| Crash Course | 卌 | 卌 |

7. Create a frequency table comparing results and schools.

8. Of all students who passed, what portion went to Drive Time?

9. Which school had the most failures?

10. At which school are students least likely to fail?

A random group of high school students was surveyed. Each student was asked whether it should be mandatory for all high school students to participate in a sport. The results are partially summarized in the two-way table.

| | Agree | Disagree | No Opinion | Total |
|---|---|---|---|---|
| Freshman | 53 | 12 | 7 | |
| Sophomore | 65 | | 2 | 104 |
| Junior | 18 | 42 | 12 | |
| Senior | 56 | | | |
| Total | | 158 | | 375 |

11. How many seniors were surveyed?

12. What percent of students surveyed were seniors?

13. What percent of students disagree with the mandate?

14. What percent of students disagreeing were seniors?

15. What percent of seniors disagreed with the mandate?

16. Do you see an association between grade level and opinion in this survey?