Two-Way Tables

Let's look at categorical data.

1.1 Utensils and Paper Preferences

Several students are surveyed about whether they prefer writing with a pen or a pencil, and they are also asked whether they prefer lined paper or unlined paper. Some of the results are:

- The survey included 100 different students.
- 40 students said they prefer using a pen more than a pencil.
- 45 students said they prefer using unlined paper more than lined paper.
- 10 students said they prefer lined paper and a pen.
- 45 students said they prefer a pencil and lined paper.

For each part, explain or show your reasoning.

1. How many students prefer using pencil more than pen?

2. How many students prefer using pen and unlined paper?

3. How many students prefer using pencil and unlined paper?

1.2 Fruit Fly Mutations

A scientist is trying to determine the role of specific genes by looking at traits of fruit flies. The offspring of two fruit flies are examined to determine the color of their eyes and whether they have curled wings or standard wings. Eighty offspring are randomly selected, and the results are recorded in the **two-way table**.

	curled wings	standard wings
red eyes	17	45
white eyes	5	13

1. Describe what the 17 in the table represents.

2. How many selected fly offspring had white eyes? Explain or show your reasoning.

3. How many selected fly offspring had standard wings? Explain or show your reasoning.

Are you ready for more?

1. Write 2 of your own survey questions that produce data which can be represented in a two-way table.

2. Give the survey to 20 or more students, and record the results in a two-way table.

3. What questions can you answer with the information you found from your survey?

4. What does that tell you about the population of students who took your survey?

1.3 Info Gap: Running to the Dentist

Your teacher will give you either a problem card or a data card. Do not show or read your card to your partner.

If your teacher gives you the problem card:

1. Silently read your card, and think about what information you need to answer the question.
2. Ask your partner for the specific information that you need. “Can you tell me _____?”
3. Explain to your partner how you are using the information to solve the problem. “I need to know _____ because . . . .”

   Continue to ask questions until you have enough information to solve the problem.
4. Once you have enough information, share the problem card with your partner, and solve the problem independently.
5. Read the data card, and discuss your reasoning.

If your teacher gives you the data card:

1. Silently read your card. Wait for your partner to ask for information.
2. Before telling your partner any information, ask, “Why do you need to know _____?”
3. Listen to your partner’s reasoning, and ask clarifying questions. Only give information that is on your card. Do not figure out anything for your partner!

   These steps may be repeated.
4. Once your partner says they have enough information to solve the problem, read the problem card, and solve the problem independently.
5. Share the data card, and discuss your reasoning.

Lesson 1 Summary

In statistics, a **variable** is a characteristic that can take on different values. A **categorical variable** is a variable that takes on values which can be divided into groups or categories. Data from two categorical variables about a population can be organized using a **two-way table**.

For example, this two-way table shows the results from 170 responses to a survey asking people their age group and whether they have a cell phone or not.

	has a cell phone	does not have a cell phone
10–12 years old	25	35
13–15 years old	38	12
16–18 years old	52	8

The 38 in the table means that 38 of the 170 people surveyed are in both the 13–15 years old age category and have a cell phone. The two-way table also shows that 55 of the people surveyed do not have cell phones, since $35 + 12 + 8 = 55$.

The categories for a single variable should not overlap (a person cannot be 10–12 years old and 13–15 years old at the same time). Each individual is included in only one of the cells in the table rather than in multiple places.