**CCM8 Two-Way Tables**

Categorical variables are variables that can be placed into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. For example, Skittles can be grouped by color, so color is a categorical variable. Middle school students can be grouped by grade level (6th,7th, or 8th), so grade level is a categorical variable.

A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organizes data between two categorical variables when data for both categories is collected from each subject.

For example, if you ask a group of students if they have every flown on an airplane and if they prefer soccer or football you may get responses like the ones listed below.

Student 1: has flown in an airplane, prefers soccer

Student 2: has flown in an airplane, prefers football

Student 3: has not flown in an airplane, prefers football

Student 4: has not flown in an airplane, prefers soccer

Student 5: has not flown in an airplane, prefers soccer

Student 6: has flown in an airplane, prefers soccer

Student 7: has flown in an airplane, prefers soccer

Student 8: has flown in an airplane, prefers football

Student 9: has flown in an airplane, prefers football

Student 10 has not flown in an airplane, prefers soccer

This information can be organized into a two-way table by grouping similar responses.

|  |  |  |
| --- | --- | --- |
|  | Has flown in an airplane | Has not flown in an airplane |
| Prefers Soccer | 3 | 3 |
| Prefers Football | 3 | 1 |

Now that the data is organized, relative frequencies can be calculated to describe associations.

For example:

* What percent of the students who like soccer, have flown in an airplane?
* What percent of students who like football, have flown in an airplane?
* What percent of students who have not flown in an airplane, like soccer?
* What percent of the students surveyed have flown in an airplane?

Example 2: A group of 50 students were surveyed and asked if they preferred chocolate or vanilla ice cream and if they preferred pizza or hamburgers. Use the results in the table below to answer the questions.

|  |  |  |
| --- | --- | --- |
|  | Chocolate Ice Cream | Vanilla Ice Cream |
| Pizza | 15 | 8 |
| Hamburger | 17 | 10 |

* Of the students who preferred pizza, what percent also preferred chocolate ice cream?
* Of the students who preferred vanilla ice cream, what percent also preferred pizza?
* Of the students who preferred pizza, what percent also preferred vanilla ice cream?
* Of the students who preferred chocolate ice cream, what percent also preferred hamburgers?
* What percent of all students preferred chocolate ice cream?
* What percent of all students preferred pizza?

**Independent Practice**

Twenty five students were surveyed. They were asked if they had a dog and if they received a weekly allowance. The results from the survey are organized in the table below.

|  |  |  |
| --- | --- | --- |
|  | Has a dog | Does not have a dog |
| Receives and allowance | 7 | 8 |
| Does not receive an allowance | 6 | 4 |

* Of the students who receive an allowance, what percent has a dog?
* Of the students who do not have a dog, what percent receives an allowance?
* Of the students who have a dog, what percent does not receive an allowance?
* What percent of students surveyed has a dog?
* What percent of students surveyed receive an allowance?