

# EXAMPLE 1



## Construct a Two-Way Frequency Table

Scan for Multimedia



Jensen asked 100 people at his school whether they prefer digital or print textbooks. Construct a two-way frequency table that shows the relationship between the person's position and their textbook preference.

Which type of textbook do you prefer?		
	Digital	Print
Students	42	28
Teachers	6	24

These data are **categorical data**. Categorical data consist of data that fall into categories. They do not have an inherent order, like numerical data.

**Model with Math** A two-way frequency table is a way to show and interpret the relationships between paired categorical data. MP4

**ONE WAY** Construct a two-way frequency table.

The column category is People at School: Students or Teachers.

		People at School		
		Teachers	Students	Total
Textbooks	Digital	6	42	48
	Print	24	28	52
	Total	30	70	100

The row category is Textbooks: Digital or Print.

**ANOTHER WAY** Construct a different two-way frequency table.

The rows and columns can be interchanged.

		Textbooks		
		Digital	Print	Total
People at School	Students	42	28	70
	Teachers	6	24	30
	Total	48	52	100

The order of the categories does not matter here since these are not numerical.

## Try It!

A weatherman asks 75 people from two different cities if they own rain boots. Complete the two-way frequency table to show the results of the survey.

**Convince Me!** What pattern do you see in the two-way frequency table?

		Rain Boots		
		Yes	No	Total
City	A	13	19	32
	B	28	15	43
	Total	41	34	75



A two-way frequency table shows the results of a media survey. People responded to the question, "Do you spend more time watching the winter or the summer Olympics on television?" Decide if the following statement is true or false. Explain.

More men than women spend more time watching the winter Olympics.

$\frac{45}{79} \approx 0.57$  **57% Men**  
 $\frac{27}{71} \approx 0.38$  **38% Women**

The statement is true because 45 of 79 men watched the winter Olympics, which is a greater ratio than 27 of 71 women.

Gender	Olympics		
	Winter	Summer	Total
Men	45	34	79
Women	27	44	71
Total	72	78	150

Look in the Winter and Total columns to compare the data.

### EXAMPLE 3



### Construct and Interpret a Two-Way Frequency Table

Two hundred people responded to a survey. Of those who had green eyes, 7 had blonde hair, 9 had brown hair, and 2 had red hair. Of those who had brown eyes, 76 had blonde hair, 89 had brown hair, and 17 had red hair. Construct a two-way table to display these data. Then identify the least common combination of eye and hair color. Explain.

Eye Color	Hair Color			Total
	Blonde	Brown	Red	
Green	7	9	2	18
Brown	76	89	17	182
Total	83	98	19	200

Check that the sum of the row and column totals is 200.

Because 2 is in the Green row and the Red column, green-eyed people with red hair is the least common combination.

### Try It!

One hundred students were asked how they traveled to school. Of the girls, 19 rode in a car, 7 rode the bus, and 27 took the train. Of the boys, 12 took the train, 25 rode in a car, and 10 rode the bus. Construct a two-way frequency table. Then tell which mode of transportation is the most popular. Explain.

**Car, it is the largest # for the mode of transportation**

Gender	Transportation			Total
	Car	Bus	Train	
Boys	25	10	12	47
Girls	19	7	27	53
Total	44	17	39	100

A two-way frequency table displays the relationship between paired categorical data. You can interpret the data in the table to draw conclusions.

$19 + 24 + 9 + 12 + 15 + 26 = 105$

		Winter Activity			Total
		Ski	Sled	Ice Skate	
Gender	Boys	19	24	9	52
	Girls	12	15	26	53
	Total	31	39	35	105

$52 + 53 = 105$

$31 + 39 + 35 = 105$

Total population

## Do You Understand?

- Essential Question** How does a two-way frequency table show the relationship between sets of paired categorical data?

A 2-way Frequency table shows 2 categories which can have 2 or more subcategories.

- Model with Math** How do you decide where to start filling in a two-way frequency table when some of the data are already there? MP.4

Start w/ the row or column that has 1 missing value

- Use Structure** How can you use the structure of a two-way frequency table to complete it? MP.7

## Do You Know How?

- A basketball coach closely watches the shots of 60 players during basketball tryouts. Complete the two-way frequency table to show her observations

		Basketball Shots		
		Free Throws	3-Point Shots	Total
Grade Level	Underclassmen	18	<input type="text"/>	28
	Upperclassmen	<input type="text"/>	19	<input type="text"/>
	Total	31	<input type="text"/>	<input type="text"/>

- Do the data in the two-way frequency table support the following statement? Explain. There are more middle school students who wear glasses than high school students who wear contacts.

		Vision		
		Glasses	Contacts	Total
Grade	Middle School	13	6	19
	High School	11	20	31
	Total	24	26	50

