

Scatter Plots

To find out if two sets of data may be related, you can make a *scatter plot* of the data values in each set.

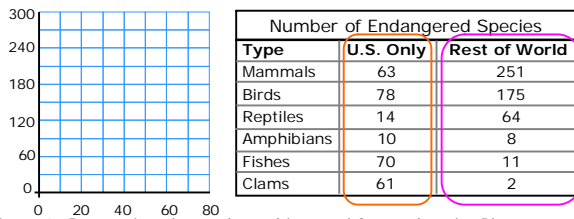
A **scatter plot** has **two number lines**, called **axes**—one for each set of data values.

Each point on the scatter plot represents a pair of data values. These points may appear to be scattered or may cluster in the shape of a line or a curve.

Scatter plots shows **relationships** between two sets of data.

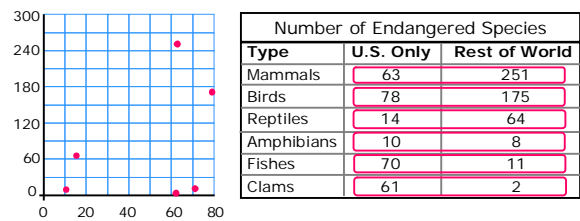
Additional Example 1: Making a Scatter Plot

Use the data to make a scatter plot. Describe the relationship between the data sets.



Step 1: Determine the scale and interval for each axis. Place the number of animals endangered in the U.S. on the **horizontal axis** and the number of animals endangered in the rest of the world on the **vertical axis**.

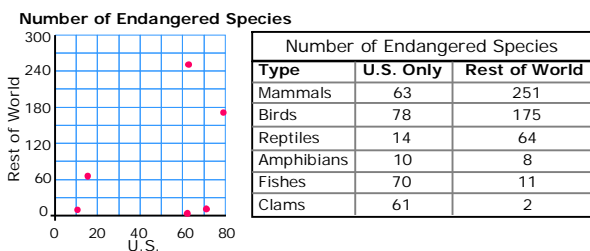
Additional Example 1 Continued



Step 2: Plot a point for each pair of values.

Additional Example 1 Continued

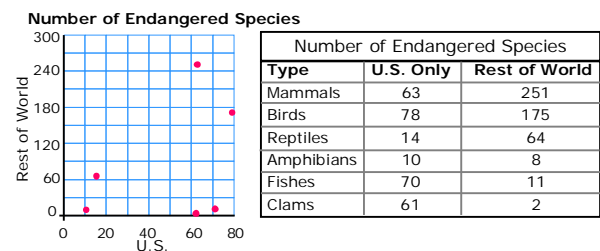
Use the data to make a scatter plot. Describe the relationship between the data sets.



Step 3: Label the axes and give the graph a title.

Additional Example 1 Continued

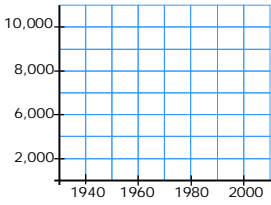
Use the data to make a scatter plot. Describe the relationship between the data sets.



There appears to be no relationship between the data sets.

Try This: Example 1

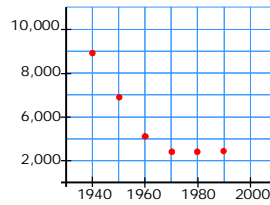
Use the data to make a scatter plot. Describe the relationship between the data sets.



Year	Number of farm workers in thousands
1940	8,995
1950	6,858
1960	4,132
1970	2,881
1980	2,818
1990	2,864

Step 1: Determine the scale and interval for each axis. Place the year on the horizontal axis and the cost on the vertical axis.

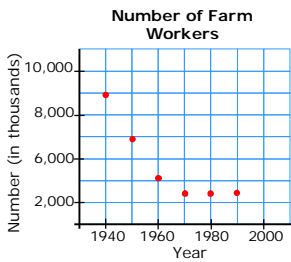
Try This: Example 1 Continued



Year	Number of farm workers in thousands
1940	8,995
1950	6,858
1960	4,132
1970	2,881
1980	2,818
1990	2,864

Step 2: Plot a point from each pair of values.

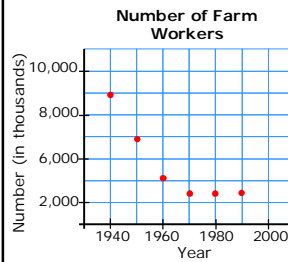
Try This: Example 1 Continued



Year	Number of farm workers in thousands
1940	8,995
1950	6,858
1960	4,132
1970	2,881
1980	2,818
1990	2,864

Step 3: Label the axes and give the graph a title.

Try This: Example 1 Continued

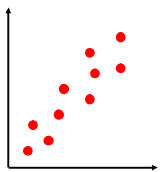


Year	Number of farm workers in thousands
1940	8,995
1950	6,858
1960	4,132
1970	2,881
1980	2,818
1990	2,864

The number of farm workers decreased from 1940 to 1970.

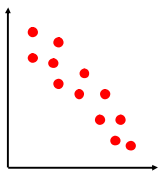
There are three ways to describe data displayed in a scatter plot.

Positive Correlation



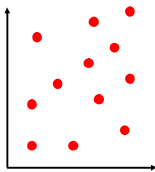
The values in both data sets increase at the same time.

Negative Correlation



The values in one data set increase as the values in the other set decrease.

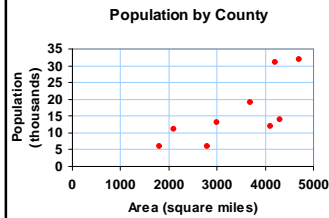
No Correlation



The values in both data sets show no pattern.

Additional Example 2A: Determining Relationships Between Two Variables

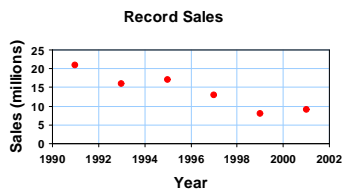
Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.



The graph shows that as area increases, population increases. So the graph shows a positive correlation between the data sets.

Additional Example 2B: Determining Relationships Between Two Variables

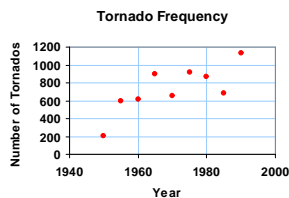
Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.



The graph shows that as the year increases, sales decrease. So the graph shows a **negative correlation** between the data sets.

Try This: Example 2A

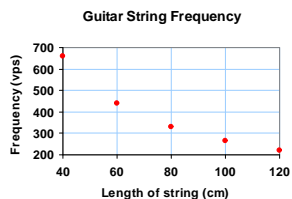
Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.



The graph shows that as the year increases, number of tornados increases. So the graph shows a **positive correlation** between the data sets.

Try This: Example 2B

Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.



The graph shows that as the length of string increases, frequency decreases. So the graph shows a **negative correlation** between the data sets.

vps = vibrations per second

Additional Example 2C: Determining Relationships Between Two Variables

Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.

height and number of vacation days

The number of vacation days is not related to height. So there would not be any correlation between these two variables.

Try This: Example 2C

Write *positive correlation*, *negative correlation*, or *no correlation* to describe each relationship.

eye color and age

There would not be any correlation between these two variables.

Additional Example 2A: Identifying the Correlation of Data

Do the data sets have a **positive**, a **negative**, or **no correlation**?

A. The size of a jar of baby food and the number of jars of baby food a baby will eat.

Negative correlation: The more food in each jar, the fewer number of jars of baby food a baby will eat.

Additional Example 2B: Identifying the Correlation of Data

Do the data sets have a positive, a negative, or no correlation?

B. The speed of a runner and the number of races she wins.

Positive correlation: The faster the runner, the more races she will win.

Additional Example 2C: Identifying the Correlation of Data

Do the data sets have a positive, a negative, or no correlation?

C. The size of a person and the number of fingers he has

No correlation: A person generally has ten fingers regardless of their size.

Try This: Example 2A

Do the data sets have a positive, a negative, or no correlation?

A. The size of a car or truck and the number of miles per gallon of gasoline it can travel.

Negative correlation: The larger the car or truck, the fewer miles per gallon of gasoline it can travel.

Try This: Example 2B

Do the data sets have a positive, a negative, or no correlation?

B. Your grade point average and the number of A's you receive.

Positive correlation: The more A's you receive, the higher your grade point average.

Try This: Example 2C

Do the data sets have a positive, a negative, or no correlation?

C. The number of telephones using the same phone number and the number of calls you receive.

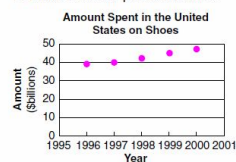
No correlation: No matter how many telephones you have using the same telephone number, the number of telephone calls received will be the same.

LESSON 1-8 Practice A
Scatter Plots

The table shows how much money people in the United States spent on shoes from 1996 to 2000. The amounts are rounded to the nearest billion dollars.

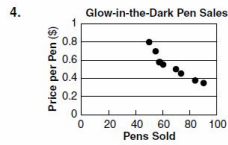
Year	1996	1997	1998	1999	2000
Amount (\$billions)	39	40	42	45	47

1. Make a scatter plot of the data.
2. What does the scatter plot show about how much people in the United States spent on shoes from 1996 to 2000?



- Spending on shoes increased over time.
3. What kind of a correlation does the scatter plot show—positive, negative, or no correlation?
positive correlation

Write *positive*, *negative*, or *no correlation* to describe each relationship.



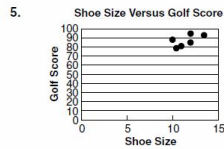
negative correlation

6. outside temperature and the chance of your getting frostbite

negative correlation

8. number of basketballs going into the basket and distance in feet from the basket when shooting

negative correlation



no correlation

7. number of hours of spent studying for a test and the test scores

positive correlation

9. height and age of adults over 25

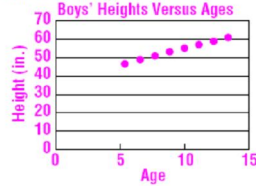
no correlation

LESSON 1-8 Practice B
Scatter Plots

The table shows boys' average heights in inches from ages 6 through 13. Use the table for Exercises 1–3.

Age	6	7	8	9	10	11	12	13
Height (in.)	$46\frac{3}{4}$	49	51	$53\frac{1}{4}$	$55\frac{1}{4}$	$57\frac{1}{4}$	59	61

1. Make a scatter plot of the data.



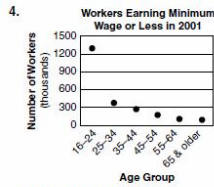
2. Describe the relationship between the data sets.

As boys get older, they grow taller.

3. What kind of correlation does the plot show?

positive correlation

Write *positive*, *negative*, or *no correlation* to describe each relationship.



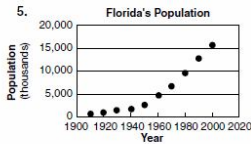
negative correlation

6. student test scores and the number of students who walk to school

no correlation

8. the year a state entered the union and the number of years as a state

negative correlation



positive correlation

7. the grade levels of students and their ages in months

positive correlation

9. ages of students and their grades on tests

no correlation