**CCM8 Associations between Variables**

When analyzing scatterplots you can determine whether a scatterplot has a \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_relationship, or if there is \_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the variables in the data set.

A scatterplot has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship if you can draw a line through the points and the points all follow along with the line.

There is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ association if the line increases from the left to right. This means that both variables are increasing at the same time.

There is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_association if the line decreases from the left to right. This means that as one variable increases, the other decreases.

There is \_\_\_\_\_ association if there is no pattern of increase or decreases. The points on the scatterplot are randomly distributed on the graph.

There is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relationship if the data points on the graph have a pattern, but the pattern does not follow a straight line.

If there is a point on the graph that doesn’t follow the same pattern as the rest of the points then it is called an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. When a set of data has an outlier it can affect the way that the data is interpreted.

Example 1:

This data is from a survey that asked students how long they spent on math homework every night and their grade in math class. Describe the association between the time and math grade.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Time in Minutes | 20 | 30 | 0 | 40 | 25 | 15 | 10 | 45 | 30 | 25 |
| Math Grade | 87 | 90 | 60 | 91 | 87 | 85 | 80 | 94 | 95 | 93 |



Example 2: Data that relates the number of pets a student has to the average number of texts that they send each day. Describe the association between the number of pets and number of texts.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Number of Pets | 2 | 1 | 0 | 3 | 2 | 5 | 3 | 0 | 1 | 4 |
| Number of Texts | 60 | 50 | 20 | 45 | 0 | 10 | 15 | 70 | 30 | 55 |



Example 3: Data was collected from a local group that meets once a month to clean up trash at a local park. They recorded the amount of time that it took to clean up the park and the number of volunteers that they had working that day. Describe the association between the number of workers and time that it takes to clean up the park.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Number of workers | 10 | 8 | 7 | 12 | 5 | 8 | 6 | 9 |
| Time | 4 | 2.1 | 2 | 1.6 | 2.6 | 2 | 2.4 | 1.9 |



Example 4: Data was collected over the years to keep track of how many tons of material was recycled each year. Describe the relationship between the year and the amount of recycled material.

Source: <http://www.epa.gov/epawaste/facts-text.htm#chart3>

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1960 | 1965 | 1970 | 1975 | 1980 | 1985 | 1990 | 1995 |
| Material (million tons) | 5.6 | 6.5 | 8.0 | 9.3 | 14.5 | 16.7 | 33.2 | 55.8 |



**Independent Practice**

1. Data from the first 10 games for a baseball team are provided in the table. Describe the relationship between the number of hits and the runs scored.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Game  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Hits | 10 | 8 | 15 | 18 | 12 | 9 | 7 | 9 | 14 | 15 |
| Runs  | 4 | 3 | 7 | 6 | 5 | 4 | 1 | 2 | 8 | 6 |

1. Data from the first 10 games for a basketball team are provided in the table. Describe the relationship between turnovers and points scored.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Game | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Turnovers | 10 | 15 | 8 | 12 | 14 | 10 | 11 | 13 | 9 | 20 |
| Points | 60 | 48 | 60 | 55 | 56 | 59 | 61 | 54 | 63 | 40 |

1. Data that gives a bean plant’s height per day. Describe the relationship between the day and the plant height.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Day | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| height (cm) | 0 | 3.1 | 5.3 | 6.2 | 8.7 | 12.0 | 15.5 | 16.4 | 18.2 | 18.9 | 19.2 |

1. Data that shows the population in Wake County since 1960. Describe the relationship between the year and the population of Wake County.

(Data source: <http://www.wakegov.com/planning/demographic/documents/trends2012.pdf>)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Year | 1960 | 1970 | 1980 | 1990 | 2000 | 2010 |
| Population | 169,082 | 238,453 | 301,327 | 423,380 | 627,846 | 900,993 |