Scatter plots. Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Key ideas.**

* **A scatter plot is** a \_\_\_\_\_\_\_\_\_\_\_\_\_ that shows the relationship between two numerical data from two different sets.
  + The data is displayed as a collection of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + The points in a scatter plot are not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + The points represent two \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **To create a scatter plot**:
  + Collect the data and organize it in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  + Present the data points on a graph with labeled \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Why do we create scatter plots?

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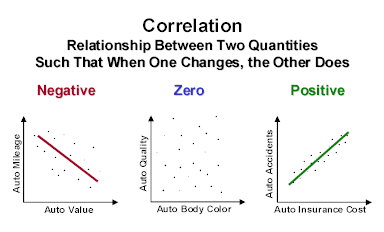
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* **Use the scatter plot to**:
  + Analyze the data by looking for a pattern.
  + Describe the pattern if one exists.

Describing the pattern.

* **A scatter plot of the relationship between two variables shows:**
  + Positive correlation when the pattern slopes up and to the right. The two quantities increase together.
  + Negative correlation when the pattern slopes down and to the right. As one quantity increases, the other decreases.
  + No correlation when no pattern appears.
  + The correlation is strong if the points nearly form a line.
  + The correlation is weak if the points are dispersed more widely, but still form a rough line.



Auto Value

Auto Quality

Auto Insurance Cost

Auto Body Colour

Auto Accidents

Auto Mileage

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**How to identify which variable is independent and dependent?**

**Independent Variable**:

A quantity that does not depend on another variable and generally cannot be controlled.

**Dependent Variable**

A quantity that depends on another variable

**Where do the variables go on the axes of a graph?**

**Example: Scatter Plot**

The table shows the wrist and the neck sizes of some students.

1. Determine a hypothesis with respect to the two variables.

1. Make a scatter plot of the data. Put wrist size on the x-axis and neck size on the y-axis. Label the axes, and include a title for the scatter plot.

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| --- | --- |
| Wrist size (cm) | Neck size (cm) |
| 15.5 | 33.0 |
| 19.0 | 34.5 |
| 21.5 | 40.5 |
| 22.5 | 44.0 |
| 15.0 | 34.0 |
| 21.0 | 38.9 |
| 17.0 | 32.0 |
| 19.5 | 37.0 |
| 18.0 | 35.0 |
| 16.5 | 33.5 |
| 16.0 | 31.0 |
| 15.0 | 32.5 |

**Note:** The symbol is used to signal a “break” in the axis when the scale does not start at zero to avoid a large empty space in one corner of the graph.

1. Describe the trend in the data. Discuss the correlation between the variables.
2. Describe the relationship between a student’s wrist and neck sizes.
3. Does the data support the hypothesis? Give reasons to support your answer.
4. Are there any outliers? If so, explain how they differ from the rest of data.

**Example.**

You want to find out whether more hours spent studying will have an effect on a person’s mark. You set an experiment with some students in your class, recording how many hours they spent studying and then recording what happened to their mark.

You recorded data in the table.

|  |  |
| --- | --- |
| Hours studying | % Increase |
| 1 | 2 |
| 1 | - 1 |
| 2 | 2 |
| 3 | 1 |
| 3 | 5 |
| 4 | 4 |
| 6 | 1 |
| 5 | 7 |
| 7 | 6 |

Plot the hours spent studying on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, since it’s the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Plot the change in the mark on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, since it’s the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

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**Analyzing given data and describing a pattern.**

We notice that, while the points are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ around, they do seem to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_.The points tend to get \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as we move to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. This type of relationship is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It’s \_\_\_\_\_\_\_\_\_\_\_\_\_\_ because points slope up \_\_\_\_\_\_\_\_\_\_\_\_\_\_.