**Lesson 3.2 – Using Scatter Plots to Identify Relationships**

***Goal: Create, interpret, and analyse two-variable data using scatter plots***

***What is a Scatter Plot?***

 A graphical representation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Creating a Scatter Plot***

***EXAMPLE*** Shayna recorded the cost of customers restaurant bill and the amounts they left her as a tip

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **$ Bill** | $25.15 | $38.49 | $19.27 | $49.66 | $32.45 | $72.14 |
| **$ Tip** | $4.00 | $5.50 | $2.50 | $9.00 | $5.00 | $14.00 |

**Steps**:

* Title
* Axes labels
* Independent variable ( \_\_\_\_\_\_\_\_\_\_ ) relies on nothing
* Dependent variable ( \_\_\_\_\_\_\_\_\_\_ ) relies on independent variable
* Appropriate scale
* Plot the (x, y) coordinate pairs
* Draw a Line of Best Fit (LOBF)

***Interpreting a Scatter Plot***

***EXAMPLE***  Jay researched estimates for a job painting his house. The scatter plot below shows Jay’s results.

1. Which is the dependent variable?
2. Which two companies will take the longest? Which of these two is cheaper?
3. Which two companies charge the same amount?

***Analyzing a Scatter Plot***

A ***correlation*** indicates the strength and direction of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between two variables

* ***Positive*** Correlation: Points on a scatter plot go \_\_\_\_\_\_\_\_\_\_\_ and to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ***Negative*** Correlation: Points on a scatter plot go \_\_\_\_\_\_\_\_\_\_\_ and to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ***Strong*** Correlation: Points on a scatter plot \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ***Moderate*** Correlation: Points on a scatter plot \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* ***Weak*** Correlation: Points on a scatter plot \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***EXAMPLE*** Classify each of the following scatter plots



***EXAMPLE*** Davis conducted an experiment comparing a person’s leg length and how long it takes to
walk 100 m. His data is shown in the scatter plot.

1. What sort of relationship does the graph suggest between leg length and time taken to walk 100 m?
2. Use the scatter plot to estimate the time it would take a person with a leg length of 85 cm to walk 100 m
3. How might Davis make the results of his experiment more reliable?

***Considering Cause & Effect***

Observing a relationship between two variables does \_\_\_\_\_\_\_\_\_\_\_ mean that one variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a change in the other. **Other factors could be involved**, or the correlation could be a **coincidence**. Some relationships are natural and/or obvious, while others may have a **common cause** to both variables.

***EXAMPLE*** State whether the claim in each situation is reasonable. If not, determine if there is a common cause, or if the relationship is coincidental.

1. A scientific study showed a negative correlation between aerobic exercise and blood pressure. It claimed that the increase in aerobic activity was the cause of the decrease in blood pressure.
2. Mila discovered a positive correlation between ice cream sales and the number of drowning incidents. She warned all of her friends not to eat ice cream if they intended on going swimming.
3. Since the 1950s the concentration of carbon dioxide (CO2) in the atmosphere has been increasing. Crime rates in most countries have also increased over this time period. A newspaper reports that the increase in CO2 level in the atmosphere cause people to commit crimes.

**Practice**: Page 142 #1 – 6, 8, 10, 12