**Model responses for Sardine Story**

**Reflection 1**

As a consultant with Acme Data Consulting, what are your thoughts about the graph with temperature by year?

1. What do you observe from this line graph?

2. Does the temperature of the ocean change over the years? If so, how?

3. Are you able to identify an overall trend from this line graph?

**Model Response:** The first observation that we can make from this graph is we have zoomed in on temperature readings since the y-axis is between 14 degrees C and 17 degrees C. Looking at the temperature over the years, we see that there are a few spikes in the ocean temperature at certain years. The spikes in the ocean temperature are between 16-18 degrees C, while the other years have a range of ocean temperatures between 13-15 degrees C. We cannot see an overall trend clearly from the graph.

**Reflection 2**

Consultant, what are your thoughts about the graph with landings by year?

1. What do you observe from this line graph?
2. Does the amount of sardine landings change over the years? If so, how?
3. Are you able to identify an overall trend from this line graph?
4. Looking at both line graphs of the raw temperature and sardine landings data, do you notice any relationship between the two variables? Take note of the x-axis which allows us to compare these two graphs.

**Model Response:** The first observation that we can make from this graph is that between 1920 to 1945, sardine landings look to be slowly increasing towards 250,000 tons. However, the increase in sardine landings is not a clear trend because there are decreases in sardine landings after each spike. After 1945, there is a sharp drop in sardine landings down to below 50,000 tons. There is another smaller increase in sardine landings around 1950 and then it levels off between 1951 and 1968.

Looking at both line graphs, we can see that there does seem to be a cyclic type pattern in the ocean temperature and sardine landings, but it is difficult to see exactly what is happening.

**Reflection 3**

Let’s take a closer look at these graphs, Consultant.

1. What do you observe from each of these line graphs with the loess lines?
2. Are you able to identify a better overall trend using the loess lines for the temperature and sardine landings variables?
3. Can you describe the relationship between the two variables better now with the loess lines?
4. What do you notice between the two line graphs? How do they compare? How are they different?

**Model Response:** We observe from the first line graph of ocean temperature that the loess line shows us a trend of increasing ocean temperatures between 1920 and 1930 with a slow decrease in temperature between 1931 and 1950. With the second line graph of sardine landings, we see a steady increase in sardine landings with the loess line from 1920 to 1940 with a decrease after that year. We can see a better overall trend using the loess line. We can see that as the ocean temperatures increase so does the sardine landings. After the ocean temperatures decrease, we consequently see a decrease in sardine landings.

**Reflection 4**

What do you think, Consultant?

1. What can you say visually about the relationship between the average surface temperatures and the catch in tons?
2. Is the relationship positive or negative? Strong or weak?
3. Think about where you would place the linear regression line on the graph.

**Model Response:** From the graph, we can see that there is variability in sardine landings at various surface temperatures. The relationship between average surface temperatures and sardine landings is a very weak positive relationship. The linear regression line would be relatively flat starting between 50,000 and 10,000 tons.

**Reflection 5**

Does the correlation value align with your visual interpretation of the relationship between the surface temperature and the sardine catch?

**Doesn’t really need a model response because it is a yes/no question**

**Reflection 6**

Consultant, I’m interested in hearing your thoughts about the regression line.

1. How does the linear regression line compare to your estimated regression line?
2. Overall, what does Pearson’s r and the simple linear regression model tells us about surface temperature as a predictor for the sardine catch?

**Model Response:** Think about how your regression lines compare. The Pearson’s correlation value and simple linear regression model tell us that only looking at surface temperature as a predictor of sardine landings doesn’t capture all the variability that we see in the sardine catch during the early to mid-1900’s.

**Reflection 7**

Consultant, what are your thoughts on the line graph using the smoothed data?

1. What can you say visually about the relationship between the smooth surface temperatures data and the smooth catch data?
2. Is the relationship positive or negative? Strong or weak?
3. Think about where you would place the linear regression line on the graph.

**Model Response:** We see that there is probably not a linear relationship surface temperatures and sardine catch data when looking at the smoothed data from the loess line. The relationship looks positive from the scatterplot, but a linear regression line may not be the best model for looking at the relationship between these two variables.

**Thinking of stopping here because looking at the correlation and adding the linear regression to the graph doesn’t seem to make much sense?**