## TARSOG

## Trend

The first comment we need to make is about the trend. There are three statements we need to make about the trend.

* How strong the trend is: weak, moderate, strong (or somewhere in between),
* If the trend is positive or negative (does it go up or down) and
* Is the trend linear (most circumstances we look at – forming a straight line) or non-linear.

**Example** From the graph I can see a strong positive linear relationship.

## Association

Association is about explaining why the relationship is either positive or negative, and it is important to link back to the context.

**Example** I can see that the association is positive because as the engine size of the car increases, the weight of the car also increases.

## Relationship

The statement about the relationship is about justifying the strength of the trend that you can see on your graph. It is important that you are commenting on what you can see. You can use the correlation coefficient (r-value) to back up your strength statement, but it should only be used as a backup… what you can see is the most important.

**Example** The relationship is strong and linear as I can see most the points are fairly close to the trend line. This is confirmed by the correlation coefficient of 0.8451, indicating that the linear relationship is quite strong.

## Scatter

In the scatter section you need to look and see how consistent the scatter is. Are there any areas that are denser or sparser than others?

**Example** The scatter appears to be reasonably consistent throughout the data range with no obvious areas with more points.

## Outliers

In a large number of graphs there will be points that do not follow the trend. These are called outliers. When you identify an outlier you need to find it on the data list and find out as much information about it as you can in order to explain why it might be an outlier.

**Example** There is a possible outlier that has a lower weight than expected. This is the Chevrolet Corvette which has a 5.7 litre engine but only weighs 1533kg. The Chevrolet Corvette is a sports car, so hence doesn’t weigh as much as the other ‘Large’ type vehicles that weigh that much.

## Grouping

Sometimes in graphs you can end up with two groups (or clusters) of data. If this happens you need to comment on it and what might be causing it, otherwise you can comment that there is not any obvious grouping. Again link it to what you can see.

**Example** Looking at the graph I cannot see any obvious groupings.

***Note: to be going for a Merit Grade in this TARSOG section you need to be justifying these features in context. To be going for an Excellence Grade you need to be using research to back up your statements.***

## Interpretation of Regression Line

One of the key bits of information that we get given from iNZight is the equation of the regression line. Interpreting the gradient of this regression line is an important comment to make. It is vital that you realise that this is only giving the **average** increase over the whole graph, and not a fixed amount for every unit.

**Example** The regression line of Weight = 217.97 x Engine\_size + 812.32 means that for every one litre increase in engine size, the weight of the car increases by 217.97 kg on average.

## Predictions

As well as interpreting the regression line we need to use this line to make **at least two** predictions and comment on how reliable you think the predictions are.

In order to do this you need to substitute two different values into the equation. It is normally good to have one that is right inside your data range (interpolation), and one that is outside of the range of data (extrapolation) that you have. It is also vital that you **round the prediction sensibly** (usually the same as the original data for that variable was rounded to)

* Make a prediction inside the data range.

**Example**

*217.97 \* 3 + 812.32 = 1466.23*
Based on my regression line I would predict that a car with a 3 litre engine would weigh approximately 1470kg. I am confident in this prediciton as it is right in the middle of my data range and I have similar values to this result.

* Make a prediction outside the data range.

**Example** Based on my regression line I would predict that a car with a 10 litre engine would weigh approximately 2990kg (217.97\*10 + 812.32). I cannot be confident in this predicion as I do not have any cars to compare it to.

***To be going for a Merit level grade you need to be discussing the confidence in the predictions***

# Conclusion

We now need to make a concluding statement to summarise our report. You need to include a statement around the relationship, and it needs to be linked back to what you are predicting.

**Example** In conclusion I think there is a strong positive relationship between the engine size and weight of cars – the larger the car’s engine is the more that they will weigh, therefore if we know the size of a car’s engine we should be able to predict how heavy the car will be.