**Data Processing**

* Mathematically changing your data in some way to make it more understandable
* Types:
  + Sums
  + Averages/ means
  + Differences
  + Percentages
  + Medians
  + Modes
  + Ratios
  + Frequencies
  + Statistical tests: chi-squared, t-tests, ANOVA, etc

**Data Presentation = graphs**

* Make it easier to see trends and patterns in data and to draw conclusions, especially when using lots of data!
* Types:
  + Bar- used for non-numerical Independent variables
  + Line- generally not used in science, but similar to scatter plots
  + Scatter- used for numerical/ continuous independent variables
  + Pie- percentage of a whole

**Analysis and Evaluation Methods (judging reliability and validity of data/ procedure)**

* Uncertainty: all measurements have an element of uncertainty to them
  + Calculated: (smallest unit value of instrument/ 2) x by the number of judgements made
  + Example: beaker- 25ml between lines, so 25/2= 12.5ml, only one line of judgement so the beakers uncertainty is ±12.5ml
* Linear Regression Lines (for scatter plots
  + On a scatter plot create a best fit line (a line that gives the general trend of the data)
  + With the best fit line comes an R2 value = measurement of how close your line fits your data
    - The closer the number is to 1 the better the fit, and more valid your conclusion
* Standard Deviation (used only when calculated average)
  + Measurement of how close your data is to the mean/ average
  + The greater the variation in your data the more unreliable your data is
  + Can be represented by error bars on a graph

**Data set 1**

Table 1: Amount of distilled water (ml) in the graduated Cylinder

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 | Trial 4 |
| Plastic Bag | 24 | 25 | 25 | 25 |
| Foil | 25 | 25 | 25 | 25 |
| Coffee Filter | 23 | 24 | 25 | 24 |

Table 2: Amount of Salt Water (ml) in the Y beaker

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 | Trial 4 |
| Plastic Bag | 101 | 100 | 100 | 100 |
| Foil | 100 | 100 | 100 | 100 |
| Coffee Filter | 102 | 101 | 100 | 101 |

Table 3: Amount of distilled water (ml) in the graduated Cylinder after 8 days

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 | Trial 4 |
| Plastic Bag | 25 | 24 | 25 | 24 |
| Foil | 25 | 25 | 25.5 | 25 |
| Coffee Filter | 23 | 24 | 23 | 25 |

Table 4: Amount of Salt Water (ml) in the Y beaker after 8 days

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 | Trial 4 |
| Plastic Bag | 100 | 101 | 100 | 101 |
| Foil | 100 | 100 | 99.5 | 100 |
| Coffee Filter | 102 | 101 | 102 | 100 |

**Data Set 2**

|  |  |  |  |
| --- | --- | --- | --- |
| Volume of pineapple juice put into Jell‐O  Solution (+/- 0.05ml) | Time it takes for marble to reach the bottom of the test tube  (Seconds +/- 0.005) | | |
| Trial 1 | Trial 2 | Trial 3 |
| 1 | 0.34 | 0.34 | 0.41 |
| 2 | 0.35 | 0.33 | 0.29 |
| 3 | 0.28 | 0.38 | 0.22 |
| 4 | 0.20 | 0.21 | 0.33 |
| 5 | 0.23 | 0.14 | 0.18 |