

## Year 10 Mathematics

## Statistics Folio

<u>Due Date:</u> 6/08/2018	<u>Method of submission:</u> DayMap	<u>Criteria to be assessed:</u> Criteria A – Knowing and Understanding Criteria C - Communication
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<u>Unit Title:</u> Statistics	<u>Statement of Inquiry:</u> Statistics is a powerful model to develop global perspectives.
<u>Key Concept:</u> <b>Form</b> - Statistics allow us to quantify and create visual representations, and make predictions about the future	

## Task description:

*“Our class has the best memories Year 10 at BHS has ever seen”*

A teacher in the staff room has claimed that their Year 10 Maths class has the best memories of any Year 10 Maths class in the school.

You will attempt to **evaluate** the memory performance of your class using a memory game found on the Maths is fun website.

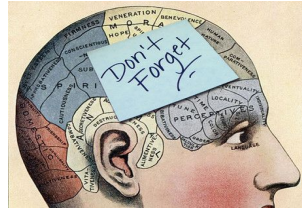
The memory game requires students to complete a concentration exercise. It is a memory game played on the computer, locating matching pairs of images. **PLEASE MAKE SURE YOU SET YOUR GAME AT LEVEL 9**

<https://www.mathsisfun.com/games/memory/index.html>

**Each person in your class needs to record their best 2 completion times for the game.**

The results for your class will be collected and the results for all Year 10 Maths classes will be compiled into one Google Sheet for you to use in your report.

You will be comparing your class's times to another Year 10 class in an attempt to **evaluate** the memory performance of the groups.



## Task: Using your data find the following:

### Part A. Cumulative Frequency

- For each person in your class, record their 2 best memory times in a table. This data can be appended to the back of the report.
- Prepare a cumulative frequency table for your class and another Year 10 Maths class.
- Draw a cumulative frequency curve for each group **on the same set of axes**. Indicate the median for each curve.
- **Discuss** the main features shown on a cumulative frequency curve.
- **Compare** the two cumulative frequency curves for each class and comment on the results.

### Part B. Box Plot

- Prepare a table containing the five number summary (minimum, lower quartile, median, upper quartile, maximum)  
Note that you should use your graphics calculator or google sheets to determine the five number summary.
- Prepare a parallel box plot for the data.
- **Discuss** the features of a box-plot - what information does it display? Using the box plots, briefly **describe** the shape of each data distribution and the features of the graphs that lead you to this description.

### Part C. Outliers

- Determine the existence of any outliers for each class's data by calculating the lower and upper boundaries.

$$\text{Lower boundary} = Q1 - 1.5(I.Q.R.)$$

$$\text{Upper boundary} = Q3 + 1.5(I.Q.R.)$$

- Are there any outliers?  
If so, how do they affect the results?

### Part D. Histograms

- **Construct** a separate histogram for each class. Use the same class intervals for both histograms.
- **Describe** the shape of the distributions. Does this support your descriptions in part B?
- **Discuss** the features of a histogram. How are these features different to the features of a box plot? Are there features that appear on one graph and not the other?  
**Describe** the advantages and disadvantages of each graph type.

### Part E. Analysis and Interpretation

- Prepare a table showing the measures of centre and spread.  
The table should include:  
Mean, median, mode, standard deviation, IQR and range.
- **Describe** and **compare** the memory times for the two groups of students. (Your class vs. another Year 10 class)  
Note that you should refer to the data in the table of centre and spread and your graphs from parts A - D above to support your discussion.
- **Discuss in detail** any limitations and assumptions for this report.
- Comment on whether or not the results support or contradict the conjecture:  
*Our class has the best memories that Blackwood High School has ever seen*

### Presentation

Your work is to be presented as a 'persuasive text' report. Below is an outline of how to structure your report.

<b>Title:</b>	Make sure your report has a title!
<b>Introduction:</b>  What is this report about?	Introduce the task you are responding to in a paragraph: <ul style="list-style-type: none"> <li>• Use a topic sentence</li> <li>• <b>Elaborate</b> on the topic sentence in terms of a Maths problem or a conjecture. What argument are you going to make?</li> <li>• What type of mathematics will be used to solve the problem or prove the conjecture? How are you going to persuade people?</li> <li>• Briefly <b>describe</b> how the data will be obtained</li> </ul>
<b>Body of report:</b>  Parts A-E  Answer each question, using sentences and suitable mathematical notation	When answering the questions that have been asked, consider the following:  Make sure a person reading your work could understand your answers without needing to look at your instruction sheet.  Ensure you have addressed all the dot points in Parts A – E. When <b>discussing</b> and <b>analysing</b> your data make sure you refer to your graphs and statistics table. Use the results to provide evidence to back up your statements.

<b>Conclusion:</b>  What have you learnt?	Write a concluding paragraph: <ul style="list-style-type: none"> <li>• Create a topic sentence that explains what you have learnt about comparing the two sets of data.</li> <li>• Do your results support or contradict the conjecture?</li> </ul>
<b>Appendix:</b>	Attach the raw data that was used for your class and another Year 10 class.

## Assessment Criteria

### Criteria A – Knowing and Understanding

	Level descriptors
7-8	The student is able to: <ol style="list-style-type: none"> <li><b>select</b> appropriate mathematics when solving challenging problems in both familiar and unfamiliar situations</li> <li><b>apply</b> the selected mathematics successfully when solving these problems</li> <li>generally <b>solve</b> these problems correctly.</li> </ol>

### Criteria C – Communicating

	Level descriptors
7-8	The student is able to: <ol style="list-style-type: none"> <li>consistently <b>use</b> appropriate mathematical language</li> <li><b>use</b> appropriate forms of mathematical representation to consistently present information correctly</li> <li>move effectively between different forms of mathematical representation</li> <li><b>communicate</b> through lines of reasoning that are complete, coherent and concise</li> <li><b>present</b> work that is consistently organized using a logical structure.</li> </ol>