

### KS3 Rationale

- ✓ No wasted lessons recapping/ basic low- level skill.
- ✓ Assume levels on entry are correct and build on prior knowledge and attainment allowing students to continue to make rapid progress.
- ✓ DO NOWs consolidate previous skills taught and are recapped using the memory model.
- ✓ Topics follow a logical progression and are woven into a cumulative curriculum where skills are built up throughout the year.
- ✓ The structure of each lesson allows students to access problem solving and reasoning.
- ✓ Planned cultural capital: Using Mathematical skills in real life contexts linked to careers and problem solving. Topics: Number, working with units and volume and surface area.
- ✓ Topics build on year on year. Year 7 content builds from KS2, Year 8 content builds on from Year 7 and Year 9 builds on from Year 8.
- ✓ In KS3, students will be introduced to terminology they may or may not have seen before which is required in the Statistics GCSE such as data, variable and sample.
- ✓ Students will be introduced to both mathematical and statistical notation which is used both in formulae and interpretation for the Statistics GCSE
- ✓ Students will be given the opportunity to criticise data in KS3, which becomes a core skill during their Statistics GCSE.

## Statistics Curriculum: 2 Year plan

<b>Year 10</b>	Collecting data Planning an investigation Evaluating data Formulating Hypotheses Issues with data	Representing data Analysing data Comparing distributions Shapes of data Standard deviation Outliers	Correlation Bimodal data Spearman's Rank CC Product moment CC Time Series Statistical Investigation
<b>Year 11</b>	Risk and Sample space Probability Index Numbers Normal and Binomial Distribution Standardisation and QC	Random Response Method PMCC Regression Lines RESPONSE	RESPONSE EXAM FLUENCY

### Year 10 Rationale:

- ✓ DO NOW tasks in LP1 of Year 10 will focus on key skills which are expected of them as stated in the prerequisite knowledge section of the Statistics GCSE.
- ✓ The Year 10 curriculum follows the statistical planning cycle in chronological order, starting with the collection of data and reaching the evaluating data phase of the cycle.
- ✓ The curriculum is structured in a way that any content which is assessed in the examination is not assumed as secure knowledge. Topics such as Pictograms although taught in Year 9, will be given sufficient time to be taught as part of a coherent curriculum.
- ✓ Independent practice which students will complete in lesson are questions which have been endorsed by Edexcel, therefore will be best suited to prepare students for their examination.
- ✓ Students will be given the opportunity to meet as many Assessment Objectives 1,2 and 3 as possible by giving them the opportunity to evaluate and critique data collection.
- ✓ All students will be following an ambitious and rigorous curriculum in which all students will be following the Higher pathway from year 10. Students will be taught all foundation and higher content which is assessed in the examinations.
- ✓ Students will be directed to a specific pathway at the end of Year 11 depending on their EOY result.

### Year 11 Rationale:

- ✓ DO NOW tasks in LP1 of Year 11 will recap key skills and core content from LP3 of Yr10.
- ✓ The Year 11 curriculum follows the statistical planning cycle in chronological order. It will pick up directly from the end of Year 10 until the end of the cycle.
- ✓ The curriculum is structured in a way that any content which is assessed in the examination is not assumed as secure knowledge. Topics such as Pictograms although taught in Year 9, will be given sufficient time to be taught as part of a coherent curriculum.
- ✓ Independent practice which students will complete in lesson are questions which have been endorsed by Edexcel, therefore will be best suited to prepare students for their examination.
- ✓ Students will be given the opportunity to meet as many Assessment Objectives 1,2 and 3 as possible by giving them the opportunity to evaluate and critique data collection.
- ✓ All students will be following an ambitious and rigorous curriculum in which all students will be following the Higher pathway from year 10. Students will be taught all foundation and higher content which is assessed in the examinations.
- ✓ Students who are following the higher pathway, will continue the intended the curriculum. Those who follow the foundation pathway (if applicable) will complete their curriculum followed by a revisit of key topics.

### Long term Memory/ Retrieval of Knowledge:

- ✓ All DO NOWs are linked to core skills and include topics from previous lessons. This is long term recall and is linked to the memory model and the science of learning.
- ✓ Low- stakes testing is used to check student understanding and address misconceptions.
- ✓ Teachers use targeted questioning to checking understanding.
- ✓ Progress pit stops allow for retrieval of knowledge and teachers use this technique to collect data based on the needs of their class.
- ✓ Responsive teaching is used as immediate intervention and teachers provide

### Pedagogy within the Classroom:

- ✓ Clear instructions given to reduce cognitive overload.
- ✓ Use of 'I,WE,YOU' modelling to break down skill and create resilient and independent learners.
- ✓ Regular, low-stakes testing used to create strong bonds with the long-term memory.
- ✓ Provide every opportunity for students to engage in purposeful discussion and develop their use of Statistical and Mathematical vocabulary.
- ✓ Provide links to students' past learning, across faculties and in the outside wider world allowing students to have a broader understanding of the subject.

# Statistics lessons at The Birkenhead Park School

## DO NOW Retrieval.

NO NOW retrieves previous skills and focus' on core content. Students complete this on their MWB. The Learning Objective is displayed and referenced. Key words are displayed and referenced.

## Discovering new concepts.

In order to involve a Maths Mastery approach, well designed discover tasks allow students to unpick new mathematical concepts linked to their learning objective. High quality questioning and student involvement allows new learning to be interactive. Concrete, Pictorial and Abstract models are used when needed. (This does not apply to all lessons)

## Teacher exposition: modelling a worked example. (I, WE)

New concepts and skills are modelled by the teacher using 'I, We, You'. 'I' is clear and modelled in steps using specific mathematical vocabulary. This example MUST be written in books by students with a red border and include any key steps, vocabulary or misconceptions where appropriate (NO PRINTED SHEETS)

'We' is another example which includes less teacher input and more student input using key vocabulary. It will include pre-planned questioning and will address misconceptions where appropriate. 'We' does not always need to be written in books but clear classroom discussion must be evident.

## Progress Pit Stops (YOU)

Progress pit stop and Hinge questions are used during stages of new learning to check understanding. These are completed on their MWB and shown to the teacher. These low stakes questions allow for collection of key data and responsive teaching will follow.

## Responsive Teaching (Practice questions)

Students must be given opportunities to practice the skill if they are not secure in the progress pit stop. It allows for immediate intervention. Here the teacher will circulate and provide personalised verbal feedback.

## Deliberate Practice: My Questions

Students can practice the modelled skill at Red, Amber and Green level which allows for differentiation. New learning can also be done through group tasks where students problem solve and work together. Students are always encouraged to be ambitious.

Work is marked through self-assessment or peer assessment (red pen- faculty approach). Teacher checks understanding during these tasks and will intervene quickly to deal with any misconceptions or gaps in knowledge.

**Challenge Questions/ Purple Problems/ Group Tasks.** If students have secured their skill they can be given a 'PS', 'FS' or 'MR' to stretch and deeper their understanding. Challenge questions link to other areas of Mathematics and are framed using GCSE Language and Terminology. These can be in the form of purple problems or group tasks.

**Think tasks and Questioning.** These are used during the lesson to promote deeper level thinking skills linked to Bloom's Taxonomy.

**Enrichment Tasks.** These tasks are given regularly to students (typically during the DO NOW response lesson) and are designed to consolidate, stretch and challenge and enrich students' capital culture of Mathematics. These may be in the form of investigations, codebreakers, treasure hunts, Murder Mysteries or exploring different careers. They could also include exam questions in problem solving contexts. Students will develop their knowledge of the 'Word of the Week' during this time and also check their 'COPS'.

**Plenary techniques.** A range of techniques can be such as 'Exit tickets', '3, 2, 1', WWW EBI and 'Tweets' are used to check student understanding and contribute to low stakes testing where applicable.

Year 8 DO NOW Week 34

Divide Decimals:  $375.2 \div 8 = 46.9$ ,  $18.26 \div 2 = 9.13$ ,  $7.38 \div 2 = 3.69$ ,  $78.4 \div 8 = 9.8$

Algebraic Equations: Find the 5th term given  $a^2 \text{ term} = 4x + 1$  (37), Find the 5th term given  $a^2 \text{ term} = 2x + 4$  (10)

Percentages: 0.2 as a percentage (20%), 0.4 as a fraction (1/2), 0.3 as a fraction (3/10), 0.1 as a percent (10%)

Speed: A car travels 100 km in 10 km/h, An object travels 600 m in 20 m/s

Rounding: Round 900 to nearest 10 (900), Round 900 to nearest 100 (900), Round 4500 to nearest 1000 (4000), Round 4500 to nearest 10000 (40000)

Discussion

What is Quantitative data? Quantitative data is data which takes a numerical (number) form. For example:

- Heights - 125cm, 155cm, 133cm
- Time - 32s, 15s, 23s
- Force - 20N, 32N, 50N

I do: Worked Example

Write down the word 'Qualitative' or 'Quantitative' next to each of the following variables:

- Colour of a highlighter
- Mass of a piece of paper
- Someone's age in years
- Name of favourite pet
- How many pairs of shoes someone owns

We do: Worked Example

Allison wants to compare the number of pets people own who live in the Wirral compared to people who do not.

Write down the two pieces of information she will have to collect and whether they are Quantitative or Qualitative.

You do: Progress Pit stop

a) Ellis says that he could ask his friend what his eye colour is. Circle the word below which describes what type of data this is.

Quantitative data      Qualitative data

b) Write down 2 pieces of Quantitative data he could collect from his friend.

I don't understand      I nearly understand      I fully understand

1. Write down the definition of the term 'Quantitative data'

2. Write down the definition of the term 'Qualitative data'

3. Which of these are qualitative data and which are quantitative data?

A. Number of pets      Qualitative  
B. Height      Quantitative  
C. Make of car      Qualitative

1. Write down a piece of quantitative data which could be collected about a house.

2. Write down a piece of qualitative data which could be collected about a car.

3. Write down a piece of qualitative and quantitative data which could be collected about a person.

4. The words to compare the number of people who read their maths exam who failed compared to those who did not. Write down two pieces of data she needs to collect, and state whether it is quantitative or qualitative.

1. Data which takes a numerical form.

2. Data which takes a non-numerical form.

3. Which of these are quantitative data and which are qualitative data?

A. Number of pets      Quantitative  
B. Height      Quantitative  
C. Make of car      Qualitative

1. E.g. Price, Number of rooms, number of walls etc.

2. Colour, brand of car, Manual or Automatic?, brand of tyres etc.

3. Qualitative - Hair colour, Eye Colour, Colour of Clothes, Favourite things etc. Quantitative - Age, Height, Weight, etc.

Qualitative - Did they revise? Yes or no  
Quantitative - Number of marks 25, 57  
Qualitative - Salary/Wage - £

Useful Summary

Data

- Qualitative: "Statistics is so much fun!"
- Quantitative:
  - discrete: 3
  - continuous: 2.71828

### Build-up of Skills:

- ✓ The skills identified for success at GCSE is outlined and planned backwards from Year 11- 7.
- ✓ These skills are built upon each year from year 7.
- ✓ They are age appropriate for each Year group and allow students to fully access assessments and low stakes testing.
- ✓ The language is similar to allow students to become familiar and build up a layer of skills each year- to review and refine these at regular intervals to become independent and resilient learners.

### Assessment:

- ✓ Assessment takes place regularly. 'LSQ end of topic quiz' are used to allow teachers to test student performance but are clear this does not show 'learning' from the long -term memory.
- ✓ Full year assessments are completed at the end of each LP and are planned to test current and prior knowledge.
- ✓ Assessment QLA is used to address student's misconceptions and re-test rather than re-teach.
- ✓ Topic Response lessons following low stakes tests are built into the curriculum to allow students to plug gaps in their knowledge.