



Teaching New GCSE Maths Specifications Number, Probability & Statistics

Participant Handbook

Teaching New GCSE Maths Specifications: Number, Probability & Statistics

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Introduction and aims for the day

Welcome to the 'Teaching new GCSE Maths specifications - Number, Probability and Statistics' day.

Aims of the programme

The highly successful Maths Enhancement Programme set a new standard in the training of Maths teachers in the Post 16 Sector in England. This subsequent set of three single days aims to use the same principles to provide development for teachers of Foundation Level GCSE, particularly those who have only to date taught Functional Skills.

However, there is debate and development to be had for all participants in each of the three days which we hope will result in confident and capable deliverers of the [new GCSE subject content & assessment objectives for teaching from 2015](#).

Aims for Number, Probability & Statistics day

- For participants to identify innovative and activity based ways of working with Post 16 learners.
- To begin to self-assess and reflect on personal Maths skills.
- To consider the factors that might engage Post 16 learners with Maths and develop their enthusiasm for the subject.
- To develop connections between different topics in maths, and between maths and everyday situations.
- To discuss and debate new style examination questions in the field of number, probability and statistics

Making the most of this handbook

One day courses are renowned for inspiring and enthusing teachers but this can only have a long term effect if you develop plans to change your practice that are sustainable. This handbook gives you the opportunity to consider the activities you experience and after each one to make notes on what changes you can make to your practice that will engage your own learners.

Don't be afraid to criticise the activities if you feel that is necessary. However, analyse your thoughts and go away with notes on how you will use the materials differently to best effect for the benefit of your own learners.

Create your action plan and then implement it!!

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Starter activity: Would you rather have ...

Aims:

- To engage delegates on arrival
- To start delegates thinking!

Activity:

- Look at the slide displayed on arrival.
- Consider your answer, the information required and how you would solve the problem.
- Look up any relevant information you wish.

If you finish this task, can you think of any other “would you rather have ...” questions?

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Session 1: Fractions and decimals

Aims:

To help:

- Interpret decimals and fractions.
- Reflect and discuss approaches to equivalence and operations.

Resources:

Adapted from: *NCETM Thinking Through Mathematics*

Activity:

- The first part of the session uses a card matching exercise looking at equivalence.
- Following this, you are asked to work through the slides considering operations.

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 2: Percentages

Aims:

To help:

- Make links between percentages, decimals and fractions.
- Represent percentage increase and decrease as multiplication.
- Recognise the inverse relationship between increases and decreases.

Resources:

Adapted from: *Improving Learning in Mathematics N7*

Activity:

- In this session you will make connections between set values using percentage increases and decreases.
- Make sure that you explain your reasoning to others in your group, and challenge your peers.
- Continuing on to make those connections with words, decimals and fractions

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 3: Evaluating statements

Aims:

To help:

- Understand the properties of number operations.
- Substitute integers, fractions, decimals and negative numbers into statements and equations in order to test their validity.
- Address common misconceptions about the effect of addition, subtraction, multiplication, division, squaring and finding square roots.

Resources:

Adapted from: *Improving Learning in Mathematics* N2

Activity:

- In this session you will be asked to evaluate statements regarding number operations.
- Following through the statements one by one on slides, you will be asked to decide between a range of possible answers and give reasoning for your choice.

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 4: Tackling examination questions

Aims:

To help delegates to:

- Understand some of the general changes within the new specification.
- Examine the difficulties that this presents to students.
- Investigate ways of supporting students with these changes.

Resources:

All questions taken from new specimen papers - foundation tier.

Activity:

- Initially, you are asked to consider a question from a new foundation specimen paper adding input to the discussion from both the teachers and students perspective.
- Then you are asked work in groups to break down the question using ordered reasoning.
- The main activity will then involve a carousel of activities (within your small groups) including producing your own ordered reasoning cards.
- Finally, groups will check each others responses.

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 5: Four 4's problem

Aims:

To help:

- Gain an understanding of knowledge of operations.
- Provide alternate strategies to practicing basic number operations.

Activity:

- This is a short activity that may be continued over the lunch period.
- It will involve seeing how inventive you can be in manipulating number operations!

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 6: Probability

Aims:

To help:

- Consider the use of games within learning.
- Use past examination papers creatively .
- Analyse the demands made by examination questions.
- Discuss and clarify some common misconceptions about probability.

Resources:

Adapted from: Bowland Assessment tasks and *Improving Learning in Mathematics S7*

Activity:

- Initially you will play a simple number game to encourage you to think about the role of games and how they can be used.
- Then you will consider an examination question based around a game before progressing to the main activity.
- The main activity will involve you developing an examination question around a specific template.
- Finally through a further game and evaluative statements you will consider the misconceptions some students may have around the topic of probability.

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

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Session 7: Statistics

Aims:

To help:

- To assess knowledge and understanding of data representation diagrams.
- Understand and interpret bar charts and pie charts (inc. box and whisker plots extension).
- To gain a clearer understanding of statistics such as Mean/Mode/Median.

Resources:

Adapted from: *Improving Learning in Mathematics S5*

Activity:

- This session starts by asking you to produce a range of sketches depicting data representation diagrams that you are aware of.
- Then you will be asked to complete a card matching exercise involving bar charts and pie charts and look at a question showing comparative bar charts.
- You will need to consider the strategies you used and how students might view these exercises.
- Finally finishing with an activity that uses mean, mode and median to solve a two way table problem.

Individual Review:

What did you learn from the activity?

What was it about the activity that helped you learn?

Does the activity differentiate to meet the needs of a range of learners?

How might you adapt the activity with your learners?

Teaching New GCSE Maths Specifications: Number, Probability & Statistics

Glossary of terms used in GCSE Number, Probability & Statistics:

Equivalent	Equal in value
Event	Possible outcome
Integers	A whole number.
Operations	Processes in which a number, quantity, expression etc. is altered or manipulated according to set formal rules such as; addition, multiplication etc.
Outcome	An outcome is a possible result of a single trial in an experiment.
Median	Is the middle value in an ordered set of data
Mean	Is the arithmetic average
Mode	Is the most frequently occurring value
Multiple	A number that contains another number an integral number of times without any remainder
Mutually exclusive	Two events are mutually exclusive if they cannot both occur
Product	The result of multiplying values or expressions
Statistic	A value that can be calculated from a set of data

Useful websites to consider:

<https://www.mathsisfun.com/definitions/>