



# YEAR 12 Core Maths

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning – Normal Distribution Unit

### Curriculum Intent

### Skills/Assessment Objective Links

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	Content	Additional information
S1.1	knowledge that this is a symmetrical distribution and that the area underneath the normal 'bell' shaped curve represents probability	knowledge that approximately $\frac{2}{3}$ of observations lie within 1 standard deviation of the mean and that approximately 95% of observations lie within 2 standard deviations of the mean
S2.1	use of the notation $N(\mu, \sigma^2)$ to describe a normal distribution in terms of mean and standard deviation	use of the notation $N(0, 1)$ for the standardised normal distribution with mean = 0 and standard deviation = 1
S3.1	using a calculator or tables to find probabilities for normally distributed data with known mean and standard deviation	the finding of an unknown mean or standard deviation by making use of percentage points will not be required

### Prior Knowledge

#### 1. Understanding Averages and Spread

Students should be familiar with:

Mean, median, and mode

Range and an intuitive understanding of spread

Basic understanding of standard deviation (even if not deeply applied at GCSE)

#### 2. Interpreting Graphs and Data

Reading and interpreting:

Histograms, frequency polygons, box plots

Bell-shaped curves and symmetric data

#### 3. Basic Probability

Understanding:

Probability between 0 and 1

Simple probability from frequency tables or data

Interpreting results in context

#### 4. Calculator Skills

Using a scientific calculator (or Classwiz-type) for:

Normal cumulative distribution functions (e.g. normalcdf or invNorm)

Reading and interpreting calculator output

#### 5. Z-scores and Standardisation (optional/intro level)

Some familiarity with:

Converting data into standard units (z-scores)

Interpreting how far a value is from the mean

### Spiritual, moral, social, and

Spiritual - Encourages awe in natural order and patterns in data

<b>cultural development</b>	<p>Moral - Highlights ethical concerns in how statistical norms are used or misused</p> <p>Social- Explores implications of "average" and "outlier" status in society</p> <p>Cultural - Promotes awareness of how norms and expectations differ across cultures</p>
<b>Numeracy</b>	<p>Averages and spread - Mean and standard deviation define the distribution</p> <p>Graph interpretation - Understanding the bell curve and area as probability</p> <p>Probability - Estimating probabilities based on standardised values</p> <p>Formula use - Applying z-score formula for standardisation</p> <p>Reasoning and interpretation - Drawing conclusions from contextualised data</p> <p>Calculator/technology skills - Using normalcdf or tables to find probabilities</p>
<b>Literacy</b>	<p>Mathematical vocabulary - Using precise terms like mean, standard deviation, z-score</p> <p>Reading comprehension - Understanding reports, graphs, and calculator outputs</p> <p>Written explanations - Justifying conclusions based on statistical reasoning</p> <p>Critical evaluation - Discussing model assumptions and limitations</p> <p>Verbal communication - Explaining data findings clearly in discussion or presentation</p>
<b>Becoming future ready</b>	<p>Data interpretation- Make informed decisions</p> <p>Statistical reasoning - Avoid misinformation</p> <p>Application to careers - Relevance across industries</p> <p>Problem solving - Practical and logical thinking</p> <p>Digital fluency - Foundation for AI and analytics</p>
<b>Adaptation QFT/SEND Provision</b>	<ul style="list-style-type: none"> <li>• By progressive questioning: exploring pupils' understanding through interactive dialogue.</li> <li>• By outcome: different learners will produce different outcomes.</li> <li>• By resource: worksheets are clearly presented and accessible.</li> <li>• By intervention: by providing different levels of supervision and support.</li> <li>• By grouping/setting: according to prior attainment, gender, social preference, preferred learning style.</li> <li>• By offering optional activities: In class or as homework, to extend learning.</li> </ul>
<b>Implementation Curriculum Delivery Learning Outcomes (Knowledge)</b>	<p>1. Understand the Characteristics of a Normal Distribution          Know the shape (symmetrical, bell curve).          Recognize the importance of the mean (<math>\mu</math>) and standard deviation (<math>\sigma</math>) in defining the distribution.          Know that about 68%, 95%, and 99.7% of values lie within 1, 2, and 3 standard deviations of the mean (Empirical Rule).</p> <p>2. Use Z-Scores (Standardized Scores)          Calculate z-scores using the formula:          Interpret what a z-score tells you about how unusual a data point is.          Use z-scores to compare values from different distributions.</p> <p>3. Find Probabilities from the Normal Distribution</p>

	<p>Use z-tables (or calculator functions) to find probabilities associated with specific z-scores. Solve problems involving percentages and probabilities under the normal curve.</p> <p>4. Apply the Normal Distribution to Real-World Contexts Model real-life scenarios (e.g., exam scores, product lifespans, heights). Interpret and solve problems using the normal distribution in contextual situations (a key focus of Core Maths).</p> <p>5. Understand the Limitations of the Normal Model Recognize when the normal distribution is an appropriate model. Identify situations where the distribution may not apply (e.g., skewed data or categorical variables)</p>
<b>Assessment</b>	<b>Refer to Assessment Map – Final examination May/June End of Year 12</b>
<b>Impact</b>	Attainment and Progress – Refer to assessment results / data review documentation.