

LEVEL 3 CERTIFICATE IN QUANTITATIVE REASONING (MEI)

Introduction to Quantitative Reasoning	
Content	Cross – curricular link
Risk	Understanding risk is important in business, science and in careers which involve looking after other people such as teaching and health.
Percentages	A good understanding of percentages is important for everyday life, understanding the news and in business, science and social science.
Interpretation of data	The collection and interpretation of data is important in science, social science, geography and is also used in many careers, in politics, business and in understanding the news. The ability to spot errors and rogue figures is part of the CBI's definition of functional numeracy.
Estimation	Estimation is included in the requirements for biology, chemistry, psychology, geography, geology and environmental science A levels. The ability to spot errors is included in the CBI's definition of functional numeracy.
Foreign exchange	Nearly all students will go abroad at some time and need to be able to decide where to change their money and to calculate rough equivalent prices in pounds when shopping abroad.
Graphs and gradients	Interpreting graphs is important in science, business, economics, geography, psychology and social science; it is also important for future life and work – graphs are used in magazines and reports.
Appreciation and depreciation	Ideas of appreciation and depreciation are important when thinking about investments (including pension funds), the value of cars, houses and other major purchases including those made by businesses.
Standard form	Standard form is used in science to write very large or small numbers; it is also called scientific notation.
Measures and scaling	Some students will need to interpret scale drawings and photographs as part of future work and study but most students will use online or paper maps when planning a journey or researching a place they intend to visit. Relationships between lengths, areas, weights and volumes of similar figures are especially important in biology but also in manufacturing when considering how to scale up a container to a larger size.
Exponentials and logarithmic scales	Exponential growth is used as a model for population growth and so has applications in all the social sciences as well as business, economics and science. Exponential decay is important in business when modelling depreciation and also in science for radioactive decay. Radioactive decay is important in carbon dating in archaeology and also in considering issues to do with nuclear power so a basic understanding of it is important for all citizens. Examples of logarithmic scales are pH in chemistry, decibels and the Richter scale for earthquakes. Logarithmic scales are sometimes used in graphs showing economic data to make the scale more manageable.
Modelling	Modelling is intrinsic to the use of mathematics in real life situations, especially in science and economics. Due to the easy availability of computers, mathematical models are used to predict how an epidemic might unfold, the possible effects of climate change and the long term effects of national economic strategy. It is helpful for every informed citizen to have a general understanding of mathematical modelling.



LEVEL 3 CERTIFICATE IN *QUANTITATIVE REASONING (MEI)*

Introduction to Quantitative Reasoning

Content	Cross – curricular link
The Normal distribution	The Normal distribution is used as a model in biology and psychology; related distributions are used in economics.
Statistical problem solving	These skills are essential for anyone who is likely to use statistics in science, business or social science and is also a useful insight for all informed citizens to ensure that they have an insight into the power and limitations of statistical enquiry.
Probability	An understanding of conditional probability is important in both medicine and law so this section is especially relevant to students who intend to work in health, law and social work as well as for sport and for every citizen who may have to interpret medical or legal information one day either as a patient or on a jury.
Financial problem solving	Financial situations are arising in either business or in personal life.



LEVEL 3 CERTIFICATE IN QUANTITATIVE REASONING (MEI)

Critical Maths	
Content	Cross – curricular link
Fermi estimates	The skills developed in this section are highly valued in industry or further study because they enable students to develop a sense of whether the answer to a calculation is about right and enable them to get a rough answer with little time spent.
Use and abuse of percentages	Percentages are often used in the news, not always correctly – students should be encouraged to look out for examples of the use of percentages and to explain what the numbers are saying in simple terms – this is a useful skill for life, work and study.
Medical Screening	An understanding of conditional probability is important in both medicine and law so this section is especially relevant to students who intend to work in health, law and social work as well as for sport and for every citizen who may have to interpret medical or legal information one day either as a patient or on a jury.
Valid arguments	The material in this section is relevant for careers in journalism and politics as well as for informed citizenship.
Product prices	This section connects to further study and careers in business.
Business and risk.	This section illustrates how insurance companies, banks, services, agriculture and the manufacturing industry all make key decisions based on what they predict is going to happen in a given market. In some businesses, an understanding of probability, in particular risk and expectation, linked to an ability to gather and evaluate data, is crucial.
Population sampling	Ideas of sampling are important in many social sciences and in medicine; it is helpful for students to understand that such decisions are made on the basis of probability.
Regression to the mean	An understanding of regression to the mean is helpful when considering the kinds of strategies for improvement and comparison which are used in most areas of work.
Scams	Being able to evaluate offers and opportunities and avoid being taken in is an important skill for future life.
Voting and decision making systems	Decision making systems such as the ones considered in this section are used for competitions and in sport as well as in politics so the thinking that students do in this section is relevant to a variety of careers and interests.
Making decisions with risk	This section is connected to psychology, business and economics.
Randomised Controlled Trial, sampling and bias	Randomised controlled trials are used in medicine to decide whether a proposed new medical treatment is effective. They have also been used by charities trying to decide how best to help people and in education. Understanding how randomised controlled trials work is becoming increasingly important for informed decision making as a citizen as well as for careers in medicine and research.
Approximately Normal	Many students going on to further study in science or social science will encounter the Normal distribution so it is helpful for them to understand that it can occur approximately in many contexts. The “bell-shaped curve” is sometimes referred to in the news so a general understanding of places where the Normal distribution can occur is also useful for the informed citizen.

