

KS3 STAGE 9, NUMBER, MATHS

| Rationale and Context of Unit: | Core curriculum content: | Tier 2 & Tier 3 vocabulary explicitly taught: |
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| <p>Prior key stage 2 content reviewed using pre-tests and whiteboard work at the start of each topic.</p> <p>Calculating</p> <ul style="list-style-type: none"> • Know the meaning of powers • Know the meaning of roots • Know the multiplication and division laws of indices • Understand and use standard form to write numbers • Round to a given number of decimal places or significant figures <p>Know the meaning of the symbols $<$, $>$, \leq, \geq</p> | <p>Calculating</p> <ul style="list-style-type: none"> • <u>Powers and Roots</u> • You will learn to calculate with powers and roots • Calculate with positive indices (roots) using written methods • Use a calculator to evaluate numerical expressions involving powers (roots) • <u>Standard form</u> • You will explore the use of standard form • Interpret a number written in standard form • Calculate with negative indices in the context of standard form • Add (subtract) numbers written in standard form • Multiply (divide) numbers written in standard form • Convert a 'near miss' into standard form; e.g. 23×10^7 • Enter a calculation written in standard form into a scientific calculator | <p>Power, Root, Index, Indices, Standard form, Inequality, Truncate, Round, Minimum, Maximum, Interval, Decimal place, Significant figure.</p> <p>Highlighted words MUST be explicitly taught, defined and recorded in student books as they are first met. Other listed words may be introduced verbally or written in a similar format.</p> |

| | <ul style="list-style-type: none"> • Interpret the standard form display of a scientific calculator • Accuracy • You will explore the effects of rounding • Understand the difference between truncating and rounding • Identify the minimum and maximum values of an amount that has been rounded (to nearest x, x d.p., x s.f.) • Use inequalities to describe the range of values for a rounded value • Solve problems involving the maximum and minimum values of an amount that has been rounded | |
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| Challenge and Support: | World wide learning/ links to 21 st century: | Cultural capital/ Industry/ Enrichment: |
| <ul style="list-style-type: none"> • Kenny thinks this number is written in standard form: 23×10^7. Do you agree with Kenny? Explain your answer. • When a number 'x' is rounded to 2 significant figures the result is 70. Jenny writes '$65 < x < 75$'. What is wrong with Jenny's statement? How would you correct it? • Convince me that $4.5 \times 10^7 \times 3 \times 10^5 = 1.35 \times 10^{13}$ | <p>The study of stars, moons and planets involves huge numbers. Astronomers use standard form to write very large quantities. This makes it easier for them to compare the quantities and it allows them to calculate with and without calculators. The sun has a mass of 1.988×10^{30}kg. This is a number with 27 zeros and it would be clumsy and impractical to have to write it out each time you wanted to use it.</p> | <p>NRICH website – access current articles and enrichment activities. Search tool: secondary, age 11-14, Number https://nrich.maths.org/public/topic.php?group_id=10</p> <ul style="list-style-type: none"> • NRICH provides thousands of free online mathematics resources for ages 3 to 18 - completely free and available to all via their website (nrich.maths.org/). These resources aim to: <ul style="list-style-type: none"> ○ Enrich and enhance the experience of the mathematics curriculum for all learners |

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| | | <ul style="list-style-type: none"> ○ Develop mathematical thinking and problem-solving skills ○ Offer challenging, inspiring and engaging activities ● Decades Day – Runaround game (1980s). |
| Historical, Social, Moral, Spiritual, Cultural context: | Cross curricular links/ literacy/numeracy: | Common misconceptions: |
| <ul style="list-style-type: none"> • Students conducting an opinion survey on a moral issue. • Students having an awareness of sexist or racist, stereotypical bias in materials - e.g. for worksheets to include female builders, male secretaries etc. • Awareness of possible causes of bias in data collection (e.g. race, age, gender). • Students investigating different number sequences and where they occur in the real world. • Students considering the development of pattern in different cultures. • Students developing an understanding of Maths in nature; the golden ratio and Fibonacci patterns. • Students developing awe and wonderment in the size of the universe and looking at cells and inner space (powers of 10). • Allowing discussion and debate on the use and abuse of statistics in the media. • Allowing discussion on the cultural and historical roots of Mathematics e.g. ancient | <ul style="list-style-type: none"> • It is important that students understand accepted ways to represent numbers dependent on the context. For example, we use fractions, decimals and percentages daily, and each form has its benefits for a given use. But students also need to be able to work with indices, standard form, rounded values, etc, and they need to understand the limitations of these. Which format is chosen should follow common conventions such as those in the sciences, design and technology, and so on. | <ul style="list-style-type: none"> • Many pupils believe that 1 is a prime number – a misconception which can arise if the definition is taken as ‘a number which is divisible by itself and 1’ • Some pupils may think $35\ 934 = 36$ to two significant figures • When converting between ordinary and standard form some pupils may incorrectly connect the power to the number of zeros; e.g. $4 \times 10^5 = 400\ 000$ so $4.2 \times 10^5 = 4\ 200\ 000$ • Similarly, when working with small numbers (negative powers of 10) some pupils may think that the power indicates how many zeros should be placed between the decimal point and the first non-zero digit |

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| <p>civilizations such as the Egyptians and Greeks.</p> <ul style="list-style-type: none"> • Students learning how mathematics is relevant in industry and future careers. • Students learning how key areas of Maths are used in running a household and developing personal financial independence. • Probability, gambling and the online gaming industry promoting moral debate. • Interest rates, pay day loans and the banking industry promoting moral debate and a sense of personal financial responsibility. • Students to have the ability to use exchange rates for foreign travel. | | |
| <p>Assessment timeline:</p> | | |
| <ul style="list-style-type: none"> • Topic test assessments (BAM tests) are conducted at the end of each topic. These are roughly after 2 weeks per topic, but this may vary. • Pre-checks are conducted at the start of the topic to test student prior knowledge. This informs lesson planning and delivery. • Tracking assessments are conducted once a term with end of year formal exams, for reporting and checking cumulative knowledge. • Testing data leads to discussions about setting, intervention groups and individual in-class intervention. • All students have access to a wide range of resources to develop their understanding. | | |
| <p>Home learning</p> | | |
| <ul style="list-style-type: none"> • Homework is set weekly for each group. This will often be via interactive websites with immediate feedback and support. • Teachers have the autonomy to use whichever resource they wish within the criteria set for the topic. • Students have access to lots of resources at home, including: Kerboodle, MyMaths, Mathswatch, PiXL Maths APP, PiXL Times Table App. | | |
| <p>Feedback</p> | | |
| <ul style="list-style-type: none"> • Feedback is given after each topic test, tracking assessment and end of year exams. After tracking and end of year exams, this will include “Formative Marking” sheets which give feedback question by question to help support the students with priorities for further work. | | |

Length of unit (duration indicated in lessons)

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| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| Unit: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |