

Maths Policy

Inspire - Impact - Independence

OAKWOOD ACADEMY MISSION STATEMENT

"Promoting learning excellence - Inclusion beyond the barriers".

Moral Purpose

"We are united in the belief that together we can inspire all learners to dream, persevere and achieve so that we can change lives for the better, now and for future generations to come"

Policy developed by:	J McQueen
Policy to be reviewed:	Summer 2024
Summary of changes	• changes to the curriculum content

Aims of Teaching and Learning at Oakwood; Inspire - Impact - Independence

The aim of Teaching and Learning at Oakwood is to provide high quality education which inspires, has a positive impact on all young people and results in fostering independence, preparing them for the future.



Policy Development (How)

This policy has been developed through:

- Review of Maths Policy in Summer 2023
- RAG of Action plan for academic year 2022 2023
- Developed through the Curriculum Review Summer 2022 with A.S. and D.J.

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Maths Policy - Rationale

- The rationale of this Maths policy is to:
 - introduce the key aims and objectives of the Maths department.
 - to explain the curriculum design and coverage.
 - to explain the effective Teaching and Learning strategies involved in Maths

Maths Policy - Vision (Why)

- Oakwood's Maths Policy Vision (Why)
- The purpose of maths at Oakwood is to foster an enduring love of number and become fluent in fundamental maths that also includes learning to reason and problem solve effectively in order to support decision making and increases life chances as an adult

Main aims of the curriculum



Provide an **ambitious academic curriculum** so that students can access a wide range of qualifications that can support and impact on their further education and their employability.

To address pupils widest gaps in education by developing basic skills in **literacy and numeracy** across the curriculum in order to prepare our students for the opportunities, responsibilities and experiences of later life.

To ensure that we have a **broad and balanced offer** for our students to build upon students strengths and interests to inspire them to hold high aspirations for their future

To develop our students wider skills and qualities that prepare our students for the opportunities, responsibilities and experiences of later life. These include:

- Equipping pupils with the knowledge and cultural capital they need to remove barriers to learning and support their future aspirations
- Support pupils' spiritual, moral, social and cultural development
- Awareness of British values to become well informed and responsible citizens

The guiding principles of our curriculum through Maths

Inclusion

• We have selected visual resources that are representative of our school community. Functional maths topics are selected to ensure that we are diverse in our coverage.

· All students should see representations of themselves or people likes themselves in the resources that we expose them to.

· Current affairs topics are chosen because they are meaningful for our school population.

• Our pedagogical approaches are selected based upon their inclusive nature.

• Our teaching process is designed to gradually build up pupil knowledge and confidence so that eventually pupils could work towards producing substantial independent pieces of work.

•We follow the principles from our T & L policy to create inclusive classrooms and to deploy inclusive pedagogical approaches.

Locality

• Where we can, we have identified representations of maths in our locality.

·We have found inspirational people from our locality to focus upon when students are learning about diversity and inclusion within maths.

·We invite local mathematicians / business people into school to inspire our students.

Research informed

• Our curriculum is evidence informed through rigorous application of the best practice and the science of learning. The pedagogical principles applied are grounded in research. We have used Mastery Approach throughout the curriculum based on research from NCETM.

Appropriate

• The curriculum content has been chosen specifically for it's appropriateness for our students, this is driven by rigorous assessments of student starting points across all areas of Maths.

• We have designed pathways to allow us to ensure that the Maths curriculum is appropriately tailored to those who it is delivered to.

· Teachers have flexibility to choose the pathway best suited to their learners based on the evidence they have collected.

Curriculum intent

- The intent for the Maths curriculum is laid out in the Curriculum framework and progression mapping documents. These are the things that we intend our students will study over their time at Oakwood. The progression mapping documents detail the steps of progress that we want our children to achieve.
- As a SEND school the starting points for our students is varied even within classes. This is less apparent in KS4 where maths classes are now streamed to better fit the pupils ability. However we cannot define simply, the educational outcomes of all our students by cohort. This has to be very individualized based on their starting points.
- Planning a coherent curriculum; everything is taught for a reason and will facilitate both the current and a future topic. It is based on the principles of mastery including fewer topics in greater depth in order to develop proficiency with core content
- Ensuring that the curriculum documents the facts, concepts, methods and strategies that make up the planned curriculum. These are curated and developed using academic research and best practice.
- Planning the curriculum in order to make connections within and between the maths. This
 creates opportunities to link concepts, structures and so support fluency and deepen
 conceptual understanding; and
- Providing opportunities to promote mathematical thinking and develop mathematical habits of mind are explicitly built into the curriculum in order to develop problem solving strategies

Breadth and Depth of the Curriculum

Number

- Place Value
- Addition and Subtraction
- Multiplication and Division
- Fractions
- Decimals and Percentages
- Algebra
- Ratio and Proportion

Measurement

- Using measures
- Time
- Money
- Perimeter, Area and Volume

Geometry

- Properties of 2D shapes
- Properties of 3D shapes
- Position and Direction
- Angles and Lines

Statistics

Statistics

The concepts identified in Maths

	Estimation	Is a reasonable guess of the actual value to make calculations easier and realistic.
	Reasoning	The process of applying logical thinking to a situation to derive the correct problem solving strategy for a given question and using this method to develop and describe a solution.
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	Equivalence	The principle that two sides of an equation represent the same value. The equivalent terminology for mathematical symbols and units
	Number line and place value	To understand the value of each digit within a number. It is important that students understand that whilst a digit can be the same, the value depends on where it is in a number.
	Basic number facts	This refers to all the addition and multiplication problems formed by combinations of one digit numbers. Learning the basic facts is an important aspect of building a strong mathematical foundation.

The concepts identified in Maths

Pattern & Sequencing	A pattern is a repeated design or recurring sequence. This could be an ordered set of numbers, shapes or mathematical objects arranged according to a rule. To know a sequence is a set of values which are in a particular order according to a rule.
Algebra	Algebra is a branch of mathematics dealing with symbols and the rules for manipulating those symbols.

Concepts across strands

	Number	Measure	Geometry	Statistics
Estimation	Estimation of calculations and probable results to problems to test the rationality of an answer.	Estimation of most sensible unit, weight, distance, time etc. Testing the rationality of an answer.	Sensible estimation of angle size, area, perimeter, height, width etc.	Sensible estimate of sizes of sections within pie charts and other types of charts and diagrams
Reasoning	Selecting and applying the most appropriate function to solve a problem. Explaining the steps taken and why	Using logical decision making to		Interpreting and explaining, finding missing data
Equivalence	Both sides of the equation being equal. Equivalent fractions, percentages and decimals. Recognising equivalent language for mathematical symbols	Equivalence between units.		Equivalent in data sets Recognising the same data represented in different ways.
Number line and place value	The value of each digit within a number. It is important that students understand that whilst a digit can be the same, the value depends on where it is in a number.	Recognising and placing number in the correct position on a scale of measure.		

Concepts across strands

	Number	Measure	Geometry	Statistics
Basic number facts	Estimation of calculations and probable results to problems to test the rationality of an answer.	Estimation of most sensible unit, weight, distance, time etc. Testing the rationality of an answer.	Sensible estimation of angle size, area, perimeter, height, width etc.	
Pattern & Sequencing	Selecting and applying the most appropriate function to solve a problem. Explaining the steps taken and why .	Using logical decision making to	Green marketing is a practice whereby companies seek to go.	Interpreting and explaining, finding missing data
Algebra	Both sides of the equation being equal. Equivalent fractions, percentages and decimals. Recognising equivalent language for mathematical symbols	Equivalence between units.		Green marketing is a practice whereby companies seek to go.

There is a curriculum map across the whole of KS2, 3 and 4

The concepts have been put together in an approach which allows them to be revisited regularly and therefore the pupils' knowledge be consolidated. The yearly plan shows that the topics have been given shorter time but more regularity. Every 10 weeks there is a review week which allows all pupils to also revisit their new acquired knowledge from the previous weeks. This applies from when pupils enter Oakwood in Years 5/6.

The coverage enables the pupils to have a broad overview of all topics related to mathematics and due to the repeated nature it allows the coverage to be embedded.

The curriculum is designed to be appropriate to the needs to our pupils. Due to the nature of the pupils the classes vary tremendously. Therefore, the Scheme of Work would have to be far too prescriptive. Our approach allows teachers to follow the topic assigned, whilst using the Oakwood progression intent documents to be able to give them further details as to what children at every level need to experience within the topic.

Depending on the class they range from having either 4 or 5 lessons a week. The extra lesson is given to looking at Times Tables.

L	Lesson 1	Lesson 2	Lesson 3	Lesson 4
Content T	Topic Coverage 1	Topic Coverage 2	Topic Coverage 3	Reasoning and Problem Solving related to Topic work / Homework Corrections

Our approach to teaching Maths

Teaching in Oakwood's mixed-ability classrooms can be a challenge. It is not uncommon to find a wide range of abilities in one classroom - from pupils struggling to grasp new concepts, to those who are way ahead of their peers from day one.

While individual pupils do benefit from different learning styles, there are a range of effective strategies which can help pupils to succeed.

Make it hands-on

Maths can be difficult because it involves learning new, abstract concepts that can be tricky for pupils to visualise.

Try to imagine what it's like for a pupil to see an addition problem for the very first time. Since it's a totally new concept to them, it can be hard for them to visualise a scenario where one quantity is added to another.

Manipulatives are hand-on tools that makes maths a lot easier for young children to understand. Tools like lego, clay, wooden blocks can all be used in the classroom to demonstrate how maths ideas work.

For example, lego is a great way to demonstrate number building, operations, fractions, sorting, patterns, 3D shapes and more.

Numicon and Base 10 are also regularly used.

•Find opportunities to differentiate their learning

It is important that pupils feel comfortable and are given the opportunity to learn new maths ideas at their own pace, without feeling rushed. But while the idea that 'given enough time, every pupil will learn' is nothing new, it's easier said than done.

Mastery learning is about giving pupils as much time as they need to grasp a specific skill or concept. It involves varying the time you give each pupil to succeed.

Technology-based classroom tools offer a powerful way to differentiate learning whilst teaching maths.

•Ask pupils to explain their ideas

Have you ever noticed how much more confident you feel about a concept after explaining it to someone else?

Meta-cognition is the process of thinking about your options, choices and results, and it has a big impact on the way pupils learn.

Before assigning a maths problem, ask the pupils to brainstorm problem-solving strategies that they can use. Encourage pupils to work together to suggest different strategies in a respectful way.

This process can be carried out at every stage of problem solving when teaching maths. Once pupils have offered an answer, ask them to verbalise step-by-step how they got that answer.

•Incorporate storytelling to make connections to real-world scenarios

When it comes to igniting the interest of pupils, not much comes close to a good story.

Incorporating story problems into your classroom lessons allows pupils to see how certain maths concepts can apply to real life. Story problems are also a good way to help pupils understand how to use maths in everyday life, and see the relevance of maths.

•Show and tell new concepts

Maths lessons normally begin with a 'show and tell'. Telling is the process of sharing information and knowledge with pupils, while showing involves modelling how to do something. This can be done with an interactive whiteboard, using animations and videos to clearly show and tell specific maths concepts in an engaging and interesting way.

•Let your pupils regularly know how they're doing

Feedback is an important part of teaching maths and improving pupils' results. Let your pupils know how they have performed on a specific task, along with helpful ways that they can further improve and extend their skills. Remember, feedback is different from praise. Focus your feedback on the task itself and make sure they have a clear understanding of what they did well and how they can improve next time.

In Carol Dweck's research around what is known as the 'growth mindset' she writes:

'The growth mindset was intended to help close achievement gaps, not hide them. It is about telling the truth about a student's current achievement and then, together, doing something about it, helping him or her become smarter.



After the teachers have decided which stage each pupil is going to begin their journey on it is important that they are assessed alongside. Using the progression ladders each pupil is to have a copy and highlight as and when they / you feel they have confidently met each skill. These should be kept in their progress files. Then when it comes to data capture all staff will have a good picture of where each pupil is up to and to grade them appropriately.

Levelling pupils at Oakwood we grade them in Oakwood Learning Stage 1 etc (OLS1)

Emerging Developing Secure Mastered

This is done across Key Stage 2 and 3.

In Key Stage 4 all pupils are assessed against the qualification that they are working towards and the pathway they are following.

Assessment Type	Details	Frequency
Maths ages	Summative	Once per term.
Schofield and Sims	Summative – on entry to provide a starting point for the years homework curriculum content.	On entry to a new school year
Mini topic tests	Formative - all pupils in the school completed adapted version of the same topic tests. This provides information on what has been remembered and allows us to moderate and standardise out assessment of levelling across topics.	Once per term.
Data capture	Formal data captured across all strands of the curriculum using formative and summative methods.	Once per half term (+ baselining new students)
Target sheets	Recording of day to day progress against particular strands chosen for pupils in the back of exercise books	Ongoing

Class	Typical Oakwood Entry Point	Qualifications
Sycamore	Oakwood 2+	GCSE Functional skills 1 & 2
Fir	Oakwood 1 / Oakwood 2	Functional skills 1 Entry Level 3
Pine	Working towards / Oakwood 1	Entry Level 2/3
Maple	Working towards	Entry Level 1/2

The table above indicates the intended outcomes for each Oakwood class. This is based upon pupils' entry points to Oakwood. Discretion is applied, students capable of achieving higher level qualifications will always be pushed to do so.

Cross Curricular links

Design

• Our whole school curriculum has been designed with collaboration between all subject leads at is core. We want students learning to be joined up and connected where strong links are possible. For us, this will allow our students, many of who have difficulties with retrieval, the best opportunity to experience content across different specialisms. This repetition and opportunities for retrieval practice will allow for deeper learning.

• We have been provided with the opportunity to familiarize our self with the content from different subjects and the plan and build upon any links established. Some examples are shown below:

Cross Curricular links	Science	Computing	Geography
Maths	Material Monsters Light and Shadows Earth, Sun and Moon Materials and their properties	Programming a robot Repetition in shapes Sequencing Spreadsheets Creating videos	Important Dates Coordinates Compass directions Temperatures Currency Scale Population

Subject enhancements

At Oakwood, we believe in providing a comprehensive mathematics education that goes beyond the classroom. We recognize the value of subject enhancements, such as trips, in-school visits, projects, theme days, and the inclusion of famous mathematicians throughout the curriculum. These enhancements aim to deepen students' understanding of mathematical concepts, foster a love for the subject, and develop crucial real-world skills. By incorporating these activities, we create a holistic learning experience and promote cultural capital among our students.

Trips: Trips offer students the opportunity to apply mathematical concepts in real-life situations and develop practical skills. The following table highlights the trips organized by year group and their focus:

Year	Trip	Focus
Year 7	Wythenshawe Wheelers	Distance and time - maths in real life
Year 9	Year 9 Maths Airport Car Park	

In-School Visits: In-school visits bring experts and external organizations to our students, providing hands-on experiences and fostering problem-solving skills. The following table showcases the in-school visits and their focus:

Year	Visits	Focus
Willows	The School Puzzle Company	Generating a love of Maths and problem- solving
Year 8	STEM workshop	Problem-solving

Projects and Theme Days: Projects and theme days allow students to delve deeper into specific mathematical topics and engage in interactive and collaborative activities. The following table highlights the projects and theme days conducted throughout the year:

Year	Theme Day / Project	Focus
All years	My Money Week	Money
Successful student applicants	Enterprise project	Money, profit, maths in business

Inclusion and Cultural Capital: We value inclusivity and aim to provide a diverse and representative curriculum. To celebrate inclusivity, we have incorporated the study of famous mathematicians throughout the curriculum. The following mathematicians are interwoven into our lessons:

Year	Mathematician
Year 7	Florence Nightingale
Year 8	DaVinci
Year 9	Ruth Fairclough
Year 10	Stephen Hawkings

Additionally, on Inclusivity Day (March 23rd), students study a famous mathematician who has overcome challenges to achieve success. This activity aims to inspire students by reflecting their own experiences and the experiences of others in the curriculum. Additionally, on Inclusivity Day (March 23rd), students study a famous mathematician who has overcome challenges to achieve success. This activity aims to inspire students by reflecting their own experiences and the experiences of others in the curriculum.

Year	Mathematician
Year 7	Leonhard Euler
Year 8	Albert Einstein
Year 9	Sir Isaac Newton
Year 10	Inspiration past students story
Year 11	Oakwood Academy shop and how this links to Maths

British Values & SMSC

Design

- Extremism and radicalization All subject teachers in the Maths department are familiar with the indicators of vulnerability to extremism and radicalisation and the procedures for dealing with concerns. When delivering lessons in Maths we look out for indicators and report any concerns. We work to prevent pupils from developing extreme and radical views by embedding SMSC principles throughout the Maths curriculum.
- **Promoting values** During lessons in Maths we strive to create a learning environment which promotes respect, diversity and self-awareness and equips all of our pupils with the knowledge, skills, attitudes and values they will need to succeed in their future lives.
- Planning for British Values we have looked at all areas of our Maths curriculum and have pre-planned the coverage of the British values through the topics that we have selected.
- British Value and SMSC coverage is considered throughout the planning stages of the curriculum and plotted in our coverage grids. An example of this can be seen on the next slide.

Maths curriculum - SMSC overview

Oakwood ensures pupils' SMSC development through both implicit teaching and through other aspects of school life.

	Social Investigate moral issues; appreciate diverse viewpoints; participate, volunteer and cooperate; resolve conflict; engage with the fundamental values of British democracy.	Moral Recognise right and wrong; respect the law; understand consequences; investigate moral and ethical issues; offer reasoned views and have an appreciation of British Values.	Spiritual Explore beliefs; respect faiths, feelings and values; enjoy learning about oneself, others and the surrounding world; use imagination and creativity; reflect.	Cultural Appreciate cultural influences; appreciate the role of Britain's parliamentary system; participate in culture opportunities; understand, accept, respect and celebrate diversity
Explicit maths curriculum opportunities	See next slide	See next slide	See next slide	See next slide
Natural Numeracy Day assembly	Themed assemblies, leading to opportunities for discussion and reflection.	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection
Number day assembly	Themed assemblies, leading to opportunities for discussion and reflection.	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection
Enterprise assembly	Themed assemblies, leading to opportunities for discussion and reflection.	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection
My Money Week assembly	Themed assemblies, leading to opportunities for discussion and reflection.	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection	Themed assemblies, leading to opportunities for discussion and reflection
Homework tasks	Homework opportunities available to all pupils	Homework opportunities available to all pupils	Homework opportunities available to all pupils	Homework opportunities available to all pupils

Investigate moral issues: appreciate diverse viewpoints; participate, volunteer and cooperate; resolve conflict; engage with the fundamental values of British democracy.

Social

Mathematics lessons use a range of teaching and learning strategies. Sometimes independent work is required, other times pair work or group work essential. Among others we use debates, dominoes, jigsaws, sort cards and team quizzes to structure group work. Verbalising and discussing mathematical problems is one of the most powerful tools we have in arriving at their solutions (or at least gaining a deeper understanding of the problem at hand).

Many topics have a direct and deep sociological impact or effect. We teach co-ordinate geometry, bearings and vectors which are the bedrock of so many "real life" applications of mathematics that have had and still have profound consequences to human development (eg wireless communications, GPS, flight, electronics).

We develop each pupil's understanding of statistics to a depth which should equip them with the ability to tell when statistics are meaningful or being used inappropriately (eg in newspapers or on social media).

Even simpler skills such as numerical fluency or confidence with estimation benefit our students' functioning in society. When is something a poor/good deal? Is this really a special offer, or a rip off? Is £9 a good price? How long will it take to get to Manchester from here? Half termly estimation challenged also happen within each class.

Moral

Recognise right and wrong; respect the law; understand consequences; investigate moral and ethical issues; offer reasoned views and have an appreciation of British Values.

We get many opportunities to develop our pupils' moral values incidentally through the mathematics we teach. For example, a study of probability lends itself to considerations of gambling, betting, lotteries, raffles and games of chance. Our students are encouraged to weigh up the pros and cons of taking part in such activities.

Another statistical example is our requirement to teach experimental design. Questionnaires should not be (mis)leading, culturally biased or poorly operationalised.

Spiritual

Explore beliefs; respect faiths, feelings and values; enjoy learning about oneself, others and the surrounding world; use imagination and creativity; reflect. Our pupils learn geometrical reasoning through knowledge and application of angle rules. The whole purpose is to demonstrate the power of deductive logic and problem solving through use of rigorous, proven techniques. This should encourage pupils to question "why" more often, to interrogate motives and to avoid assumption when analysing any given problem. These skills should transfer to the less abstract situations facing our students daily.

Another example is our insistence on algebraic fluency throughout the curriculum. Algebra is a uniquely powerful set of tools that enable us to describe and model reality. When understood as a language, algebra enables us to express truth in its purest form. It is the language of science, but it also develops the type of intuitive logic in pupils that equips them to recognise when an argument (eg political, religious, social) is valid or nonsensical.

Many topics give rise to the opportunity of developing our pupils' senses of "awe and wonder" - none more so than the topic of standard index form where astronomically large and microscopically small worlds are considered and accurately described in detail. Concepts such as a "light year" cannot fail to inspire amazement and fascination. Even some more trivial pure mathematics investigations produce beautiful elegance in their surprising symmetries, patterns or results. Pi is a number that goes on forever in a nonrepeating and unpredictable way. Another example is the number of ways a pack of cards can be shuffled. It is so unbelievably vast that we need convoluted descriptions to even get close to understanding its magnitude.

Cultural

Appreciate cultural influences: appreciate the role of Britain's parliamentary system; participate in culture opportunities; understand, accept, respect and celebrate diversity

All mathematics has a rich history and a cultural context in which it was first discovered or used. The most ancient of our knowledge we owe to the Babylonians, Egyptians, Greeks and Arab and Vedic mathematicians. The opportunity to consider the lives of specific mathematicians isn't lost (eg Newton, Pythagoras, Galileo or Fibonacci).

A study of Imperial units specifically is no longer on the our syllabus, although pupils are still required to make conversions between any given units. An understanding of the deep emotional and cultural attachment to these is normally discussed.

The world of modern computing would be impossible without the fundamental mathematics upon which they are built. Algorithmic approaches to problem solving are first introduced in KS4.

Mathematics has deep links to music, art and sport. Factors and multiples build rhythm and design percussion. Furthermore, ratios mathematically explain pitch and tuning (especially from a physical perspective) and trigonometric functions describe and illuminate the structure of sound waves. The world of professional sport has been revolutionised by statistics and their analysis.

Oakwood Maths Policy Impact (What)

Policy intent:	Policy impact:
To foster an enduring love of mathematics.	All pupils are given opportunities to engage in mathematical competitions. As a mathematics' department we actively try and push the love of mathematics through times table weekly challenges. Also we encourage healthy competition throughout the school on Maths Shed. We have a display board promoting this.
To support pupils to become active mathematicians.	Every half term all pupils engage in an estimation challenge. This is an opportunity to allow pupils to improve on their skills and guess the number of objects. We have a display board promoting this. Also throughout the school we have a number of initiatives that encourage active mathematicians; telling the time in the classroom, countdown of days until, date format, the page number in the book odd or even, seasons of the year
Develop an appreciation for the functional and practical uses of Mathematics.	As a Centre of Excellence in Financial Education we pride ourselves on the work we do to improve our functional awareness. We annually celebrate My Money Week as well as try and set up as many enterprise opportunities as possible.