MATHS
OCEAN ACADEMY

Purpose:

The purpose of this policy is to ensure that all staff understand the high expectations agreed, whilst establishing and maintaining a consistent approach to the teaching and learning of maths across our school, ensuring that all learners have exposure to high quality maths teaching and learning opportunities.
The effective teaching of mathematics requires not just a well-structured and progressive programme but its consistent implementation in every class.
Consequently, this will ensure that excellent attainment and progress is achieved by all children, regardless of ability, gender or socio-economic backgrounds.

Underpinning evidence:

1. Ofsted Research review: mathematics
2. The forgetting curve, Ebbinghaus
3. Cognitive Load Theory, Sweller
4. Principles of Instruction, Rosenshine
5. Metacognition and Self-regulated Learning, EEF
6. Improving Mathematics in Key Stages 2 and 3, EEF
7. Feedback, EEF Teaching and Learning Toolkit
8. Mastery Learning, EEF Teaching and Learning Toolkit

Intent:

At Ocean Academy, we believe that mathematics is an essential component in enabling understanding of the world, and as such, it is an integral part of our curriculum. The Aspirations Trust of which we are a part, has a real emphasis on the application of learning to employability and future life choices. As such, we strongly believe that, beyond the study of numbers, shapes and patterns, our work in mathematics provides important tools for work in fields such as engineering, physics, architecture, medicine and business. It nurtures the development of a logical and methodical mindset, as well as helping to instil focus and the ability to solve all manner of problems. Alongside this, we work to ensure that the mathematics curriculum helps pupils to gain enjoyment through a growing self-confidence in their own ability.

Selecting and sequencing core declarative, procedural and conditional knowledge:

The teaching of mathematics involves the acquisition of 3 types of knowledge, and a successful mathematics curriculum will be carefully designed and sequenced to allow for all 3 of these:

- **Declarative** - 'I know that' - mental fluency through key facts and formulae, plus the relationship between facts (e.g. tables, applications to multiples of 10 and 100, plus decimals etc) and conceptual understanding.
- **Procedural** - 'I know how' - written fluency - key methods and procedures used to enable accurate calculation within the 4 operations of whole numbers, decimals and fractions.
- **Conditional** - 'I know when' - the ability to apply declarative and procedural knowledge, procedures and understanding to problems and more complex contexts, as well as being able to explain the reasoning which is taking place.

The Ocean Academy mathematics curriculum is the product of careful selection, sequencing and linking of declarative, procedural and conditional knowledge. Pupils systematically acquire core mathematical facts, concepts, methods and strategies to be able to experience success when problem-solving and in order to become proficient mathematicians. Careful sequencing of content, instruction and rehearsal also shows pupils new and consistent patterns of useful information. These then form the basis of further concepts, rules and principles that pupils can store in their long-term memory.

Problem-solving requires pupils to hold a line of thought. It is not easy to learn, rehearse or experience if the facts and methods that form part of a strategy for solving a problem type are unfamiliar and overload the working memory. Pupils are also unlikely to be successful if they do not know many number bonds, unit measurement facts, conversion formula or an efficient method of multiplication to automaticity.

Therefore, the sequence of learning at Ocean Academy places a high value on pupils building familiarity with the facts and methods that will form the strategies taught and applied later in the topic sequence. A key component of this is our focus on times table practice, which incorporates a high level of focused attention, particularly throughout year 3 and 4, on the individual tables each child needs to work on, through use of speed tables, phased practice booklets, discrete teaching of concepts and use of TTRockstars for regular practice and recall at speed. Recent results of this have included an average score of 21 out of 25 across year 4 in the governmental multiplication tables check in 2024, 22 out of 25 in 2025 and 23 out of 25 in 2026.

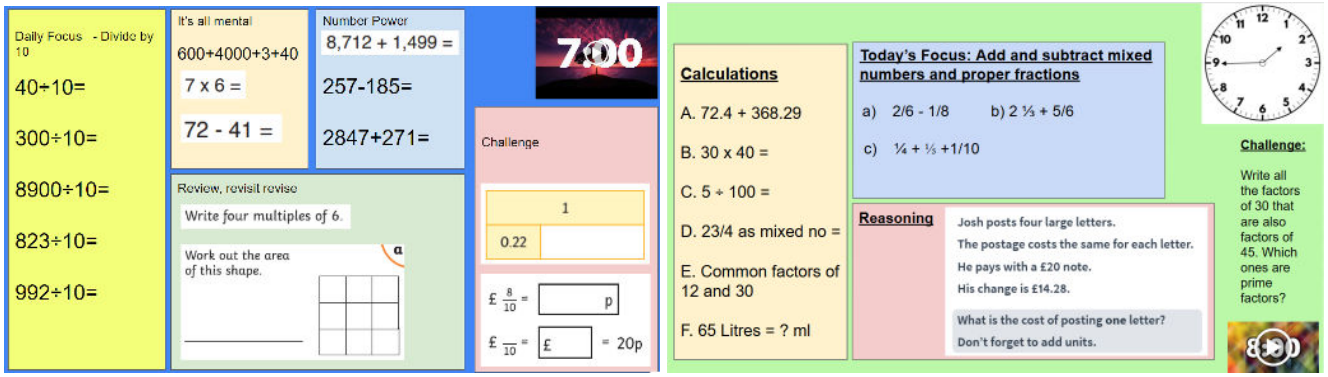
Progression map for maths at Ocean
Progression in maths guidance documents
Vocabulary Progression in maths at Ocean

The relationship between core mathematical facts and powerful methods:

Linked declarative and procedural knowledge are ideally sequenced together to reflect the learning relationship between them. This is because

- familiarity with the facts being used helps with learning and understanding the linked method
- familiarity with the method helps to make associated facts firm and precise in the mind

At Ocean Academy, our daily arithmetic sessions are a fundamental part of our mathematical learning strategy. They incorporate regular opportunities to revise and revisit previous learning of efficient written procedures, mental facts and effective strategies to enable a high level of fluency to be developed by each child.



The content of these sessions is closely related to our ongoing assessment of needs within the classroom and identified areas for development amongst individuals, small groups and the whole class. We monitor ongoing success with arithmetic individually in our assessment tracking, and provide a comprehensive system of intervention for individuals requiring it, based on regular question level analysis and monitoring of daily work. Across the year, this is resulting in significant progress in the average arithmetic attainment of children and, in turn, is creating a solid foundation upon which conditional knowledge and understanding can be built within our reasoning work.

Successful curriculum approaches around the world tend to emphasise the acquisition of this core knowledge early on, and this is very much the foundation of the approach at Ocean Academy. When pupils have learned this core content thoroughly and deeply, they are less likely to forget and are therefore unlikely to need to 're-learn' it later. This fits perfectly with our academy-wide focus on 'Review, Revisit, Revise' - a concept we hold dear across our curriculum.

A positive attitude towards mathematics is the outcome of success in the subject

Pupils are more likely to develop a positive attitude towards mathematics if they are successful in it, especially if they are aware of their success. Staff and pupil voice / surveys are regularly carried out to gauge attitudes towards mathematical learning across the academy, and successive data in recent years has shown this to be a strength of teaching at Ocean Academy.

Whilst some pupils may become anxious about mathematics, teachers at Ocean ensure that all pupils acquire core mathematical knowledge and quickly start to experience success, meaning that pupils will begin to associate the subject with enjoyment and motivation. This is accomplished through targeted interventions, both within and outside of maths lessons, tailored arithmetic focus sessions and our phased learning system which enables all children to receive the level of input, support and challenge that they require so that they can become the best mathematicians they can be. The Ocean emphasis on the development of a Growth Mindset in every pupil ensures that mistakes made by pupils are viewed as opportunities for further development and learning in a positive way. Teachers are alert to potential misconceptions, and opportunities to preempt and explore these are taken whenever possible.

Implementation

Curriculum sequencing: declarative knowledge

Maths facts, vocabulary and symbols at the start of the school journey

At the start of their learning journey at Ocean, a priority is made of determining a baseline of mathematical knowledge which the children initially possess. It is important for children to acquire proficiency with whole numbers and fractions and for working with 2- and 3-dimensional shapes in the primary phase because of how much they are used in later topics and key stages. This includes, for example, automatic recall of number facts and familiarity with the main concepts such as the associative, distributive and commutative properties, alongside a focus on pattern and structure and the ability to make links between different areas of mathematical learning. Having identified this, the curriculum is carefully sequenced and tailored to the needs seen amongst the pupils.

Maths facts, vocabulary and symbols at the start of a sequence

Throughout the academy, core concepts are built upon seamlessly from knowledge acquired in previous phases, both from Key Stage 1 and subsequently each year throughout the academy.

Curriculum sequencing: procedural knowledge

Planned obsolescence of early methods

Whilst use of manipulatives is an essential part of developing the conceptual understanding of different areas of mathematics for all children across the school - for example by allowing pupils to be supported by simple everyday objects and semi-concrete representations, such as Numicon - we aim that pupils move to working with symbols and abstract representations as soon as they are ready to do so. These may be quite visually simple, for example use of counting frames or place value grids, but it is not the resource itself but the fact that its use is associated with efficiency, accuracy and visual simplicity that is the most important feature of powerful early methods.

Methods for more complex measurements and calculations

The ideal pencil and paper methods in the 4 operations and for working with fractions are efficient, accurate and clear. Teachers at Ocean seek to balance developing pupils' understanding and their associated use of informal and diagrammatic methods with instruction in efficient methods that accurately and consistently reveal new patterns and connections of number, using informal methods as a bridge to formal written methods. This gives greater assurance that our pupils will be ready to use these methods within sequences of calculation and to solve more complex problems in their next phase of learning. These different methods are all demonstrated visually in our calculation policy (which is in line with the nationally lauded White Rose Maths programme) and reviewed regularly in staff meetings to enable full consultation and consistency across the school.

Curriculum sequencing: conditional knowledge

The importance of a curricular approach

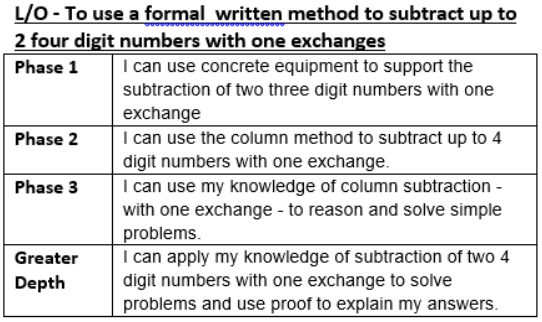
Our focus is on developing a well-connected knowledge base of facts, methods and strategies that can be used to solve a wide variety of problems. We believe that successful problem-solving is not just an activity but an outcome of successful learning of the facts and methods, and their useful combinations as strategies.

We achieve this by teaching:

- useful combinations of facts and methods

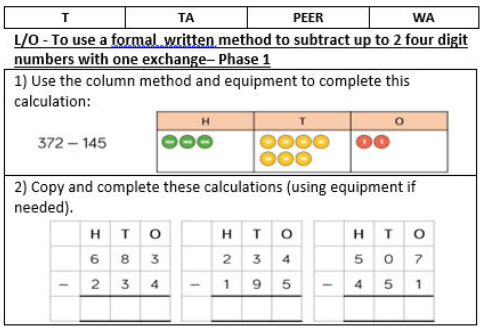
- recognising the problem types
- understanding the reasoning behind the mathematical concepts required

We work to ensure that pupils are fluent in the relevant facts and methods before being expected to learn how to apply them to problem-solving conditions, and our phase structure which we use in all lessons expressively supports and enables this approach.



L/O - To use a formal written method to subtract up to 2 four digit numbers with one exchanges

Phase 1	I can use concrete equipment to support the subtraction of two three digit numbers with one exchange
Phase 2	I can use the column method to subtract up to 4 digit numbers with one exchange.
Phase 3	I can use my knowledge of column subtraction - with one exchange - to reason and solve simple problems.
Greater Depth	I can apply my knowledge of subtraction of two 4 digit numbers with one exchange to solve problems and use proof to explain my answers.



T | TA | PEER | WA

L/O - To use a formal written method to subtract up to 2 four digit numbers with one exchange– Phase 1

1) Use the column method and equipment to complete this calculation:

372 – 145

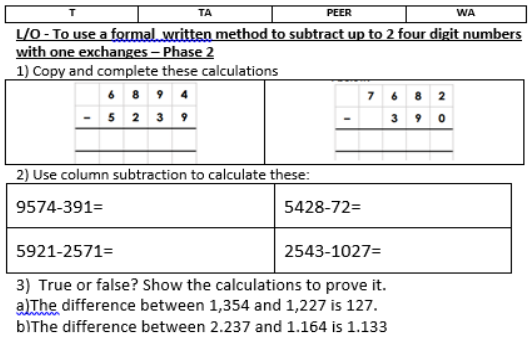
H | T | O

2) Copy and complete these calculations (using equipment if needed).

	H	T	O
	6	8	3
–	2	3	4

	H	T	O
	2	3	4
–	1	9	5

	H	T	O
	5	0	7
–	4	5	1



T | TA | PEER | WA

L/O - To use a formal written method to subtract up to 2 four digit numbers with one exchanges – Phase 2

1) Copy and complete these calculations

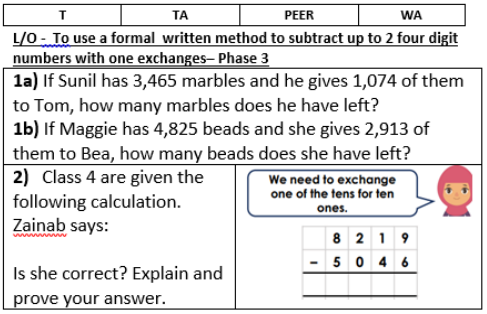
	6	8	9	4
–	5	2	3	9

	7	6	8	2
–		3	9	0

2) Use column subtraction to calculate these:

9574-391=	5428-72=
5921-2571=	2543-1027=

3) True or false? Show the calculations to prove it.
a)The difference between 1,354 and 1,227 is 127.
b)The difference between 2.237 and 1.164 is 1.133



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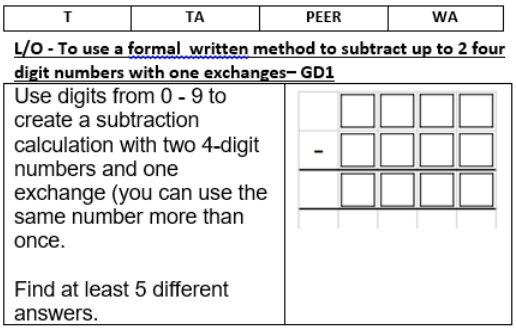
L/O - To use a formal written method to subtract up to 2 four digit numbers with one exchanges– Phase 3

1a) If Sunil has 3,465 marbles and he gives 1,074 of them to Tom, how many marbles does he have left?
1b) If Maggie has 4,825 beads and she gives 2,913 of them to Bea, how many beads does she have left?

2) Class 4 are given the following calculation.
Zainab says:

Is she correct? Explain and prove your answer.

	8	2	1	9
–	5	0	4	6



T | TA | PEER | WA

L/O - To use a formal written method to subtract up to 2 four digit numbers with one exchanges– GD1

Use digits from 0 - 9 to create a subtraction calculation with two 4-digit numbers and one exchange (you can use the same number more than once.

Find at least 5 different answers.

Giving younger pupils the ability to understand word problems

At Ocean, we believe in removing the barriers and therefore we support children to become proficient readers at the required level, with a whole school focus on reading and a variety of monitoring and intervention mechanisms to ensure that those children who are behind are quickly picked up and enabled to catch up with their peers. Whilst this process of catching up reading is continuing, additional use of scaffolding and other support mechanisms will be utilised to support children in their mathematical development, so that, as far as possible, this is not held back by their reading ability.

Through our phase system, all children are given the opportunity to experience and work with problem solving scenarios of varying different types, with careful use of starting points ensuring that children begin each area of learning at the appropriate level, such that those requiring support in a specific area can receive an initial focus on fluency of key skills before starting to apply these to reasoning contexts, whilst those who can be stretched further are encouraged to begin with these reasoning opportunities and then progress onto more complex examples and open-ended investigative tasks.

Throughout, the ability to explain and reason, discussing and demonstrating their understanding of the concepts being studied is central to our approach and all children are given the opportunity to practise this regularly. Attention will be given to looking beyond the surface features of a problem towards the deep structure underlying it that signals the strategy to be used. Wherever possible, connections are

made between different areas and methods of mathematics to ensure a wider understanding of how elements of the subject fit together and complement one another.

Every objective will contain problem solving opportunities directly linked to their individual features and aspects, which then over time will be revisited, reviewed and revised across the year group objectives and beyond. As a result of this, more generic problem solving abilities will also develop, enabling them to apply their skills across various subject areas but as a by-product of the more individualised approach rather than teaching problem-solving as a separate skill itself. This complements the Aspirations vision of every element of learning having a purpose. This all results in all pupils achieving success in developing their problem solving skills, whether through a more generic process that involves weighing up, sifting through and trial and error processing of information or having the ability to recognise the deep structure of a problem and to be able to implement a suitable strategy.

Using the White Rose Curriculum, subject areas are carefully sequenced in the most useful orders, to support combinations of facts and methods for solving sub-classes of problems, as well as the features of conditions that these strategies would be useful for.

Curriculum sequencing: meeting pupils' needs

Planning for what pupils will be thinking about

Through careful use of assessment for learning, starting points and daily monitoring of children's success in that day's lesson, (alongside ongoing question level analysis of summative assessments) lessons are ordered and targeted in the most effective way to support the specific needs of each cohort and their prior learning and knowledge retention. Teachers apply a deliberate, intentional approach to planning whereby the learning journey for children is determined by teaching staff based on their professional knowledge of what will be most effective for them, while supported by the White Rose Curriculum to ensure coverage of the curriculum and progression. However, through use of starting points and the opportunity for children to assess their own confidence levels, they retain some control over the speed at which they work through each individual subject area, thus balancing an element of autonomy for the children in their learning as well.

Balancing new learning and rehearsal of learning

The entire Ocean approach, across all curriculum areas, is based around 'review, revisit, revise', and this is central to our approach in mathematics also. Daily use of arithmetic sessions ensures regular revisiting of the different concepts and methods, resulting in impressive progress in underlying skills across all year groups each year. This is then balanced with introducing new content in the main part of lessons, which often explicitly links to and requires the application of previous knowledge and skills developed.

Careful monitoring ensures that children who are yet to become secure in a specific subject are given opportunities to catch this up through targeted support and intervention. This ensures that, as seen in the most effective mathematic curricula around the world, children roughly move onwards together through their learning, whilst those needing it are given the additional time and support they need to stay on track, and those capable of being stretched are enabled to experience contexts of additional complexity within each area of learning as well.

Support activities are planned into every objective, with teachers referring to progression documents and prior knowledge required to access objectives being studied. Through this approach, children with SEND are able to access explicit, systematic instruction and rehearsal of key skills, whilst always allowing them to experience the full curriculum and make appropriate progress for their individual needs. This approach is useful both for pupils with moderate learning difficulties who have slower cognitive processing speed, and neurodivergent pupils who may require a more individualised learning

experience. These approaches are also highly beneficial in enhancing the progress, attainment and self-esteem of disadvantaged pupils, through the greater feeling of inclusion they experience.

Pedagogy: new learning

To most effectively develop more comprehensive and abstract thinking about mathematics, children often need more than their natural, spontaneous learning, and incorporating extra elements of explicit, systematic instruction is vital. This will help to close the school entry gap in knowledge. This is particularly important at Ocean being a school with a large number of feeder schools and as such, often a large divergence in starting points amongst each cohort.

Use of intelligent variation in sets of exercises

When delivering lessons, teachers look for opportunities to provide a variety of learning experiences for their classes both within the phase system and during discussion and tuition with the class. This will include experience of the following:

- the ranges and boundaries of strategy applicability
- important patterns and rules
- connections between varying problems
- pattern-seeking habits
- how to focus
- logical and systematic approaches to solving problems

Maths leaders monitor this through regular book looks, learning walks and pupil voice, using this to identify any areas for staff development and planning support sessions as appropriate to address identified needs.

Maths lessons at Ocean will typically contain several of the following each day:

- Systematic instruction of key methods
- Explicit identification of helpful patterns and sequences
- Use of worked examples
- Shared verbalising and writing of concepts to ensure understanding
- Careful use of questioning to deepen the learning process
- Use of concrete, pictorial and visual representations to develop a deeper understanding of the mathematical concepts.

Pedagogy: consolidation of learning

The Phase System

The Phase system at Ocean Academy enables all learners to think, practise, recall and apply, ensuring that pupils have adequate opportunities to practise.

The phases of learning represent the learning journey and building blocks of each learning objective. The phase system ensures that teachers are consistently using assessment for learning effectively to assess starting points for individual learners. Each phase will focus on developing the depth of learning within the learning objective.

Phase 1 - Fluency with concrete and pictorial examples, alongside appropriate scaffolding.

Phase 2 - Fluency in an abstract form to ensure security in the written methods and procedures required to be successful in that particular area of learning.

Phase 3 - This is the expected level for age related expectations and will incorporate reasoning and problem solving, alongside opportunities to expressly verbalise and write down their understanding of how this skill operates.

Greater Depth - More complex problem solving opportunities to apply their knowledge to, often incorporating wider knowledge to enable links to be made between different areas, alongside some more open-ended challenges to enable the ongoing development of systematic and investigative skills.

This, alongside arithmetic lessons, enables consolidation of learning, transforming pupils' initial moments of success, realisation and understanding into long-term memories whilst allowing for a sufficient number of repetitions to ensure the attainment of automaticity in facts and methods. Arithmetic sessions especially, have a real focus on systematic rehearsal of facts, ensuring sufficient time is given to development of these fundamental underlying skills.

Extensive research (for example, on *The Forgetting Curve*, Ebbinghaus) points to the need for teachers to provide enough opportunities to practise taught facts, methods and strategies, as well as additional opportunities for overlearning, and our approach actively encourages this.

Our curriculum is carefully sequenced utilising the nationally recognised White Rose approach, ensuring a logical progression and overlearning enabling a sequential approach to learning and regular opportunities to revisit and revise so that our pupils remember more, understand more and can apply their learning.

Tasks that are content-focused and achievable

Tasks in mathematics lessons are carefully selected and designed to tackle the specific objectives we want the children to develop. We incorporate the principles of Cognitive Load Theory (Sweller) to ensure that children's working memory is not overloaded and extraneous stimuli (for example unnecessary information or illustrations) are minimised such that the learning takes precedence.

Appropriate use of scaffolds and physical resources is incorporated and available to learners of all abilities to enable this focus on specific skills, particularly in the earlier phases in an objective, gradually reducing these as the later phases move to a focus on using and applying the specific skills being developed.

Use of the phased approach, alongside starting points and assessment for learning, ensures that pupils can master the component parts of each objective and are therefore more likely to stay on task and be motivated by the achievable tasks. At the same time, challenge is still enabled for each child through the opportunities to experience more complex reasoning tasks as part of each objective's learning, once fluency has been attained.

Balancing rehearsal of proof and explanations with rehearsal of facts, methods and strategies

The phase system described above actively acknowledges and encourages the two 'types' of practice:

- 'Type 1' involves the rehearsal of core facts, methods and strategies that can be used to complete exercises and solve problems now and in the next stage of education
- 'Type 2' includes explaining, justifying and proving concepts using informal and diagrammatic methods, parsing and derivation of number

This ensures a balance between these two, enabling pupils to have the opportunity both to replicate explanations and proof as a way of improving their own conceptual understanding of the 'why', but also practise the methods of calculation themselves so that they can be recalled in the long term and become increasingly proficient. This gives greater assurance that pupils can use core knowledge of facts, efficient methods and useful strategies in the next stage of their education.

Assessment

Assessment at Ocean takes on a variety of different forms. These include the following:

- Starting points at the beginning of each objective.
- Constant teacher and support staff assessment for learning within the lesson.
- Children self-marking and seeking further support as needed.
- Daily verbal feedback and overviewing of books by teachers to identify gaps in knowledge or to move learning on, ensuring that both support and challenge can be provided as necessary and that the next day's lesson responds directly to the needs identified from the previous day, including opportunities to explore any misconceptions or issues which have arisen through a 'feedback in five' structure.
- Daily timed arithmetic practice incorporates regular revisiting of key objectives with instant feedback given, alongside opportunities to verbalise understanding and address misconceptions.
- Regular timed opportunities to assess key number facts, particularly times tables.
- Use of TT Rockstars to have a continued assessment approach to times tables across the school.
- Phase stickers for each objective, highlighted so that teachers and subject leaders can see at a glance which objectives children are succeeding with, or may need revisiting.
- Termly summative assessments from PIXL - that are closely aligned to the curriculum - to provide regular overviews of learning and knowledge retention. This enables detailed question level analysis to take place, leading to comprehensive intervention programmes to be developed and delivered and adaptations made to daily arithmetic sessions to reflect the individual needs of each year group as they evolve through the year.

As a result of all these, pupils at Ocean are motivated to achieve their personal best, understanding their own specific needs and gaining a real sense of their own ongoing progress and development. Teachers are able to use these assessments to inform their planning.

Ocean Academy planning and assessment cycle: Maths

1. Year teams consult whole school curriculum overview - centralised
2. Year teams consult long term planning progression - centralised
3. Year teams consult calculation policy - centralised
4. Year teams design medium term maths planning of new learning and to incorporate opportunities to revisit and revise prior learning - quality assured by year leads and maths leads
5. Year teams design phases of learning (building blocks) and resources for support and challenge - quality assured by year leads and maths leads - year group specific
6. Year teams discuss planning, resources, models and common misconceptions to ensure all staff are secure in subject knowledge and process of learning/chunking
7. Teachers use a variety of assessment strategies within and between lessons to inform starting points and scaffold or challenge necessary in future learning. Planning and learning is adapted to meet the needs of learners
8. Maths leads and year lead monitors maths learning regularly, including the progress of disadvantaged children
9. Termly summative maths assessments are completed - PiXL tests
10. Data analysis and QLA is completed by assessment lead, year lead and maths leads to find trends and misconceptions to guide and inform future planning
11. Planning is adapted if necessary to reflect findings and ensure opportunities to revisit and review prior learning is in place

Systems at the school level

Calculation and presentation

Good quality presentation is encouraged throughout the school and monitored by leaders regularly. Accurate calculations and careful presentation give pupils the ability to spot important and interesting patterns of number, as well as errors that need to be corrected. More 'messy' experimental workings are also appropriate at times, balanced with opportunities to learn how to be systematic, logical and accurate when applying taught facts, methods and strategies.

Proactive professional development: the planned and purposeful pathway to expertise

A comprehensive programme of monitoring and professional development is in place at Ocean, incorporating the following elements:

- Regular book looks to ensure consistency, progression and quality of learning between classes in each year group and across the school.
- Learning walks conducted regularly by SLT, subject leaders and year leaders to ensure consistency between classes.
- Regular reviews of the quality of maths education at Ocean by people outside of our academy itself, drawn from across the Aspirations Trust
- Participation in the Jurassic Maths Hub.
- Pupil, teacher and support staff voice surveys conducted, with feedback addressed through an ongoing programme of professional development during staff meetings and INSETs, for both teachers and TAs. Opportunities have included a focus on TA support and feedback in lessons and consistency of calculation approaches across the school.
- Additional support offered to new staff, including ECTs and trainee / apprentice teachers arriving at Ocean. This can include opportunities to observe good practice and joint planning sessions.

SEND and inclusion:
Throughout this document, the methods used to ensure all children, including those with additional needs, can succeed have been made explicit. Maths planning ensures that pupils with SEND or physical impairment can achieve just as well as their peers. The school works closely with the SENCO and external agencies through regular consultations to understand the specific needs, individual goals and incorporate these into the planning and delivery of maths lessons. All lessons are adapted to ensure that all children can access the learning and work with their peers.

Aims of monitoring and evaluation:

- To make secure judgements of teaching and learning across the school
- To monitor and evaluate the progress of students
- To evaluate the performance of individual teachers against the Teacher Standards and check that high standards of professional performance are established and maintained
- To identify training needs across the teaching and support staff and drive the CPD programme

SLT and subject leaders will monitor and evaluate the impact of teaching on student's learning through

- Learning walks
- Book looks
- Review of termly assessment data
- Gathering input from pupil voice and staff voice

Review:
This policy is subject to yearly reviews by the subject leader and SLT.
Upon review, amendments will be made in line with the Academy Improvement Plan and shared with all staff.