

# Maths curriculum vision

We have certain key principles that we uphold when creating our broad and balanced curriculum and when we implement our intent - teaching pupils. The result is an innovative learning structure designed to nurture confidence and raise achievement by knowing more and remembering more.

Our key principles around pedagogy are:

- Fluency
- Mathematical reasoning
- Problem solving
- Progression
- Direct Instruction
- Deliberate Practice
- Concrete-Pictorial-Abstract
- Relevance
- Reflection (metacognition)

In line with the National Curriculum, there is a strong focus on fluency, reasoning and problem solving to help prepare pupils to progress through their studies and be able to play their full part in this world.

Stretch, challenge and support runs throughout our schemes, adapting for pupils of all abilities and needs. The schemes are engaging with accessible content, with each offering a wealth of Birley Learning Framework, literacy support, clearly defined objectives and a rigorous scheme of assessment that assesses throughout the learning journey, as well as at the end.

## Design of the maths curriculum

Throughout the curriculum, concepts are built upon over time and regularly re-visited, but with increasing complexity over time. The curriculum is inspired by the progression model. This structure ensures that pupils are able to internalise key concepts and use them in ever-more sophisticated ways towards ambitious curriculum end points. It is not only subject content, but also disciplinary knowledge which is built into the curriculum in this way. Pupils learn not only substantive mathematical knowledge but how this knowledge has come into being and how it has been revised over time, how it has impacted the world and developments throughout history and how it can support a wide range of future career choices.

The curriculum is research informed and considers what a successful mathematician looks like at A Level and beyond with concepts sequenced back through each year. The curriculum covers nationally and internationally accepted core concepts in maths but also goes beyond the national curriculum and examination specifications to include the knowledge considered important to attain a deep understanding of mathematical ideas.

Lessons will contain direct instruction in the form of “I do, We do, You do” during the exposition phase. It will include diagnostic AfL and questions will use variation theory whenever possible.

At the start of Y7, all pupils complete a place value unit to settle in and for us to correctly identify suitable groups for those who come to us with no KS2 data. There is also time in Y7 Autumn to use the question level analysis to plug gaps in knowledge from KS2. Exploring sequences is a topic that pupils did not study in KS2 so immediately provides challenge.

Our scheme dedicates time to master topics, ensuring “deeper understanding rather than accelerated content.” – Jane Jones, ex HMI lead for mathematics.

At the “Check-Up” point, teachers will identify aspects of work that pupils need to develop to make rapid progress. This is regularly done by the use of Exit Tickets. Teachers will model work under the visualiser, provide feedback and then pupils will work on their identified areas.

Assessment takes place regularly in lessons with diagnostics, directed questioning and exit tickets. We test pupils at the end of each learning block to assess current knowledge and understanding. We also test at the end of term with a test that incorporates topics that need retrieving from the whole term and before.

Time is allocated in the curriculum for “Closing the Gap” – Pupils can work towards mastering elements of mathematics before moving into a new half term. If a pupil receives 100% in assessments, then they are directed to either a rich task or on some occasions, be used as a lead learner.

It will be common to see groups of pupils working on the same task as we have high aspirations and will teach to the top, scaffolding where needed. Putting children on different tables with different work according to perceived ability has been abandoned. Depth of understanding is being prioritised.

The selection and ordering of topics is done to ensure that skills needed for higher level work have been taught prior to the more challenging aspects of mathematics. For example, a pupil would need to be able to divide before being able to share in a given ratio. A pupil would need to be able to recall facts about angles in triangles and quadrilaterals before being able to solve problems using circle theorems.

In each scheme, the small steps are identified, clearly stating which must be delivered for higher candidates. Topics have been pre-selected for interleaving so that pupils are able to remember more by regular retrieval.

We believe our curriculum is sequenced and connected in a way that all pupils will be able to be successful in mathematics now and in future endeavours.

## Year 11

In the final year, in preparation for taking their GCSE exams, pupils will have two additional folders to supplement their class book.

One folder will be their purple “Gap Folder” which they receive after the second mock exams. This will contain their gap analysis from their Y11 mock exams, course of study, necessary logins and materials that they have been independently working on at home or in Period 7.

All pupils will also have access to Sparx Maths with videos and questions for them to work on, based on their mock exams.

The second folder, which will be available after Easter, will be a revision folder that contains past papers, practice papers, knowledge organisers, check-lists and other necessary revision materials.

Year 11 pupils will also be offered additional time to study mathematics in school:

- There will be invitational period 7 sessions in Term 2 where they can work on their Gap folders, Revision folders or simply catch-up with classwork.
- There will be additional invitational sessions in Term 3 where pupils are asked to come to specific sessions based on their mock exam analysis.

# Delivery of the maths curriculum

## A Sharp Start in maths

This phase is the start of the lesson. It gives pupils an opportunity to practise retrieving information and use this to help them remember more in the long term.

Pupils follow a carefully selected series of questions to begin each lesson in a settled manner, whilst ensuring that content delivered last week, last month, last year... is revisited.

The sharp start must last no longer than 5 minutes and must be done in silence to ensure a calm and consistent start to lessons.

Once per term, pupils will review their presentation and unfinished work – Dedicated Improvement and Reflection Time. They should be checking through their books and ensuring all titles and dates are written and underlined. Checking that sheets are either tagged in or returned to the teacher. Unfinished work can also be done at this point; filling in the WRM booklet from last lesson etc.

Once per week, teachers will model the answers to an exit ticket.

Example of the week:

Mon	Feedback from exit ticket
Tue	Sharp Start
Wed	Sharp Start
Thur	Sharp Start
Fri	Sharp Start

\*As part of the assessment process, reviewing and red-penning exit tickets at the beginning of a lesson once per week must also still occur. The work on the exit ticket must be reviewed before the next Exposition phase as it will inevitably contain skills that pupils will need to use/build on in the next lesson, therefore this must be reviewed and checked.

## The Exposition Phase in Maths

This is the part of the lesson where we are explaining how to do the work. (The TEEP border will say Present New Information)

This phase must include:

- “I do”
- “We do”
- “You do”
- Diagnostic Questions (Review Slide)

“I do” will be a series of increasingly difficult/varied examples that are demonstrated by the teacher. Pupils are expected to watch and take notes.

“We do” will be a series of increasingly difficult/varied examples where the teacher includes all of the pupils in the modelling process. AfL is expected to be used here to check whole class understanding.

“You do” will be pupils’ independent work.

“I do” + (“We do” or “You do”) – Example-Problem-Pair: will be on one slide and include the final modelled example and then one question for pupils to try on their own or together. Discussion to follow the “You do” question.

Diagnostic Questions will be a series of multiple-choice questions to determine understanding and challenge misconceptions. This will inform which pupils need immediate intervention and feedback at the start of the next phase.

Once that process has been completed, pupils then move into a longer application and demonstration phase. The questions will often use Variation Theory. This is to provide pupils with the opportunity to reflect, expect and check their work. An example of Variation Theory in mathematics would be the volume of cube with length 2cm is  $8\text{cm}^3$ , and then to provide an example that is linked to 2cm. Usually this would be 4cm and pupils might expect that the answer is probably double the previous (which it is not). This helps battle misconceptions as well as providing a sense of wonder.

### **Application and Demonstration Phase and Consolidation and Mastery Phase**

This phase is where pupils get to practise what they have just been taught and then begin to apply their knowledge to more abstract scenarios.

### **The Review Phase**

Reviewing is a critical element in the process of teaching and learning as it is the point that can challenge the pupils to make their learning explicit. Reviews are not just tests.

The review phase can happen at any point during the cycle of the framework. It is useful to include different review opportunities throughout every lesson so that teachers and pupils can identify areas for development.

Some examples of activities that you can use for reviewing where pupils are in their learning:

- 1) Would I lie to you? – The teacher supplies pupils with some true or false statements that they can work on and tell you.
- 2) Diagnostic Questioning
- 3) Exit tickets – When exit tickets are used, these can be marked prior to the next lesson and inform planning.
- 4) Review Wheel – The teacher spins the wheel and pupils review their learning based on whichever part of the cycle it lands on
- 5) Board Rush – groups, pairs, individually – Pupils have a grid on the board that they need to complete and groups rush to the board to do it.
- 6) One minute – pupils have to talk for one minute to their partner about what they have learnt. For some pupils it may be appropriate to give time to collect their thoughts before starting this task.
- 7) End of block tests
- 8) End of term tests
- 9) All pupils will also complete a topic “Flash Card” which they will take home and attach to their other cards to create a pack of flash cards they can use for revision purposes.

### **The Homework Phase**

Homework at The Birley Academy is set using the online platform, Sparx Maths.

Year 7-11 homework is set each week and pupils should be spending around 60 minutes each week on their homework tasks.

The homework will contain questions from the current topic, as well as consolidation questions from previous topics.

Pupils should always complete the questions in their homework book and present their work in the same way as they would in class; Title, date, underlining and their bookwork check codes.

Pupils do not need to bring their book into school for you to check, but should bring it in when they receive a "See your teacher" instruction from Sparx.

Pupils should attempt to get 100% of their homework correct.

Teachers will be able to see what answers pupils have entered and provide support in class where appropriate.

## Adapting the curriculum for SEND

We aim to ensure that all our pupils who are disadvantaged or have any special educational needs and/or disabilities (SEND) have access to the same carefully planned curriculum as their peers. Our curriculum aims to provide pupils with SEND with explicit systematic teaching and rehearsal of knowledge. We also ensure that these pupils have the time they need to study important subject content in maths.

We know that successful teaching is successful for all pupils regardless of background or prior attainment. To that end the curriculum is adapted to suit all learners in the following ways:

- Learner confidence is built by making lessons accessible and offering all pupils the opportunity for success. The curriculum creates opportunities for learners to feel 'like a mathematician'.
- Lessons begin with specific knowledge retrieval activities to return to and embed fundamental ideas.
- Live modelling is used often to explicitly narrate expert thought that pupils can replicate.
- Links between ideas are made explicit so that learners can build and strengthen their schemas.
- Scaffolds are provided to support oracy and literacy activities with a plan in place to reduce reliance on these scaffolds over time.
- Further activities that aid retention and quick recall of spaced content are embedded within every lesson.

# L.E.A.D. Academy Trust

## Our vision

Through outstanding leadership we, at the L.E.A.D. Academy Trust, will provide the highest quality education to enable every pupil to realise their full potential.

## Our principles

*To achieve our vision we prioritise the four core principles for which our name stands:*

### **Lead** - *to show the way; to be first or foremost*

In every aspect of life the ability to lead is essential. Strong leadership is the key to the success of our schools. We will develop leadership skills in everyone who attends one of them, ensuring the development of pupils as leaders of their own learning.

### **Empower** - *to give power to; to enable*

At L.E.A.D. Academy schools pupils are empowered to have high aspirations for their futures. We nurture and challenge pupils to take responsibility, make decisions and work together so they grow into confident and resilient young people.

### **Achieve** - *to accomplish; to get or attain by effort*

We believe in achievement in its broadest sense and that enjoyment of learning is crucial to success. We continually look for and reward achievement in every individual in our schools. We also know that a strong command of English and maths is vital as a foundation for the whole curriculum and prioritise learning in these core subjects.

### **Drive** - *to cause and guide progress; to impel forward*

We will provide the very best education and training for every individual in our schools and will ensure that this is delivered. We value excellent teaching, underpinned by high quality professional development and will constantly move forwards, using and instigating the best ideas and practice.

We also understand that children need to be motivated if they are to succeed in life and we will provide a stimulating curriculum and environment which will prepare them for their futures with confidence and determination.

## Glossary of key terms

Word	Meaning
Learning	A lasting change in long-term memory
Substantive knowledge	Established facts (content)
Disciplinary knowledge	Methods that establish the substantive facts (skills)
Conceptual knowledge	Knowledge of concepts, theories, principles, models etc. "Know that..."
Procedural knowledge	Knowledge of how to perform specific tasks "Know how to..."
Conditional knowledge	Knowing when and why to use conceptual and/or procedural knowledge
Discipline (Disciplinary)	A branch of knowledge e.g. Mathematics, Geography, Drama etc
Sequenced	Arranged in a particular order to aid learning
Spaced	Knowledge repeated at certain intervals to aid learning
Misconceptions	A view or opinion that is incorrect based on faulty understanding
Modelling	The process of learning by copying the behavior of an expert
Literacy	The ability to read or write effectively within a specific discipline
Oracy	The ability to express oneself effectively within a specific discipline
Pedagogy	The method and practice of teaching. The 'how' of the classroom
Schema	A cognitive framework of knowledge that helps us interpret new information