L.E.A.D. Academy Trust

Lead • Empower • Achieve • Drive

Secondary Curriculum

Science

Contents

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

Science curriculum vision

Science at The Birley Academy is more than just a core subject. The curriculum has been planned with the aim of making the learning of science easier. It is designed to engage students so they have an appreciation and curiosity for the subject and be excited to study science at a greater depth and feel it is a subject they can achieve in, whatever their background.

Science relies on content (substantive knowledge) as well as skills (disciplinary knowledge) and this is woven into the fabric of our curriculum over five years. Pupils build upon their science education from primary school and cover, in depth, the most fundamental concepts in Year 7 – Atoms, Cells, Energy. This knowledge then increases in complexity as pupils build upon this knowledge through the disciplines of Biology, Chemistry and Physics.

"Somewhere, something incredible is waiting to be known." – Carl Sagan

Design of the science curriculum

We strive to constantly evaluate and evolve our curriculum to ensure that students' knowledge is built up in a logical way which is vital for a thorough understanding of complex scientific concepts.

We have recently refined our curriculum in order to include the following aims:

- To learn content that is sequenced in a logical order.
- To build on what pupils learned in primary school.
- To clearly and explicitly identify misconceptions.
- To revisit ideas and be shown different examples to develop their thinking.
- To consolidating learning before moving on.
- To help pupils see how knowledge connects with what they already know about science, so that they build connected knowledge.
- To embed disciplinary knowledge within the most appropriate substantive content so practical experiments have a clear purpose.
- To ensure a provision of stretch and challenge for all pupils.

The curriculum is research informed and considers what a successful scientist looks like at A Level and beyond with concepts sequenced back through each year. The curriculum covers nationally and internationally accepted core concepts in science but also goes beyond the national curriculum and examination specifications to include the knowledge considered important to attain a deep understanding of scientific ideas. The fact that we include ambitious content in key stage 3 means that every child has the option of taking separate sciences for GCSE when they pick options at the end of Year 9.

Delivery of the science curriculum

At KS3, students are introduced to the fundamentals in Biology, Chemistry & Physics which form the building blocks for all other knowledge. Learners are also taught the 'vocabulary' of Science which are the skills that will underpin all aspects of Science up to GCSE and beyond.

Scientific literacy is developed through chosen tasks and explicit teaching of key vocabulary. There is a requirement for pupils to express themselves with increasing sophistication and accuracy through different means.

At GCSE, students follow the AQA exam board. They are taught by skilled subject specialists who are keen to pass on the mastery of their own discipline. AQA is the most widely taken exam board, it facilitates opportunities for data analysis and collaboration that we would not have otherwise.

Practical skills are an integral part of the Science curriculum and due to the longer lessons are seamlessly embedded in the day-to-day teaching. Disciplinary procedural knowledge includes how to work safely as a scientist including the use of a range of apparatus and techniques.

Common misconceptions are identified and built into curriculum planning so that potential barriers to learning can be pre-empted and overcome

Development of examination technique focusses on identification of command words, the need to thoroughly process all information and the accurate use of subject specific vocabulary.

One of the most important features of the Science curriculum at The Birley Academy is that it is fluid in nature. The curriculum is regularly adapted and updated to make sure that it always meets the needs of the learners at the time. This combined with high quality teaching and learning experiences help us to implement our vision of a successful knowledge-engaged curriculum.

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 science.

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 scientist'
- Lessons begin with specific knowledge retrieval activities to return to and embed fundamental ideas
- Complex concepts and abstract ideas are organised through easy to follow diagrams and flow charts that can be referenced to support successful application
- 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 schema
- Practical work is not completed without a solid grounding in theory and/or demonstration by an expert
- 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

Legacy curriculum

In 2024-25 at The Birley Academy, Year 7, year 8 and year 9 students will follow the L.E.A.D. Science curriculum. This is because students in Year 10-11 have followed a legacy curriculum route as detailed below. However, knowledge checks will be used at the start of each unit taught to identify specific knowledge gaps so that these can be addressed before the unit is taught.

		23-24	24-25	25-26	26-27
Year Group in 24/25	Year 7	New	New	New	New
	Year 8	Legacy	New	New	New
	Year 9	Legacy	New	New	New
	Year 10	Legacy	Legacy	New	New
	Year 11	Legacy	Legacy	Legacy	New