Computing Curriculum Overview

At Reach Academy, our vision for computing is to support children to become technologically literate in an ever-changing, digital world.

Being technologically literate means pupils will be able to:

1. **Be safe**
Pupils know the opportunities that technology possesses, but also the dangers. They know how to navigate these dangers and who they can go to (both in and out of school) if they encounter a problem.

2. **Think computationally**
Pupils can solve problems, evaluate solutions and design algorithms.

3. **Create, store and retrieve information**
Pupils can find, use and express their ideas through a range of technological platforms.

Our computing curriculum has been designed with our whole-school vision in mind; to give students the skills, attributes and academic qualifications needed to go on to live a life of choice and opportunity. In selecting and sequencing knowledge for our curriculum, we are guided by the national curriculum, Kapow (in Primary) and Teach Computing (in Secondary). Acting as a conduit between our Primary and Secondary curriculum, are our whole-school curriculum design principles:

1. Knowledge-rich: Having adequate knowledge within and around computing is fundamental in preparing pupils for a world which is increasingly technologically advanced. The knowledge we teach in computing is split into three main areas: computer science, digital literacy and information and technology. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of digital content. This knowledge ensures that pupils become digitally literate at a level suitable for the future workplace so they can become active participants in a digital world.

2. Backwards planned: At Reach Academy, computing is taught weekly across three half-terms in Primary and weekly for the entire year in Phase 3, with Phase 4 receiving a curriculum integrated with Team Reach and full Computing drop down days to ensure we satisfy and exceed the national curriculum. As the children progress through the school, knowledge in three main areas of computing is deepened, while key concepts are revisited.

For example, students study programming in Scratch Junior in Year 2, begin programming in Scratch in Y3, and continue to use Scratch to deepen their knowledge and understanding of programming before progressing to Python in Y8.

3. Carefully resourced: We utilise a carefully sequenced computing curriculum, guided by the national curriculum, Kapow (in Primary) and Teach Computing (in Secondary). Each lesson begins with retrieval practice of key prior knowledge and then the teaching of key vocabulary. This vocabulary might be recalled from previous learning, which is fundamental for the new learning about to take place, or it could be completely new. Dual-coding is fundamental to the explicit teaching of this vocabulary, so that every child in the classroom is successful. For some units, computing booklets have been created. These booklets ensure the children are being taught vocabulary and knowledge necessary for them to succeed throughout their Secondary computing journey. Each lesson requires children to complete a task, which demonstrates their understanding of a new skill, or a key piece of new knowledge. This might be showcased independently, or collaboratively.

4. Aspirational, inclusive and diverse: As most students will be required to interact with computers daily in their further studies or employment, and some students will pursue a career in computing, our curriculum is designed so that these students have all the skills and knowledge required to confidently seize upon these opportunities. In Key Stage 4 and 5, students are also given extra-curricular opportunities to further their skills and knowledge in computing through physical computing project work, such as robotics and sensor systems, using Arduinos and Raspberry Pis, introducing them to a new programming language, C++, and allowing them to further develop their usage of the Python programming language.

5. Rigorously assessed: Assessment is carried out formatively in each unit through questioning, observation and discussion. At the end of each lesson there is an 'exit ticket', which pupils answer independently. Through the use of rigorous monitoring trackers, teachers are able to record which children have a secure understanding of the content in that lesson, and which are going to need further support. At the end of each unit, pupils sit a knowledge quiz, enabling the teacher to assess what key knowledge individual pupils have consolidated, as well as what might need to be taught again in the next unit to ensure pupils have a secure understanding to build on their prior knowledge in future units. For programming modules in Secondary, students are also assessed with practical programming tasks, to demonstrate their skills and their ability to apply their acquired knowledge.

6. Regularly evaluated and reflected upon: At Reach Academy, we continually adapt and improve our resources for the teaching of computing each year. All plans and accompanying materials are saved on a central drive system so that teachers can edit and improve materials from the previous years and respond to the needs of the cohort they are teaching. The designers of the computing curriculum from Primary and Secondary meet regularly to share reflections on current units being taught and reflect on what more can be done to ensure that children are given the necessary prerequisite knowledge in Primary to access more complex computing knowledge and skills in Secondary.

In their lessons, we want pupils to be inspired and recognise the vast array of opportunities there is within the subject. However, we also want our pupils to be acutely aware of the dangers it can present. This is why in Primary, online safety topics are revisited across all three half-terms and within Team Reach lessons. In Secondary, online safety is taught as stand alone units, but we are mindful of any new online trends and often have discrete, responsive sessions with children should any issues arise.

Year 1 - 5 are computing lessons once a week, in alternating half terms:

	Half Term One	Half Term Two	Half Term Three
Year 1	**Computing Systems and Networks:** Improving mouse skills	**Programming:** Algorithms unplugged	**Creating Media:** Digital media **Programming:** Bee-Bots
Year 2	**Computing Systems and Networks:** What is a computer?	**Programming 1:** Algorithms and Debugging	**Programming 2:** Scratch Jr
Year 3	**Computing Systems and Networks:** Networks and the internet. A journey inside a computer	**Creating Media:** Video trailers	**Programming:** Scratch
Year 4	**Computing Systems and Networks:** Collaborative Learning	**Programming 1:** Further coding with Scratch **Data Handling:** Investigating weather	**Programming 2:** Computational Thinking
Year 5	**Computing Systems and Networks:** Search Engines	**Data Handling:** Mars Rover 1 Creating Media: Stop motion animation	**Programming:** Music on Scratch

Y6 pupils study computing every half term. The units covered are as follows:

Year 6	**Computing Systems and Networks:** Bletchley Park	**Programming Essentials:** Part 1 (Teach Computing)	**Data Handling 1:** Big Data 1	**Creating Media:** History of Computers	**Data Handling 2:** Big Data 2	**Skills Showcase:** Inventing a product

In Secondary, pupils study computing every week and cover the following units:

Year 7	**Safety and Security:** Collaborating Online respectfully	**Computing Systems:** From Semaphores to the Internet	**Creating Media:** Using media: gaining support for a cause	**Programming:** Programming essentials: part II	**Effective use of tools:** Modelling data: spreadsheets
Year 8	**Effective use of tools:** Media: vector graphics	**Computing Systems & Programming:** Computing systems	**Programming:** Developing for the web	**Programming:** Mobile app development	**Programming:** Introduction to Python programming
Year 9	**Programming:** Python programming with sequences of data	**Creating Media:** Media: animations	**Data and information:** Data science	**Safety and Security:** Cybersecurity	**Computing Systems & Programming:** Physical computing