

Introduction to the computing curriculum in primary schools

Key Stage 1 Years 1 to 2 – ages 5 to 7

Key Stage 2 Years 3 to 6 – ages 7 to 11

Schools in England are expected to follow the National Curriculum for computing. The opening statement shares the ambitious intention for all students:

‘A high-quality computing education equips students to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology and provides insights into both natural and artificial systems.’

National Curriculum for computing, 2014

The purpose of this document is to help you as a STEM Ambassador align your expert knowledge to the computing curriculum. To aid matching activities to your expertise, we have divided the curriculum into 10 strands and each one shows the progression from Key Stage 1 to 2. It's worth noting that mental models maybe used to help deliver content to students, we highly recommend you discussing content with the classroom teacher to ensure your content is pitched at the correct level.

Digital skills amongst students:

It's important to consider what digital skills students will have experience of, the following information has been taken from the '[Digital literacy within the computing curriculum](#)' report – Jan 2021:

✓ Key stage 1 students:

Learning may centre on portable devices: mobile phones, tablets, games devices. Learners who have used general purpose devices – PCs and laptops – may have had only limited access to a shared device.

✓ Key stage 2 students:

Students are likely to be able to make use of computing devices, including a keyboard and mouse, to create text and graphics. They also have some experience in using technology to organise and categorise simple data.

1 Subject knowledge

Algorithms

An algorithm is a set of instructions that need to be followed in a particular order to solve a problem. In Key Stage 1, students need to follow and create basic algorithms. They can follow and explain what each instruction does (trace the algorithm) and find and fix errors in the instructions (debug). Examples can be:

- following instructions in an action song
- completing a sequence of instructions for a task, for example, 'How to brush your teeth'
- using simple floor robots to move in certain directions, giving instructions by pressing buttons

- solving simple onscreen educational games on a computer or tablet

Progressing to Key Stage 2, students will build on their prior learning by starting to break big problems into smaller parts (to decompose a problem). They will be more precise and be able to trace and debug more accurately. This includes controlling or simulating physical systems, for example, creating an algorithm for an everyday computer-controlled device.

Programming

In Key Stage 1, students will begin to learn that programs are created using common building blocks, including commands and simple loops or repeats. Students should be able to:

- use logical reasoning to predict the behaviour of simple programs
- create, follow, explain and fix errors in simple programs, based on their practice with algorithms
- name inputs and outputs
- create simple sequences of instructions and see where commands are repeated
- use simple blocks of commands to create their programs

Students will be taught to:

- use sequences of instructions, to include inputs and outputs using numbers and letters, for example, to keep score in a game or to add the name of the high scorer
- use simple maths to manipulate the numbers and carry out calculations, such as, checking if the age of a person is above a minimum age limit
- use blocks of code to control physical systems at a basic level, for example, Sphero robots. Older students can begin to experiment with control electronics, for example, micro:bit, Crumble or Raspberry Pi devices.

Progressing to Key Stage 2, students will build on their learning about programming to create and fix programs using blocks of commands.

The older students may experiment with text-based computer languages, however, the emphasis is on getting them to be confident with the programming constructs, to solve

specific problems. Block-based languages help to avoid spelling mistakes and offer a library of blocks to choose, so the majority of students can develop their understanding with these.

Data and Information

Students learn how computers process data and how the resulting information can be used to form judgements and make predictions. In Key Stage 1, students will:

- identify, describe and match objects using labels
- identify the label for a group of objects and count them
- compare totals in a tally chart and create a pictogram

Progressing to Key Stage 2, students will begin to use data collection using technology by:

- identifying data from input devices, such as, sensors
- identifying data that can be gathered over time
- use a computer program to sort data and view it in different ways
- explain the benefits of using a computer to create graphs



Computer Systems

Students learn what a computer is and how the parts function together as a whole. They need to recognise and name the main parts of a computer. They should be able to name common software applications and apps whilst explaining what they do. At Key Stage 1, students should be able to:

- explain how technology can help us
- locate examples of technology in the classroom
- name the main parts of the computer, for example, monitor, keyboard, mouse
- identify rules to keep us safe and healthy when using technology in and beyond school

Progressing to Key Stage 2, students will be able to:

- describe that a computer system features inputs, processes and outputs
- explain that computers communicate with other devices
- explain the benefits of computers for society

Networks

Students learn that a network is two or more computers connected together. At Key Stage 1, they may simply know that a computer is connected to the World Wide Web. Progressing to Key Stage 2, students develop their knowledge as they move from Year 3 to 6, this could include:

- demonstrating how information is shared across the internet
- know the internet is a network of networks and can provide multiple services, such as, the World Wide Web
- recognise the World Wide Web is part of the Internet and contains websites and web pages
- explain that the Internet allows different media to be shared
- how to search the World Wide Web
- identify how the Internet allows collaboration between people

Safety and Security

Students should be familiar with the term 'e-safety' when thinking about their use online. In Key Stage 1, they begin to discuss how to stay safe online and who to talk to, if they find something upsetting or are not sure about.

This progresses into Key Stage 2, to discuss reporting unsafe behaviour and identifying the disadvantages of being online balanced with the advantages of searching and sharing information and collaboration with others.

2 Computing Skills

Creating Media

Students will select and create a range of media including text, images, sounds and video. At Key Stage 1, students will create and adapt media with a specific purpose. Some tablet apps enable the children to capture photos and sounds, which can be triggered by pressing buttons.

At Key Stage 2, they will select, adapt, create and combine media to meet a specification. For example, writing using Microsoft Word or Google Docs and simple presentations using Microsoft PowerPoint or Google Slides. Spreadsheets can capture data and perform simple manipulations, for example, SUM. Using iPad tablets, they can use apps to write using Pages, present with Keynote and edit video with Apple Clips and iMovie. The camera can capture slow-motion or time-lapse videos.

Design and Development

Students will learn what is involved in planning, creating and evaluating computing artifacts, for example, simple programs made with block-based commands. In Key Stage 1, students will plan, collaborate, implement and evaluate simple programs.

Progressing to Key Stage 2, they will analyse other people's programs and then design their own ones, in addition to the planning, collaboration and evaluation.

Effective use of tools

Students will use software tools to support their computing work. Students will develop confidence and efficiency with different software tools throughout their learning, including:

- saving and opening files
- using word processors, drawing tools, audio and video editing tools
- block-based programming software

Impact of Technology

Students will learn how they interact with computer systems. At Key Stage 1, students will develop knowledge and understanding of the uses of technology in the home and in their everyday lives. They will consider how to use technology responsively. As they progress into Key Stage 2, they will begin to evaluate the content they find and consider their privacy and sharing online.

Further help

Follow this link to the [National Curriculum for computing in England](#).

Code Club resources can be freely downloaded from: <https://codeclub.org/en/>

A range of Teach Computing lesson ideas are available:

for Key Stage 1: <https://teachcomputing.org/curriculum/key-stage-1>

for Key Stage 2: <https://teachcomputing.org/curriculum/key-stage-2>