

A high-quality computing education equips pupils 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. 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 content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Year 1

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

AFL Questions

- Here is a real life problem/task, can you break it down into a series of steps (sequence)?
- What is an algorithm? Can you think of an everyday situation where one would be used?
- Can you predict what the program will do? Why do you think that? (This program can be a piece of computer software or one that they or a peer has created).
- What creative content can you produce using a tablet? Why is a tablet a good device for this task?
- How is IT used outside of school?
- Why do we need to keep ourselves safe when using the internet? How can we do this?

Year 2

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school

- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

AFL Questions

- What sort of program could we create using Scratch? How would we do this?
- What is it called when we correct errors in a simple program? How do we do this?
- Why is it important that we use 'SafeSearch'?
- How do you think robots have changed the way products are made in factories? Can you think of any examples of where they'd be used?
- What could the consequences of sharing personal information online be?

Year 3

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

AFL Questions

- How can we design and write a program using a block language?
- What have you learnt from using the 'simulation'?
- What is a sequence-algorithm? Why is it important that our sequence is in a particular order?
- Using a computer, how could we collect and then present information?
- Explain different ways we can show respect to others online.

Year 4

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital

devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

AFL Questions

- Describe an algorithm that uses both sequence and repetition. Where might this be used?
- How can we detect and correct errors in programs?
- Explain how results from a search engine are ranked.
- Who can we talk to if we have any concerns about inappropriate behaviour observed when using IT?
- What are the benefits of a network?

Year 5

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

AFL Questions

- How are web pages created and transmitted using a HTML code?
- What is the importance of using 'encryption'? Can you think of a scenario where this would be used?
- Share an example of when you have used a network and what advantages did this bring?
- What advantages are there of using multiple programs on your end product? Give an example of where you have done this. What challenges did this bring? How did you overcome them?
- What is the difference between a sequence-based algorithm and a rule-based algorithm? Can you think of scenarios where they would both be used?
- What strategy would you use to spot any errors in algorithms?

Year 6

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

AFL Questions

- Can you share an example of a program that you have written using your own idea and not based on the language of Scratch?
- Looking at this digital content, consider the intended audience and purpose. Do you think it is effective and unbiased? Why/why not?
- Explain the difference between algorithms that use sequence, repetition and selection. When would each be most appropriate?
- Explain how mobile phone networks work.
- What is the difference between a domain name and an IP address?
- What agencies are available to contact if you come across inappropriate content online?