

# COMPUTING

## COMPUTER SCIENCE

### Algorithms and programming

#### Year 2

- Describe algorithms as sequences of instructions or sets of rules in everyday contexts; understand the importance of order and accuracy of these.
- Program on screen using sequences of instructions to implement an algorithm.
- Create programs as sequences of instructions when programming on screen, correcting any errors.
- Begin to experiment with variables.

#### Year 4

- Design and write a program using a block language to a given brief, including simple interaction (programs to include variables, stages, artificial intelligence and a scoring system).
- Use sequence and repetition in programs.
- Write a program that accepts keyboard input and produces on-screen output.
- Develop their own simulation of a simple physical system on screen.

#### Year 6

- Design, write and debug a program using a second programming language based on their own ideas (using loops, sprites that move in a variety of ways, allowing them to disappear and appear randomly, manipulate variables and use operators that determine an outcome of a conditional statement).
- Use sequence, selection, repetition and variables in programs. Write a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers.
- Design, write and debug their own computer control application. Solve problems using decomposition, tackling each part separately.
- Understand that coding is the use of programming languages to make games, programs and computers things.
- Write and adapt programmes using Javascript and Python (print command, run button, input command, random command).

#### Year 1

- Describe algorithms as sequences of instructions in everyday contexts.
- Plan a sequence of steps to solve real life problems.
- Program floor robots using sequences of instructions (using directional language) to implement an algorithm.
- Create programs for floor robots and sprites on the screen using a number of steps in order before pressing the Go button.
- Begin to use conditional language like "if" and "when."

#### Year 3

- Design and write a program using a block language (programs to include movement, dialogue, sound effects, stages, sprites, loops and variables) without user interactions.
- Use sequence in programs. Write a program to produce output on screen.
- Explain how loops and random numbers are used in a program.
- Explain how conditional statements are used in a program.
- Understand what it means to decompose an algorithm and decompose a program into smaller parts.

#### Year 5

- Design, write and debug a program using a block language based on their own ideas (programs to include multiple sprites, multiple variables, sensors and conditional statements).
- Use sequence, selection and repetition in programs.
- Write a program that accepts keyboard and mouse input and produces output on screen and through speakers.
- Develop their own simple computer control application.
- Plan a solution to a problem using decomposition.

# COMPUTING COMPUTER SCIENCE Logical Reasoning

## Year 2

- Give logical explanations of what a program will do under given circumstances, including some attempt at explaining why it does what it does.

## Year 4

- Use logical reasoning to detect and correct errors in programs. Explain an algorithm using sequence and repetition in their own

## Year 2

- Explain and understand how an email is sent.

## Year 3

- Understand that email and videoconferencing are made possible through the internet.

## Year 4

- Use and explain how search engines work.
- Explain how the internet makes the web possible.
- Understand that search engines rank pages according to relevance. Create a webpage and explain how web pages are created and transmitted.

## Year 1

- Explain what they think a program will do.

## Year 3

- Use logical reasoning to predict outcomes and detect errors in programs.
- Use and explain a simple, sequence based algorithm in their own words.

## Year 5

- Explain a rule-based algorithm in their own words. Use logical reasoning to detect errors in algorithms.

## Year 6

- Give clear and precise logical explanations of a number of algorithms.
  - Use logical reasoning to detect and correct errors in algorithms (and programs).

# COMPUTING COMPUTER SCIENCE Networks and Search Engines

## Year 6

- Understand how mobile phone or other networks operate.
- Understand how domain names are converted into IP addresses on the internet.
- Appreciate that search engines rank pages based on the number and quality of in-bound links.

## Year 5

- Explain how search engines are ranked.
- Understand how data routing works on the internet.
- Explain how web pages are created and transmitted in their own words.

# COMPUTING

## Information Technology

## Digital Productivity

### Year 2

- Store, organise and retrieve content on digital devices for a given purpose.
- Create and edit original content for a given purpose using digital technology.
- Present findings using software and interpret the data. Input data accurately and present this information in graphical format.

### Year 4

- Use and combine a range of programs on a computer.
- Design and create content on a computer in response to a given goal.
- Collect, analyse and present data.

### Year 3

- Search for information within a single site.
- Describe how search engines select pages according to keywords found in the content.

### Year 4

- Use a standard search engine to find information using a range of strategies to be more successful in finding reliable information.

### Year 1

- Use digital technology to store and retrieve content. Identify different kinds of content.
- Create original content using digital technology.
- Use a mouse to navigate around the computer screen.

### Year 3

- Use a range of programs on a computer.
- Design and create content on a computer.
- Collect and present information.

### Year 5

- Use and combine a range of programs on multiple devices.
- Design and create programs on a computer in response to a given goal.
- Analyse and evaluate information.

### Year 6

- Select, use and combine a range of programs on multiple devices.
- Design and create systems in response to a given goal.
- Analyse and evaluate data using their chosen software and graphs.

# COMPUTING

## Information Technology

## Searching

### Year 6

- Make use of a range of search engines appropriate to finding information that is required.

### Year 5

- Use filters to make more effective use of a standard search engine.
- Understand that search engines use a cached copy of the crawled web to select and rank results.

# COMPUTING

## Digital Literacy

## Digital Creativity

### Year 1

- Identify what personal information is.
- Identify what to do if they see disturbing content online at home or at school.
- Identify ways to keep themselves safe while using digital technology.
- Understand that information on the internet can be seen by others.
- Describe some of the risks that occur on the internet.
- Show an awareness of how IT is used for communication beyond school.

### Year 2

- Explain what personal information is and develop awareness of why it is special and should not be shared.
- Explain what to do if they have concerns about content or contact online.
- Keep safe and show respect to others while using digital technology.
- Identify ways they can use the Internet to communicate with family and friends.
- Show an awareness of how IT is used for a range of purposes beyond school.

### Year 3

- Identify who they can trust and share their personal information with online.
- Use digital technology safely and show respect for others when working online.
- Identify how to report concerns and inappropriate behaviour in school.
- Recognise unacceptable behaviour when using digital technology.
- Decide whether a web page is relevant for a given purpose or question.
- Use email and videoconferencing in class appropriately.
- Explain and understand online protocols, in order to stay safe on the web.
- To identify cyberbullying and its consequences.
- Identify the risks on online gaming and know how to protect themselves.

### Year 4

- Demonstrate that they can act responsibly when using computers.
- Identify and explain the differences between acceptable and unacceptable behaviours when using digital technology.
- Know who to talk to about concerns and inappropriate behaviour at home or in school.
- Decide whether digital content is relevant for a given purpose or question.
- Collaboratively communicate with peers on a shared wiki appropriately.
- Begin to use a range of online communication tools, such as forums, email and polls in order to formulate, develop and exchange ideas.
- Describe the meaning of copyright and the importance of acknowledging sources.

### Year 5

- Demonstrate that they can act responsibly when using the internet.
- Discuss the consequences of particular behaviours when using digital technology.
- Know how to report concerns and inappropriate behaviour in a range of contexts.
- Decide whether digital content is reliable and unbiased.
- Work collaboratively with peers on a class website or blog.
- Explain what is meant by copyright

### Year 6

- Show that they can think through the consequences of their actions when using digital technology.
- Identify principles underpinning acceptable use of digital technologies.
- Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts.
- Articulate an opinion about the effectiveness of digital content.