

Year 9 - Computing

Areas of Learning

- **Algorithms:** Consider aspects of computational thinking: problem decomposition, logical reasoning, pattern recognition, abstraction, pattern generalisation and algorithm design. Understand that some problems cannot be solved computationally and that a compromise is made to create an algorithmic solution.
- **Programming & Development:** Use at least one textual based programming language to solve a variety of computational problems, using a variety of programming constructs, logic and Boolean operators, in order to build modular programs. Use logical reasoning to predict the behavior of a program, to analyse its performance and to debug logical (semantic), syntax (syntactical) and run-time errors.
- **Data & Data Representation:** Understand how computers store and manipulate data of different forms. To appreciate that the choice of digital data representation and the way it is stored can impact the ability of a computer system to analyze the information that is being held.
- **Hardware & Processing:** Understand the main functional units of a computer system, how data is generated, stored, processed by a computer, and how its output can be used. Understand the low-level architecture of computer systems, to appreciate how some of the main computer modules function and how the hardware enables such functions.
- **Communication & Networks:** Appreciate the structure and operation of data communication networks, and how the internet works.
- **Information Technology:** Use standard tools to create and repurpose digital content. Use available tools to search for content and to judge content carefully in terms of its reliability and impact.

Approaches to learning

- Use online services, such as Codecademy, that guide learners step-by-step, with interactive feedback, that allow them to learn a programming language.
- To undertake individual and team-based creative projects:
 - To build skills with common software packages that allow pupils to create and repurpose digital content.
 - To work on problem solving activities that promote the use and development of computational thinking and program development skills, within the context of cross-curricular topics and possibly related to real-world applications.
 - To use robotics and other electronics equipment to demonstrate the use of computer technology in measurement and control applications.
 - To simulate digital logic circuits in order to appreciate how circuitry in a computer operates.
 - To collection information and analyse it.
 - That research and investigate how people and organisations protect themselves, their identity and data online.
- Build simulations to demonstrate their understanding of a particular topic, such as the operation of a digital adder circuit.

- Document project work using Microsoft Word, process data using Microsoft Excel, and create presentations using Microsoft Powerpoint.
- To create poster displays of their work.
- Exercises and projects aimed at involving pupils in computational thinking.

Examples of learning

- Pupils develop computer programs that demonstrate alternative sorting algorithms, monitor their performance, analyse results, consider scaling equations for the algorithms and compare algorithmic efficiencies.
- Pupils research an issue associated to the use of computing technology.
- Pupils research the impact of computer technology on a particular industry, combine their work into a poster display that illustrates different areas of use of computer technology and its impact on society.

References

- P. Kemp, (2014), "Computing in the national curriculum: A guide for secondary teachers", ISBN: 978-1-78339-376-3.
- M. Dorling, et.al, (2014), "Computing progression pathways", Computing at School, download accessed on 07-07-2015 at www.computingatschool.org.uk
- UK Department of Education, (2013), National Curriculum Documents available at: <https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-2>, web-document published on 11 September 2013.