| | | | Phase 1 - build a computer | | | | Phase 2 - Discover Circuitry & Electronics | | | | Phase 3 - Learn to code with Pipercode | | | Phase 4 - Extend with design thinking | | | | | Phase 5 - Deconstruct & reflect | | | | |
|--------------------------|----------------------|---|----------------------------|---|---|--|---|-------------------------|-------------------------|----------------------|--|------------------|--------------|---------------------------------------|-------------------------------------|---------------------|------------------------------|---------------------------|----------------------------------|---------------------------|----------------------------|--|---------------------------|
| | | P I P E R | | 1.1 1.2 1.3 1.4 | | | 2.1 2.2 2.3 | | | 2.4 3.1 | | 3.2 | | | 3.4 3.5 | | 4.1 4.2 4.3 | | 4.4 5.1 | | 5.2 5.3 | | 5.4 |
| | | UK Curriculum Alignment | What is a computer? | Build a Computer: Executing a Plan | Build a Computer: Practicing Flexibility | Build a Computer: Completing a System | Open vs closed circuits: buttons and breadboards | Basic inputs & outputs | Polarity & audio output | Parallel circuits | Intro to computational thinking | Loops & sequence | Events | Programming with lights & sound | Additional PiperCode Projects | Extend in storymode | Design a bot & make music | Redesign a traffic bot | Engineering design with Piper | Take apart and reflection | Computers in everyday life | The environmental impact of computers | Final design challenge |
| Key Stage 3 Key Stage 2 | | design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts | | > | V | ✓ | N | ~ | X | V | V | N | V | ~ | > | \checkmark | V | ~ | > | \checkmark | | | |
| | | use sequence, selection, and repetition in programs; work with variables and various forms of input and output | | | | | | | | | $\overline{\mathbf{v}}$ | \checkmark | \checkmark | $\overline{\mathbf{v}}$ | \checkmark | | \checkmark | \checkmark | $\overline{\mathbf{v}}$ | | | | |
| | | use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs | | | | | | | | | \checkmark | \checkmark | \checkmark | \checkmark | \checkmark | | | \checkmark | \checkmark | | | | |
| | , [| 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 | | | | | | | | | | | | | | | | | | | | | |
| | Á I | 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. | ~ | V | V | V | N | ~ | V | V | V | ~ | V | ~ | ~ | \checkmark | | V | V | \checkmark | | | |
| | | use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. | | | | | | | | | | | | | | | | | | | | V | |
| | | design, use and evaluate computational abstractions that model the state and | | | $\overline{}$ | $\overline{\vee}$ | $\overline{}$ | ~ | V | ~ | abla | \overline{v} | | abla | V | abla | ~ | | $\overline{\checkmark}$ | | | | |
| | | behaviour of real-world problems and physical systems understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem | | | | | | _ | | | | | | | ✓ | | | | | | | | |
| | | attentative algorithms for the same protocols use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions | | | | | | | | | | | | | | | | | V | | | | |
| | | understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal] | | | | | | | | | | | | | | | | | | | | | |
| | | understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems | \checkmark | \checkmark | ~ | \checkmark | V | $\overline{\mathbf{v}}$ | V | ~ | \checkmark | V | \checkmark | \checkmark | ~ | \checkmark | \checkmark | \checkmark | ~ | ~ | \checkmark | \checkmark | \checkmark |
| | | understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits | | | | | | | | | | | | | | | | | | | | | |
| | | undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users | | | | | | | | | ~ | ~ | V | ~ | ~ | ~ | | ~ | | \checkmark | $\overline{\mathbf{v}}$ | | |
| | İ | create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability | | | | | | | | | | | | | | | | | | ~ | | | |
| | İ | understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns. | | | | | | | | | | | | | | | | | | | | | |
| | | use research and exploration, such as the study of different cultures, to identify and understand user needs | | | | | | | | | | | | | | | | | | | | | |
| | Evaluate Make Design | identify and solve their own design problems and understand how to reformulate problems given to them | $\overline{\mathbf{v}}$ | \checkmark | ~ | | ~ | \square | $\overline{\mathbf{v}}$ | ~ | \square | | \checkmark | $\overline{\mathbf{v}}$ | \checkmark | \checkmark | \checkmark | | $\overline{\mathbf{v}}$ | ~ | | | |
| | | develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations | | | | | | | | | | | | | | | | | | | | | \checkmark |
| | | use a variety of approaches [for example, biomimicry and user-centred design], to generate creative ideas and avoid stereotypical responses | | | | | | | | | | | | | | | | | | | | | |
| ogo | | develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools | | | | | | | | | | | | | | | | | | | | | K |
| Technology | | select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture | ~ | < | ~ | \checkmark | > | \checkmark | < | ~ | | | | | | \checkmark | | \checkmark | | ~ | | | |
| | | select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties | | | | | | | | | | | | | | | | | | | | | |
| Key Stage 3 - Design and | | analyse the work of past and present professionals and others to develop and broaden their understanding | | | | | | | | | | | | | | | | | | | | | |
| | | investigate new and emerging technologies | | | | | | | | | | | | | | | | | | | | | |
| | | test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups understand developments in design and technology, its impact on individuals, society | | | | | | | | | | | | | | | | | | | | | |
| | | and the environment, and the responsibilities of designers, engineers and technologists understand and use the properties of materials and the performance of structural elements to achieve functioning solutions | | | | | | | | | | | | | | | | | | | | | |
| | | understand how more advanced mechanical systems used in their products enable | | | | | | | | | | | | | | | | | | | | | |
| | | changes in movement and force understand how more advanced electrical and electronic systems can be powered and used in their products [for example, circuits with heat, light, sound and | | | | | | V | | <u> </u> | | | | | | ✓ | ✓ | | ☑ | <u> </u> | | | |
| | | movement as inputs and outputs] apply computing and use electronics to embed intelligence in products that respond to inputs [for example, sensors], and control outputs [for example, actuators], using | | V | V | V | V | ✓ | V | V | V | V | V | V | ✓ | V | V | V | V | V | | | |
| | | programmable components [for example, microcontrollers]. identify common appliances that run on electricity | П | | П | | | | | П | | | | | П | П | | | | | | | |
| ear 4 | Į, ľ | toentry common apprainces tract on or electricity construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers | | <u></u> | <u> </u> | | <u> </u> | | | <u></u> | | <u> </u> | | | ✓ | ✓ | | <u></u> | | <u> </u> | | | |
| 2 - Y. | Electricity | identify whether or not a lamp will light in a simple series circuit, based on whether or | | | | | ✓ | | | | | | | | | | | | | | | | |
| Stage 2 - Y Science | Elect | not the lamp is part of a complete loop with a battery recognise that a switch opens and closes a circuit and associate this with whether or | | | | | | | | | | | | | | | | | | | | | |
| Key St | - | not a lamp lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being | | | | | | | | | | | | | | | | | | | | | |
| × | | good conductors | | | | | | | | | | | | | | | | | | | | | |