

West Croft School



# Computing Intent



## Intent

The third edition of *Switched On Computing* provides full coverage of the primary computing programmes of study. You can follow the course as a whole and be reassured of delivering a coherent, complete computing curriculum which helps pupils to progress their knowledge, understanding and skills in computing. You can also adapt all that is here to suit your own school's context, your curriculum, and the enthusiasms and interests of your pupils and colleagues.

There is a 'spiral' approach to sequencing the units, with themes recurring year by year. This provides ample opportunity for pupils to:

- consolidate technical skills
- achieve fluency with a range of key applications
- develop their knowledge and understanding of the principles that underpin digital technologies and the changing consequences of these for individuals and society.

Each year includes units covering the foundations, applications and implications of computing, ensuring that pupils progress in the computer science, information technology and digital literacy strands of the computing curriculum. It also encourages creativity, collaboration and thinking skills.

## Computer science

In computer science, pupils learn to program first with BlueBots, then Scratch3k, then Scratch and the micro:bit. This takes pupils from a physical manipulative in Key Stage 1, through a pictorial representation of code with Scratch3k to a virtual, on-screen, manipulative in which text-based programming is made more accessible through a block-based language. It also ensures progression through key programming constructs, with pupils introduced to sequence with the BlueBot, repetition in Scratch3k, and selection and variables with Scratch and MakeCode for the micro:bit. They develop their computational thinking: the ability to apply programming skills to solve real world problems systematically.

## Information technology

Pupils acquire skills in using core 'office' applications to work with text, multimedia presentations and data analysis, as well as a competency with digital media from photography and audio to video, animation and virtual reality. The programme of study for computing at Key Stage 1 requires that pupils be taught to 'use technology purposefully to create, organise, store, manipulate and retrieve digital content', and *Switched On Computing* ensures that they can do this using text, images, sound and video. Building on this at Key Stage 2, *Switched On Computing* helps them to 'select, use and combine' a variety of software on a range of devices. They work with both numerical data and information across a range of formats including those that combine both words and images.

## Digital literacy

Pupils develop an understanding of how the Internet, the World Wide Web and search engines work, as well as

learning how to use these and other technologies safely and responsibly.

## Creativity

*Switched On Computing* emphasises computing as a creative subject. Many units involve pupils in making digital artefacts, ranging from programs and presentations to virtual models and movies.

## Collaboration

Units also provide ample opportunity for pupils to learn together: in many units they work in pairs or small groups, and even when working individually there is opportunity built-in for them to give and receive feedback to others. Pupils become increasingly discerning in evaluating online content and their own and others' work.

## Thinking skills

The scheme encourages pupils to think about digital technology: computational thinking concepts such as logic, algorithms, decomposition and abstraction are emphasised throughout. Pupils are regularly asked to consider the broader moral and ethical issues raised by the technologies they study.

## Implementation

*Switched On Computing* is structured around six units of work per year group, each of which has six sessions, or a half term's worth of work. It can be implemented through weekly computing lessons, or used more flexibly, for example it can be easily adapted to off-timetable theme days. There are many ways to link these units to other subjects pupils are studying and suggestions for this are included. Schools should consider which approach is best suited to their context and be clear why they have chosen this approach as the best way to deliver computing. There are also suggested homework activities to provide a bridge from one session to the next. These should never be seen as essential to completing the unit, but as a way to help engage pupils' parents with the curriculum content and their child's learning.

## Software and hardware

*Switched On Computing* has been written with multiple software and hardware platforms in mind. Most of the software suggested is free. This edition recognises the extensive use of Apple's iPads in Key Stage 1 and lower Key Stage 2, and the increasing numbers of schools that use Chromebooks and platforms such as Google's G Suite for Education or Microsoft 365 Education. There are step-by-step session presentations and walkthrough videos for the recommended software, but alternatives are also suggested, and the units are designed to be adapted for use with different tools.

## Challenge and support

Some pupils seem particularly confident in using technology and ideas for challenge are included in all the

units. These pupils could also go on to use ideas from the units for independent exploration. On the other hand, many pupils will need additional support or scaffolding: step-by-step instructions can be useful, as can focussing on the core functionality of particular apps or programs. The units provide guidance on how additional support can be provided. Assistive technology makes digital tools accessible to many pupils with SEND: speech-to-text and text-to-speech interfaces are increasingly common. Language interfaces and automatic translation can be used to make lessons and technologies much more accessible to those learning English as an additional language (EAL).

## Online safety

Online safety themes in the units can be linked to a broader exploration of these ideas in PSHE and relationships education. We also recognise where parents' permission is needed for pupils to use online services, for filming or photography or to publicly share pupils' creative work. Keeping children safe online is a key element of *Switched On Computing*, but we recognise that this responsibility can only be fully met through working in partnership with pupils' parents.

## Impact

*Switched On Computing* includes a variety of approaches to evaluate the impact of computing lessons and guidance on assessment.

The digital artefacts pupils make provide excellent evidence of their developing skills. A whole-school approach to keeping an online portfolio of each pupil's work in computing is recommended, clearly demonstrating each pupil's achievements and progress from one year to the next. There's no need for work done in the digital domain to be printed off to provide evidence. The system here need not be sophisticated: individual blogs can be set up easily, but cloud-based storage in Google Drive or Microsoft OneDrive would be quite sufficient.

In most units there is an opportunity for pupils to share their work with their peers, and to get feedback on what went well, or what might have been even better. Encourage pupils to be constructively critical in their feedback and use these sessions as an opportunity to assess the product of pupils' learning using the unit learning outcomes as a guide.

The *Switched On Computing* team are always thrilled to see pupils' work shared via schools' Twitter or other social media accounts. If you have the permission of parents, consider sharing some examples of what pupils have done with an audience beyond the classroom.

## Tracking progress

In order to help assess and track pupils' progress, each unit includes:

- assessable outcomes, presented in the format 'all pupils can...', 'most pupils can...' and 'some pupils can...', which are mapped to corresponding statements from the programme of study. Therefore, a single unit could allow pupils to demonstrate learning relating to different areas from the programme of study. Pupil progress against these can be tracked on the online tracker

- a self-evaluation opportunity for pupils to assess their own work and reflect on their own learning
- end-of-unit quizzes for pupils, to provide you with some insight into pupils' knowledge and understanding alongside their practical skills, as well as an indication of where there may be lingering misconceptions that are worth addressing through individual or class discussion.

The Rising Stars Progression Framework for computing is also provided which breaks down the curriculum into individual statements with 'what to look for' guidance to help teachers identify gaps in pupil's knowledge and understanding. It includes references to the *Switched On Computing* units.

## Development Team

The first edition of *Switched On Computing* was a result of collaboration between Rising Stars, Miles Berry of the University of Southampton, who was part of the drafting groups who drew up the computing curriculum; and experienced advisors and inspectors from HES (Hawking Education Services). The scheme was endorsed by both Computing At School and Naace, with Dr John Weallard of the University of Southampton, acting as computing consultant for the former.

HES has a long and proud history of supporting schools to bring about continuous and sustained improvement in teaching and learning, standards and achievement, leadership and management, and curriculum and assessment. See [www.HES.org.uk](http://www.HES.org.uk)

The third edition of *Switched On Computing* has been updated by Miles Berry in partnership with HES and with additional advice from Martin Bailey, an independent primary computing consultant. Adam Chase, a Bury LA leading teacher for computing, Apple Distinguished Educator and CAS Master Teacher, has created the accompanying online resources.

## What is included?

Each year comprises:

- a teacher's book
- access to online resources on My Rising Stars.

## Teacher's book

Each teacher's book includes:

- **Introduction** – gives detail of the structure and types of resources included in the scheme
- **Overview of units** – an at-a-glance view of the units included in this book, including the learning expectations, coverage of the Computing programme of study and the software and hardware needed
- **Curriculum links** – a matching chart showing where the units link to other areas of the curriculum
- **Online safety road map** – an overview of how online safety points are covered in the units
- **Six units** – which include a unit plan, preparation for teaching the unit and comprehensive step-by-step instructions for each of the six teaching sessions
- **Glossary** – defines all key vocabulary.

# Year 1

| Term                               | Autumn1  | Autumn 2   | Spring 1  | Spring 2  | Summer 1   | Summer 2  |
|------------------------------------|--|--|---|---|--|---|
| <b>Title</b>                       | We are treasure Hunters  | We are TV chefs  | We are digital artists  | We are publishers   | We are rhythmic  | We are detectives   |
| <b>Focus</b>                       | Programming  | Filming  | Creating digital art  | Creating a multimedia eBook   | Creating sound patterns using programming  | Using data to solve clues   |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>Understand that a programmable robot can be controlled by inputting a sequence of instructions.</li> <li>Develop and record sequences of instructions as an algorithm.</li> <li>Debug programmes.</li> <li>Predict how programmes will work.</li> </ul> | <ul style="list-style-type: none"> <li>Breakdown a process into an algorithm.</li> <li>Use different features of a video camera.</li> <li>Edit a video and include video commentary.</li> <li>Develop collaboration skill.</li> <li>Revise and improve my work.</li> </ul> | <ul style="list-style-type: none"> <li>Select and set brushes and colours.</li> <li>Create an artwork in a range of styles.</li> <li>Use the undo function to amend mistakes.</li> <li>Use and transform multiple layers in art.</li> <li>Paint on top of photographs.</li> </ul> | <ul style="list-style-type: none"> <li>Plan a small multimedia eBook.</li> <li>Select and import images.</li> <li>Record audio commentary.</li> <li>Add and format titles and other text.</li> <li>Think carefully about protecting privacy.</li> <li>Respect other people's copyright.</li> <li>Revise and improve my work.</li> </ul> | <ul style="list-style-type: none"> <li>Record audio</li> <li>Programme sprites to playback audio (Scratch Jn).</li> <li>Programme repeated rhythms.</li> <li>Explore different effects that can be added to audio.</li> <li>Experiment with a range of virtual instruments.</li> </ul> | <ul style="list-style-type: none"> <li>How data can be structured as records with fields for information.</li> <li>How data can be organised into groups and subgroups.</li> <li>How data can be structured as a tree.</li> <li>How data can be organised as a table.</li> <li>How data in a table can be filtered and searched.</li> </ul> |
| <b>Curriculum Links</b>            |  | <ul style="list-style-type: none"> <li>All areas</li> </ul>  | <ul style="list-style-type: none"> <li>Art</li> </ul>   | <ul style="list-style-type: none"> <li>All areas</li> </ul>   | <ul style="list-style-type: none"> <li>Music</li> </ul>  | <ul style="list-style-type: none"> <li>Maths</li> </ul>   |

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## Year 2

| Term                               | Autumn1   | Autumn 2  | Spring 1  | Spring 2  | Summer 1  | Summer 2   |
|------------------------------------|---|---|---|---|---|--|
| <b>Title</b>                       | We are astronauts   | We are games testers  | We are photographers  | We are safe researches  | We are animators  | We are zoologists  |
| <b>Focus</b>                       | Programming   | Programming   | Photographing & editing   | Researching a topic   | Creating a stop motion animation  | Collecting data about bugs   |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>Plan a sequence of instructions to move sprites in Scratch Jr.</li> <li>Create, test and debug programmes.</li> <li>Use repetition in programmes.</li> <li>Design costumes for sprites.</li> </ul> | <ul style="list-style-type: none"> <li>Observes and describe what happens in computer games.</li> <li>Make and test predictions from looking at programmes.</li> <li>Create sequences of instructions for a virtual robot to solve a problem.</li> <li>Understand how to play games safely and in balance.</li> </ul> | <ul style="list-style-type: none"> <li>Consider the technical and artistic merits of photographs.</li> <li>Take digital photographs</li> <li>review, reject or pick taken images.</li> <li>Edit and enhance photographs.</li> </ul> | <ul style="list-style-type: none"> <li>Develop collaboration skills.</li> <li>Develop research skills by searching on the internet.</li> <li>Think through privacy implications.</li> <li>Be discerning when evaluating online information.</li> <li>Develop presentation skills by creating and delivering a multimedia presentation.</li> </ul> | <ul style="list-style-type: none"> <li>Understand how animation works.</li> <li>Use storyboards to plan an animation.</li> <li>Create original characters, props and backgrounds for an animation.</li> <li>Film, review and edit a stop-motion animation.</li> <li>Record audio to accompany their animation.</li> <li>Provide feedback to peers.</li> </ul> | <ul style="list-style-type: none"> <li>Sort and classify a group of items by answering questions.</li> <li>Collect data use tick/tally charts.</li> <li>Take, edit &amp; enhance photographs.</li> <li>Create digital charts.</li> <li>Record information on a digital map.</li> </ul> |
| <b>Curriculum Links</b>            |   |   | <ul style="list-style-type: none"> <li>Art- (Science lesson linking it to nature)</li> </ul>  | <ul style="list-style-type: none"> <li>All areas</li> </ul>   | <ul style="list-style-type: none"> <li>English</li> </ul>   | <ul style="list-style-type: none"> <li>Science and Maths</li> </ul>  |

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# Year 3

| Term                               | Autumn1 & 2   | Spring 1  | Spring 1 & 2   | Summer 1 & 2  | Summer 2  |
|------------------------------------|---|---|--|---|---|
| <b>Title</b>                       | We are Programmers  | We are presenters   | We are who we are  | We are co-authors   | We are opinion pollsters  |
| <b>Focus</b>                       | Programming an animation  | Green screens   | Creating presentations about ourselves   | Producing a wiki  | Collecting and analysing data   |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>Plan and create and algorithm for an animated scene.</li> <li>Write a programme in Scratch.</li> <li>Evaluate and correct mistakes.</li> </ul> | <ul style="list-style-type: none"> <li>Develop web-based research skills.</li> <li>Structure, prepare and deliver a talk about a given topic.</li> <li>Record a piece to camera.</li> <li>Edit a movie.</li> <li>Evaluate and give feedback.</li> </ul> | <ul style="list-style-type: none"> <li>Create a number of structured presentations.</li> <li>Narrate presentations.</li> <li>Consider issues with trust and privacy when sharing information.</li> </ul> | <ul style="list-style-type: none"> <li>understand the conventions of collaborative online work.</li> <li>Be aware of responsibilities when editing other peoples work.</li> <li>Practise research skills.</li> <li>Write for a target audience using a wiki tool.</li> <li>Develop collaborative skills.</li> </ul> | <ul style="list-style-type: none"> <li>Understand some elements of survey design.</li> <li>Understand some elements of ethical and legal online data collection.</li> <li>Use the internet to facilitate data collection.</li> <li>Use charts to analyse data.</li> <li>Interpret results.</li> </ul> |
| <b>Curriculum Links</b>            |   | <ul style="list-style-type: none"> <li>All areas</li> </ul>   |  | <ul style="list-style-type: none"> <li>Project / maths</li> </ul>   | <ul style="list-style-type: none"> <li>Maths</li> </ul>   |

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# Year 4

| Term                               | Autumn1   | Autumn 2   | Spring 1   | Spring 2  | Summer 1   | Summer 2   |
|------------------------------------|---|--|--|---|--|--|
| <b>Title</b>                       | We are software developers  | We are musicians   | We are makers  | We are artists  | We are bloggers  | We are meteorologists  |
| <b>Focus</b>                       | Programming an educational game   | Creating a piece of digital music  | Programming mircobits  | Fusing geometry and art   | Sharing experiences and opinions   | Presenting the weather   |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>Develop an educational computer game using selection and repetition.</li> <li>Understand and use variables.</li> <li>Debug computer programmes.</li> <li>Understand the importance of user interface design, including consideration of input and output.</li> </ul> | <ul style="list-style-type: none"> <li>Create a repeating percussion rhythm.</li> <li>Play music using virtual instruments.</li> <li>Compose and edit tunes.</li> <li>Perform electronic music using pre-recorded loops and create loops.</li> <li>Create a multitrack composition.</li> <li>Give and receive feedback.</li> </ul> | <ul style="list-style-type: none"> <li>Understand the input-process-output model of computation.</li> <li>Understand and programme the inputs and outputs of a microbit.</li> <li>Programme using the MakeCode block-based environment.</li> <li>Test and debug programmes .</li> <li>Convert and transfer a programme written on screen to a microbit.</li> </ul> | <ul style="list-style-type: none"> <li>Become familiar with the tools and techniques of using a vector graphics package.</li> <li>Develop an understanding of turtle graphics.</li> <li>Experiment with the tools available in order to create a design.</li> </ul> | <ul style="list-style-type: none"> <li>Become familiar with blogs as a medium and a genre of writing.</li> <li>Create a sequence of blog posts on a theme.</li> <li>Incorporate additional media.</li> <li>Develop a critical, reflective view of a range of media.</li> </ul> | <ul style="list-style-type: none"> <li>Understand digital and analogue measurement techniques.</li> <li>Use computer based data logging to automate the recording of data.</li> <li>Analyse data and make predictions.</li> <li>Practise using presentation and video software.</li> </ul> |
| <b>Curriculum Links</b>            |   | <ul style="list-style-type: none"> <li>Music PPA</li> </ul>  |  | <ul style="list-style-type: none"> <li>Art / Maths</li> </ul>   | <ul style="list-style-type: none"> <li>All areas</li> </ul>  | <ul style="list-style-type: none"> <li>Maths / Project</li> </ul>  |

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# Year 5

| Term                               | Autumn1 & 2  | Spring 1 & 2  | Spring 2  | Summer 1 & 2  | Summer 2  |
|------------------------------------|--|---|---|---|---|
| <b>Title</b>                       | We are game developers   | We are web developers   | We are architects   | We are VR designers   | We are adventure gamers   |
| <b>Focus</b>                       | Programming an interactive game  | Understanding the internet and building a website   | Creating a virtual space  | Experiment with virtual and augmented reality   | Creating an interactive adventure   |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>• Create original art and sound</li> <li>• Design and create a computer program that uses sequence, selection, repetition and variables.</li> <li>• Detect and correct errors.</li> <li>• Use iterative development techniques (making and testing a series of small changes) to improve their game.</li> </ul> | <ul style="list-style-type: none"> <li>• Name and learn the function of the components that make the school's network.</li> <li>• Understand how information is passed between components on the internet.</li> <li>• Learn what the source code for a website looks like and how it can be edited.</li> <li>• Understand how a website can be structured.</li> <li>• Know how to add content to a web page.</li> </ul> | <ul style="list-style-type: none"> <li>• Understand the work of designers, engineers and architects working in 3D.</li> <li>• Use a simple CAD tool.</li> <li>• Develop greater aesthetic awareness.</li> </ul> | <ul style="list-style-type: none"> <li>• Explore real world and imagined places in VR.</li> <li>• Create 360° photosphere images.</li> <li>• Link physical objects to digital content using QR codes.</li> <li>• Create a VR scene.</li> <li>• Programme objects and interactions in VR.</li> </ul> | <ul style="list-style-type: none"> <li>• How to plan a non-linear presentation.</li> <li>• Create text as part of a presentation.</li> <li>• Add and edit images in a presentation.</li> <li>• Use hyperlinks.</li> <li>• To record and add audio to a presentation.</li> <li>• Use commenting tools to give feedback.</li> </ul> |
| <b>Curriculum Links</b>            |  |   | • All areas   | • Project / English   | • All areas- link to Rainforests  |

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# Year 6

| Term                               | Autumn1 and 2   | Spring 1 & 2   | Spring 2  | Summer 1   | Summer 1 & 2  |
|------------------------------------|---|--|---|--|---|
| <b>Title</b>                       | We are toy Makers   | We are publishers  | We are connected  | We are advertisers   | We are AI developers  |
| <b>Focus</b>                       | Coding and physical computing   | Creating a year book   | Developing skills for social media  | Creating a short TV advert   | Learning about AI and machine learning  |
| <b>WALTs / Assessment Criteria</b> | <ul style="list-style-type: none"> <li>How computers use stored programs to connect input to output.</li> <li>How to generate and evaluate designs in response to a brief.</li> <li>To plan a complex project by decomposing it into smaller parts.</li> <li>Understand how to design and write a program for an embedded system.</li> <li>Use criteria to provide others with feedback on their work.</li> </ul> | <ul style="list-style-type: none"> <li>Contribute to large collaborative projects using online tools.</li> <li>Write and review new content.</li> <li>Source digital media while demonstrating safe, respectful and responsible use.</li> <li>Design and produce a high quality print document.</li> </ul> | <ul style="list-style-type: none"> <li>Understand appropriate rules for online discussion.</li> <li>Understand how search results are selected and ranked.</li> <li>Learn how to argue points effectively using supporting sources.</li> <li>Understand how to reliably judge an online source.</li> <li>Learn some strategies to deal with online bullying.</li> </ul> | <ul style="list-style-type: none"> <li>Think critically about how video is used to promote a cause.</li> <li>Create a storyboard for an advert.</li> <li>Shoot original footage and source additional content.</li> <li>Acknowledge intellectual property rights.</li> <li>Work collaboratively to edit and create an advert.</li> </ul> | <ul style="list-style-type: none"> <li>Learn how decision trees can be trained automatically to classify data.</li> <li>Learn how speech recognition works.</li> <li>Learn how neural net recognises images.</li> <li>Train a neural net to classify images.</li> <li>Train a machine learning system to identify sentiments.</li> <li>Consider some ethical principles in designing AI systems.</li> </ul> |
| <b>Curriculum Links</b>            |   | <ul style="list-style-type: none"> <li>Writing</li> </ul>  | <ul style="list-style-type: none"> <li>PSHE / writing</li> </ul>  | <ul style="list-style-type: none"> <li>All areas (Could this be a project linking with Writing, women's rights- political party)</li> </ul>  |   |

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Through the curriculum