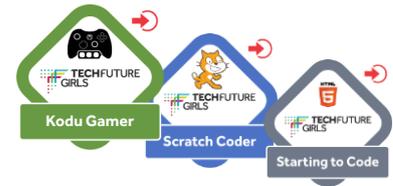# Guide to the Creative Coding topic

Club members learn about programming languages, how to write HTML, and how to build games in Scratch and Kodu. They are also introduced to algorithms through simple flow chart processes.

Three Digital Badges for members to gain by working through the online challenges.

- Starting to Code
- Scratch Coder
- Kodu Gamer

How a TechFuture Girls topic works

Within each topic – chosen to be particularly interesting to girls – there are three or more challenges for members to complete. Each challenge has an online e-learning module, which explores key concepts within a topic, with embedded quiz questions to assess understanding along the way. Members who score 80 percent or more automatically receive a Digital Badge, which appears in their profile once earned.

Alongside the online challenge, an offline challenge document is provided which asks members to go further with the topic. This is supported with sets of how2 documents that help build skills as the offline challenge is completed.

Online challenges can take between 30 and 45 minutes. Offline challenges can typically take longer, usually over several sessions. The offline challenges also lend themselves to team work and collaboration.

The online challenge format

The online challenges are built as e-learning. They are a series of screens that often include hotspots, where clicking on images or markers bring up more information. In most cases, all the hotspots have to be checked before the 'next' button appears. So if one of your members/students can't see the next button, it is because there is an unchecked hotspot!

In the screenshot on the right, each line of code is a hotspot. Only after exploring each of these will be next button appear so the learner can move on.

The challenges in the Creative Coding topic

There are three challenges in Creative Coding.

Challenge 1: Starting to Code

In this challenge, members are introduced to what code is and how it is everywhere (through a short video animation). They learn that different types of programming languages exist and have different purposes. They are introduced to HTML and how to produce a simple webpage. They learn how to use tags to lay out a webpage with paragraphs, headings, formatted text and an image.

The offline challenge is to use the free downloadable software Notepad++ to write some HTML to create their first webpage with the features introduced in the online challenged (formatted and laid out text with headings and an image).

A folder of copyright-free images are provided, alongside the how2s, to make it easy for members to create their webpage. There is also a guide to downloading and using Notepad++.

Both Blogger and WordPress can be used free of charge (for a basic account) but will need members to create accounts to access the blogging platform. Google accounts can be used for both (and can also be used for the Sports Vlogger challenge which uses YouTube).

The offline challenge supports members to create their own blog site, add a design, and start to blog within the sports theme. They are also encouraged to blog even if they are not an active participant in sport, through the com

Challenge 2: Coding in Scratch

This topic introduces members to Scratch, and how to use the sprites and the coding blocks to create simple games. It also introduces some important programming concepts, such as conditionals (if…then and if…then…else) and demonstrates how flowcharts can be used to create simple processes that are the basis of algorithms. The online challenge explores Scratch and its key features, as well as reflecting on how the programming blocks draw upon algorithms and conditional programming.

There are two offline challenges for this topic. The first is to use Scratch programming to create a game, a dance sequence, a greetings card, or to make the cat sprite fly. They are encouraged to use a conditional within this project, by adding a scoring mechanism to the project.

The second offline challenge is to use a flowchart to model a simple process, using the provided flowchart shapes in MS PowerPoint. This could be simply to make a sandwich. They test their flowchart out on friends to see whether it works (or if any steps are missing).

Challenge 3: Game Building in Kodu

The third challenge in Creative Coding uses the free software from Microsoft – Kodu Game Lab – and its versatility to create a game with a scoring mechanism. The online challenge demonstrates the key features of Kodu, and how it uses 'WHEN'… 'DO'… as the programming principle. Members are shown how to build a Kodu world, populate it with a range of different characters and objects, as well as how to program both characters and objects to act upon the world.

The offline challenge supports members to create a character game where s/he moves around the world eating apples, and adding to a score for the number of apples bumped into and eaten. Information is provided about the Kodu download, and the process of building the world and adding/programming the characters.

Going further

Members and facilitator/teachers of TechFuture Girls now have access to additional content on TechFuture Classroom. At the bottom of each topic page, there are links to do more. For this topic, a link is provided to the Coding in HTML with Intel and CoderDojo project on the TechFuture Classroom. This takes learners further into HTML tags, including those that can add tables, bullets, and even an audio player to a webpage. A second link goes to the Game Building with Radiant Worlds which introduces a team of game designers and builders from Leamington Spa-based studio, Radiant Worlds. They talk about what it is like to work in the gaming industry and the range of roles in the team.

How2s included in this topic

Each challenge has a set of how2s – guides on skills and concepts – to help members complete the offline challenges and build on knowledge acquired in the online challenges. The table below shows all the how2s in the Sport and Fitness topic.

Table 1: The How2 documents provided in this topic

Challenge	How2
Starting to Code	How2 download Notepad++
	How2 start writing HTML in Notepad++
	How2 use HTML tags
Coding in Scratch	How2 use Scratch online and offline
	How2 get started with Scratch
	How2 use flowcharts to create algorithms
Game Building in Kodu	How2 download Kodu Game Lab
	How2 create your first world in Kodu
	How2 add objects and characters to your world in Kodu
	How2 create a healthy eating character game in Kodu
	How2 add a scoring function to your healthy eating game

Learning Outcomes and curriculum mapping for the Creative Coding topic

The table below displays the learning outcomes for each topic and their relevance to the Programmes of Study for Computing (Key Stages 2 and 3).

Table 2: Learning outcomes and Computing PoS mapping

Challenge	Learning Outcomes	Programmes of Study for Computing
Starting to Code	Understand how code is everywhere in the world and that nearly everything relies upon it	**Pupils should be taught to:** **Design, write** and debug **programs that accomplish specific goals…** *(Key Stage 2)*
	Understand how different programming languages exist all with different purposes	Use two or **more programming languages**, at least one of which is textual, to solve a variety of computational problems… *(Key Stage 3)*
	Understand how HTML5 works and how to write HTML5 in Notepad++	Understand how instructions are stored and executed within a computer system… *(Key Stage 3)*
	Understand how to build a webpage with text and images in HTML5	

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Challenge	Learning Outcomes	Programmes of Study for Computing
Scratch Coder	Understand how to use Scratch in the online and offline editor	**Pupils should be taught to:** **Design, write** and debug **programs that accomplish specific goals…** *(Key Stage 2)* Use logical reasoning to explain how some simple algorithms work… *(Key Stage 2)* Understand several key **algorithms that reflect computational thinking**; use logical reasoning to compare the utility of alternative algorithms for the same problem *(Key Stage 3)* Use two or **more programming languages**, at least one of which is textual, to solve a variety of computational problems… *(Key Stage 3)* Understand simple Boolean logic and some of its uses in circuits and programming… *(Key Stage 3)*
	Understand how to navigate the Scratch editor and add sprites and backgrounds	
	Understand how to use Scratch blocks to program the sprite	
	Understand how to use if…then and if…then…else in programming	
	Understand how to use flowcharts to model simple programs with conditionals	
Kodu Gamer	Understand how to download Kodu Game Lab and create a new world	**Pupils should be taught to:** **Design, write** and debug **programs that accomplish specific goals…** *(Key Stage 2)* Use logical reasoning to explain how some simple algorithms work… *(Key Stage 2)* Use two or **more programming languages**, at least one of which is textual, to solve a variety of computational problems… *(Key Stage 3)* Understand simple Boolean logic and some of its uses in circuits and programming… *(Key Stage 3)*
	Understand how to add ground, hills and other physical features to the game world	
	Understand how to add characters to the game world, and choose characters according to their main features	
	Understand how to add objects to the game world	
	Understand how to program characters to move around the game world and interact with objects	

If you require any help setting up your TechFuture Girls club, wish to use the resources, and TechFuture Classroom, in school, or have any questions about our platform, email us at helpdesk@techfuture.com and we will respond to your request within 48 hours.

TECH PARTNERSHIP