

# CURRICULUM ALIGNMENT GUIDE

## Digital Competence Framework (DCF)

### Wales

# 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

## INTRODUCTION

---

100 ideas: Outstanding Computing Lessons is a collection of 100 practical, tried-and-tested ideas for teaching computing. It is aimed at computing / ICT teachers of all levels, whether specialist or non-specialist, newly qualified or experienced.



For more information on 100 Ideas: Outstanding Computing Lessons and to find additional education resources and supporting materials, including more than 50 free worksheets to accompany the activities in the book, visit: [teachwithict.com/100ideas](http://teachwithict.com/100ideas)

10 sample activities can be downloaded for free at [teachwithict.com/bonus](http://teachwithict.com/bonus)

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 1: PROGRAMMING STRATEGIES PART 9: PROGRAMMING ACTIVITIES

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 1	Descriptions of learning Progression Step 2
Digital Competence Framework (Level 1)		I can identify, create and follow sequences and patterns in everyday activities.	I can break down a problem to predict its outcome.
		I can recognise and follow instructions in the appropriate order to perform a task.	I can detect and correct mistakes which cause instructions (a solution) to fail (debug).
		I can organise, select and use simple language to give instructions to others.	I can create and record verbal, written and symbolic instructions to test ideas, e.g. the order of waking up through a diagram or flowchart.
		I can control devices giving instructions.	I can change instructions to achieve a different outcome.
		I can identify errors in simple sets of instructions (algorithm).	I can identify repetitions or loops in a sequence, e.g. identify where to shorten a set of instructions by repeating steps, for instance when learning a new song.

	Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
Digital Competence Framework (Level 2 & 3)	I can create and refine algorithms and flowcharts to solve problems, making use of features such as loops, Boolean values and formulae.	I can create a simple model or self-contained algorithm.	I can independently create and design models, and explain how they represent real-world problems, e.g. selecting and correctly using an appropriate method for illustrating a problem, such as a flowchart or spreadsheet.
	I can understand the importance of the order of statements within algorithms.	I can identify the different parts of an algorithm to determine their purpose.	I can develop logical solutions to determine the input, outputs and processes of a program, e.g. following pseudocode or a flowchart to come to an outcome, developing a written sequence of steps that could be followed.
		I can identify repeating patterns within an algorithm and use iteration to make the algorithm more efficient.	I can demonstrate the benefits of compartmentalising sections of a problem (using functions/procedures).
		I can detect and correct errors in algorithms.	

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 1: PROGRAMMING STRATEGIES PART 9: PROGRAMMING ACTIVITIES

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 1	Descriptions of learning Progression Step 2
	Science & Technology (Level 1)	I can identify, follow and begin to create sequences and patterns in everyday activities	I can safely use a range of tools, materials and equipment to construct for a variety of reasons.
		I am beginning to follow a sequence of instructions.	I can use computational thinking techniques, through unplugged or offline activities.
		I can experiment with and identify uses of a range of computing technology in the world around me.	I can create simple algorithms and am beginning to explain errors.
			I can follow algorithms to determine their purpose and predict outcomes.
			I am beginning to explain the importance of accurate and reliable data to ensure a desired outcome.
I can follow instructions to build and control a physical device.			

		Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
	(Level 2 & 3)	<p>I can use conditional statements to add control and decision-making to algorithms.</p> <p>I can identify repeating patterns and use loops to make my algorithms more concise.</p> <p>I can explain and debug algorithms.</p>	<p>I can decompose given problems and select appropriate constructs to express solutions in a variety of environments.</p> <p>I can select and use data structures that efficiently manage data in algorithms.</p> <p>I can plan and implement test strategies to identify errors in programs.</p>	<p>I can identify, define and decompose problems, choose appropriate constructs and express solutions in a variety of environments.</p> <p>I can use file-handling techniques to manipulate data in algorithms.</p> <p>I can test, evaluate and improve a solution in software</p>
		<p>I can use sensors and actuators in systems that gather and process data about the systems' environment.</p> <p>I can identify positive and negative design elements that affect user interactions.</p>	<p>I can select and use multiple sensors and actuators that allow computer systems to interact with the world around them.</p> <p>I can apply design principles in order to design a range of efficient user interactions.</p>	<p>I can design and create physical systems that use appropriate components and logic to complete tasks and achieve goals.</p>

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 9: PROGRAMMING ACTIVITIES PART 10: COMPUTING AND STEAM

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
Digital Competence Framework		I can use a range of software to select, produce and edit a range of multimedia components for a purpose,	I can select and use a variety of appropriate software, tools and techniques to create, modify and combine multimedia components for a range of audiences and purposes	I can use a variety of software, tools and techniques to create a professional, individual or collaborative project outcome incorporating a range of multimedia components.
		I can create and refine algorithms and flowcharts to solve problems, making use of features such as loops, Boolean values and formulae.	I can create a simple model or self contained algorithm.	I can independently create and design models, and explain how they represent real-world problems, e.g. selecting and correctly using an appropriate method for illustrating a problem, such as a flowchart or spreadsheet.
		I can understand the importance of the order of statements within algorithms.	I can identify the different parts of an algorithm to determine their purpose.	I can develop logical solutions to determine the input, outputs and processes of a program, e.g. following pseudocode or a flowchart to come to an outcome, developing a written sequence of steps that could be followed.
			I can identify repeating patterns within an algorithm and use iteration to make the algorithm more efficient.	I can demonstrate the benefits of compartmentalising sections of a problem (using functions/procedures).
			I can detect and correct errors in algorithms.	
Science & Technology		I can draw inspiration to design from historical, cultural and other sources. I can creatively respond to the needs and wants of the user, based on the context and on the information collected.	I can investigate and draw inspiration from historical, cultural and other sources to design creative solutions. I can recognise and act on user needs and wants in increasingly challenging contexts.	I can investigate, analyse and draw inspiration from historical, cultural and other sources to design new proposals that add value. I can tackle challenging problems, independently and collaboratively, to address wider design requirements in increasingly unfamiliar contexts.
		I can use conditional statements to add control and decision-making to algorithms. I can identify repeating patterns and use loops to make my algorithms more concise. I can explain and debug algorithms.	I can decompose given problems and select appropriate constructs to express solutions in a variety of environments. I can select and use data structures that efficiently manage data in algorithms. I can plan and implement test strategies to identify errors in programs.	I can identify, define and decompose problems, choose appropriate constructs and express solutions in a variety of environments. I can use file-handling techniques to manipulate data in algorithms. I can test, evaluate and improve a solution in software.
		I can use sensors and actuators in systems that gather and process data about the systems' environment. I can identify positive and negative design elements that affect user interactions.	I can select and use multiple sensors and actuators that allow computer systems to interact with the world around them. I can apply design principles in order to design a range of efficient user interactions.	I can design and create physical systems that use appropriate components and logic to complete tasks and achieve goals. I can apply design principles in order to design a range of efficient user interactions, and evaluate effectiveness through user studies.
		I can explain how digital devices can be interconnected locally and globally.	I can explain how systems communicate, in order to design a network.	I can build and test communication systems with the aim of safeguarding my own systems and data.
		I can explain the importance of securing the technology I use and protecting the integrity of my data. I can explain how my data is used by services, which can help me make more informed decisions when using technology.	I can explain the techniques used to store and transfer data and understand their vulnerabilities.	

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 3: ICT AND DIGITAL LITERACY

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
Digital Competence Framework		I can understand how to protect myself from online identity theft, e.g. identifying secure sites, phishing, scam websites.	I can understand that I have a digital footprint and that this information can be searched, copied and passed on.	I can build a positive reputation in the context of employment prospects, e.g. use social media responsibly
		I can identify the benefits and risks of mobile devices broadcasting the location of the user/device.	I can discuss the benefits and risks of presenting myself in different ways online.	I can explain the ethical issues of corporate encryption, e.g. building in a bypass system.
		I can identify the benefits and risks of giving personal information and device access to different software.		I can recognise the risks and the uses of data/services on personal devices, within the terms and conditions of a range of software and web services, and identify how organisations become data compliant when using multi national products.
		I can identify the wider positive and negative influences of technology, e.g. on my life, on society, on the environment.	I can demonstrate healthy online behaviours and identify unacceptable behaviour.	I can take reasonable steps to avoid health problems caused by the use of technology and suggest strategies to prevent or reduce the problems, both physical and psychological.
		I can exchange online communications, making use of a growing range of available features	I can select and use different online communication tools for specific purposes with higher levels of competence,	I can make use of and reflect on available online communication services for specific purposes, justifying selections made based on their appropriateness for delivery of information.
		I can independently create and plan work before beginning a digital task.	I can select and effectively use a variety of planning techniques.	I can plan my digital work effectively and with increasing complexity.
		I can work with others to create an online collaborative project for a specific purpose, sharing and appropriately setting permissions for other group members, e.g. editing, commenting, viewing.	I can independently select and use a range of online collaboration tools to create a project with others in one or more languages, e.g. Making use of online technology to share and present ideas to others.	I can reflect on choices of collaboration solutions, use them appropriately and comment on how this could be improved to meet aims of tasks.
		I can construct, refine and interrogate data sets within tables, charts, spreadsheets and databases to test or support an investigation.	I can create a data capture form, capture data, search data and create a database and spreadsheet with appropriate data input method.	I can use appropriate programs to produce statistical evidence based on my own collected data/identified scenario and justify reasoning.

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 3: ICT AND DIGITAL LITERACY

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
Digital Competence Framework		I can adjust keywords and search techniques to find relevant information.	I can search a variety of sources using relevant search techniques with increased complexity.	I can consider the benefits and limitations of digital tools and information sources and of the results I produce and use these results to inform future judgements about the quality of my digital work.
		I can store search results for future use, e.g. bookmark, add to favourites.	I can evaluate the reliability of sources of information, justify my opinions and reasons for choices, and reference using appropriate methods.	
		I can identify marketing elements designed to draw my attention.	I can identify ways of reporting unacceptable online behaviour. I can identify stereotypes and their impact in a range of media. I can make informed choices while making online choices, including making in-app purchases and clicking on adverts.	I can understand the legal responsibilities for disposal of technology and the environmental impact of doing so.
			I can understand that I have a digital footprint and that this information can be searched, copied and passed on.	I can build a positive reputation in the context of employment prospects, e.g. use social media responsibly.
		I can think critically about information shared online, e.g. the impact of sharing images and videos, metadata of images and videos.		I can identify and describe the data protection policies of a variety of organisations located in different countries, and how this affects the way that they work.
		I can identify the benefits and risks of giving personal information and device access to different software.	I can use strategies for guarding myself against identity theft and online scams that try to access my personal information.	I can recognise the risks and the uses of data/ services on personal devices, within the terms and conditions of a range of software and web services, and identify how organisations become data compliant when using multi national products.
		I can begin to reference sources used in my work, and consider if content is reliable.	I can begin to reference sources used in my work, and consider if content is reliable.	I can search efficiently for information for my digital work and evaluate the reliability of sources of information, justifying opinions and reasons for choices, and I can reference work using appropriate methods.

# Digital Competence Framework (DCF) Wales

## 100 Ideas for Secondary Teachers: Outstanding Computing Lessons

### PART 3: ICT AND DIGITAL LITERACY

Core Skill	Area of Learning & Experience	Descriptions of learning Progression Step 3	Descriptions of learning Progression Step 4	Descriptions of learning Progression Step 5
	Science & Technology	<p>I can identify and consider factors when developing design proposals.</p> <p>I can use design thinking to test and refine my design decisions without fear of failure.</p> <p>I can apply my knowledge and skills when making design decisions in order to produce specific outcomes.</p> <p>I can consider how my design proposals will solve problems and how this may affect the environment.</p>	<p>I can identify and prioritise factors which inform my design proposals.</p> <p>I can develop my design thinking to test and refine my design decisions by responding to success and failure.</p> <p>I can develop my knowledge and skills to support and refine my design decisions in order to produce purposeful outcomes.</p> <p>I can adopt an iterative process to improve my design proposals, while minimising their negative impact on the environment and society.</p>	<p>I can prioritise and justify multiple design factors to improve the effectiveness of my design decisions.</p> <p>I can fluently use design thinking, including my successes and failures, to test and refine my design decisions.</p> <p>I can identify when I need to seek out new knowledge and skills to support and refine my design decisions in order to produce purposeful outcomes.</p> <p>I can use an iterative process naturally which considers both potential intended and unintended consequences of my designs, in order to adapt and justify proposals.</p>
		<p>I can use design communication methods to develop and present ideas, and respond to feedback.</p>	<p>I can use a variety of design communication methods and techniques to develop and present ideas clearly, and can respond constructively to feedback.</p>	<p>I can independently select and apply appropriate communication methods to develop and present my ideas fluently.</p> <p>I can engage with feedback from different audiences and respond constructively to it.</p>
		<p>I can describe the impacts of science and technology, past and present, in my everyday life.</p>	<p>I can describe the impacts of science and technology, past and present, on society.</p>	<p>I can evaluate the effectiveness and impact of scientific and technological solutions on a personal, societal and environmental level.</p>
		<p>I can explain how digital devices can be interconnected locally and globally.</p> <p>I can explain the importance of securing the technology I use and protecting the integrity of my data.</p> <p>I can explain how my data is used by services, which can help me make more informed decisions when using technology.</p>	<p>I can explain how systems communicate, in order to design a network.</p> <p>I can explain the techniques used to store and transfer data and understand their vulnerabilities</p>	<p>I can build and test communication systems with the aim of safeguarding my own systems and data.</p>
		<p>I can explain how data is stored and processed.</p> <p>I can effectively store and manipulate data to produce and give a visual form to useful information.</p>	<p>I can choose the most appropriate format for the storage and interrogation of data.</p> <p>I can make use of mathematical and logical operators in different software tools to investigate a line of inquiry independently.</p>	<p>I can apply computational techniques to interrogate data sets in order to produce useful insight.</p>