NCC education®

Awarding Great British Qualifications

Digi

2021/22 Introduction to Digi

Inspiring the next generation of digital innovators

https://www.nccedu.com/qualifications-level/digi/

Contents

About Us

Digi is brought to you by NCC Education.

Originally part of the National Computing Centre, NCC Education was established as a computing initiative by the British Government in 1966. Today, NCC Education is an exam board and a global provider of British education in Computing and Business.

Our head office is situated in Manchester, UK with our regional offices located in Beijing, Kuala Lumpur, Singapore and Cape Town.

Working with an international network of schools, centres and universities, NCC Education provides students with access to high quality British education through a combination of classroom based and distance learning programmes.

Digi is a suite of primary and secondary school Computing programmes developed by NCC Education and launched in 2017. Our mission with Digi is to assist schools in their delivery of the English National Computing Curriculum at Key Stages 1-4.

Introduction to Digi

Digi recognises the importance of strong digital skills and a core understanding of computer science in the 21st century and has been designed to meet the needs of the UK and international students aged 5 to 16.

Each Digi programme covers:

With the following provided to our partner schools:

- Student Guide for each school year (30 x 1-hour lessons)
- Teacher Guide (with guidance and resource links for each lesson)
- Supplementary online material for each lesson
- Power point slides for each lesson
- Student certificates for each year completed
- Formal assessment/qualifications for each Key Stage up to and including the NCC Education Level 2 Award in Computing (IGCSE Equivalent)

Digi Curriculum

Digi has four programmes covering primary and secondary school Computing education.

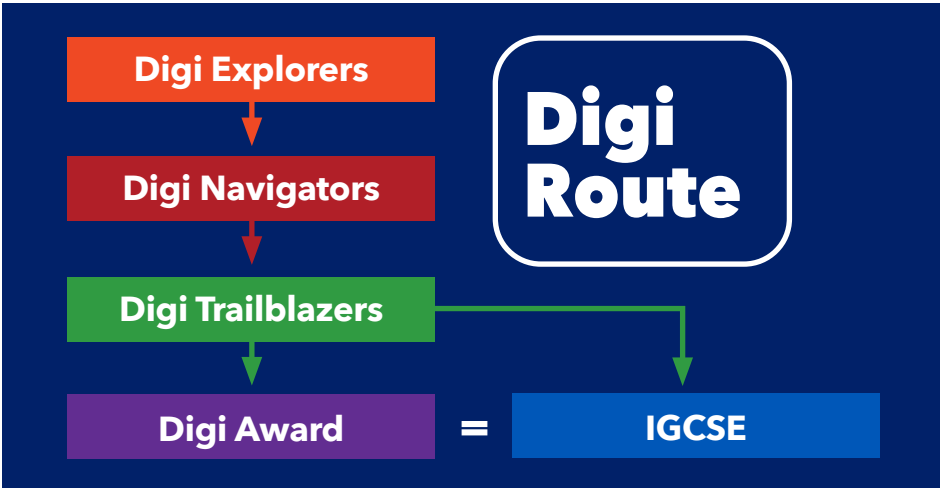
Digi Programmes:

Explorers — Explorers UK ages 5-7

Navigators — Navigators UK ages 7-11

Trailblazers — Trailblazers UK ages 11-14

Level 2 Award — Level 2 Award in Computing UK ages 14-16



Key Stages of Digi

All resources are provided for students and teachers to cover the English National Computing Curriculum with complete confidence.

Each Digi Teacher and Student Guide comprises of 30 lessons.

Formal assessments and qualification certificates provide evidence and a global benchmark for student performance. Once a Student Guide is completed, learners are provided with a certificate of completion.

The equivalent of an International General Certificate of Secondary Education (IGCSE) is obtained with the Digi Level 2 Award. This is the final fourth key stage of the curriculum.

YEAR	KEY STAGE	DIGI PROGRAMMES
Year 1	Key Stage 1	Digi Explorers – Course 1
Year 2	Key Stage 1	Digi Explorers – Course 2
Year 3	Key Stage 2	Digi Navigators – Course 1
Year 4	Key Stage 2	Digi Navigators – Course 2
Year 5	Key Stage 2	Digi Navigators – Course 3
Year 6	Key Stage 2	Digi Navigators – Course 4
Year 7	Key Stage 3	Digi Trailblazers – Course 1
Year 8	Key Stage 3	Digi Trailblazers – Course 2
Year 9	Key Stage 3	Digi Trailblazers – Course 3
Year 10	Key Stage 4	Digi Award – Course 1
Year 11	Key Stage 4	Digi Award – Course 2

UK Government Curriculum

Statutory guidance National curriculum in England: computing programmes of study

Published
11 September 2013

Contents

Aims

The national curriculum for computing aims to ensure that all pupils can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.

Key Stage 1

- understand what algorithms are, how they are implemented as programs on digital devices
- create and debug simple programs use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve content
- recognise common uses of information technology beyond school
- use technology safely and respectfully

Key Stage 2

- design, write and debug programs that accomplish specific goals
- use sequence, selection, and repetition in programs
- use logical reasoning to explain how some simple algorithms work
- understand computer networks
- use search technologies effectively
- use and combine a variety of software on a range of digital devices to design and create a range of programs and systems
- use technology safely, respectfully and responsibly

Key Stage 3

- design, use and evaluate computational abstractions understand several key algorithms which reflect computational thinking
- use logical reasoning to compare the utility of alternative algorithms for a problem
- use two or more programming languages to solve a variety of problems
- make appropriate use of data structures
- design and develop modular programs that use procedures or functions
- understand simple Boolean logic
- understand how numbers can be represented in binary
- understand how instructions are stored and executed within a computer system
- understand how data of various types can be represented and manipulated digitally
- undertake creative projects which involve selecting, using, and combining multiple applications
- create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability
- understand a range of ways to use technology safely, respectfully, responsibly and securely

Key Stage 4

All pupils must have the opportunity to study aspects of information technology and computer science at sufficient depth to allow them to progress to higher levels of study or to a professional career.

- develop their capability, creativity and knowledge in computer science, digital media and information technology
- develop and apply their analytic, problem-solving, design, and computational thinking skills
- understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns

Key Stage 1

Explorers

Explorer ages 5-7

- Digital Citizenship
- Digital Design and Creation
- Presenting Information
- Handling Data
- Programming

Digi Explorers guided learning:
Course 1: 30 lessons
Course 2: 30 lessons
(i.e. two books, 60 lessons to complete the full programme)

Programming languages taught:
- Pseudocode
- Scratch

Qualification	Online Assessment: Theoretical Component
Digi Explorer	60 minutes

Key Stage 2

Navigators

Navigator ages 7-11

- Animation and Graphical Modelling
- Computer Gaming
- Creating Digital Presentations
- Web Research
- Networks, communication and collaboration
- Data Analysis and Representation Programming Simulations and Physical Systems

Digi Navigators guided learning:
Course 1: 30 lessons
Course 2: 30 lessons
Course 3: 30 lessons
Course 4: 30 lessons
120 lessons to complete the full programme

Programming languages taught:
- Scratch

Qualification	Online Assessment: Theoretical Component
Digi Navigator	60 minutes

Key Stage 3

Trailblazers

Trailblazers ages 11-14

- Keeping yourself and your friends safe online
- Solving Problems with Algorithms
- Computer Instructions and Data Types
- Designing and Developing Computer Programs
- Computer Logic and Number Representations
- Computer Models and Simulations
- Computer Systems
- Managing a Digital Project
- Developing a Digital Artefact

Digi Trailblazers guided learning:
Course 1: 30 lessons
Course 2: 30 lessons
Course 3: 30 lessons
90 lessons to complete the full programme

Programming languages taught:
- Scratch
- Python

Qualification	Online Assessment: Theoretical Component
Digi Trailblazer	60 minutes

Key Stage 4

Level 2 Award

Level 2 Award in Computinting ages 14-16

- Developing Problem Solving Skills
- Testing Computer Programs
- Protecting your online presence
- Computer Systems
- Programming in multiple languages
- Searching and Sorting
- Computer Logic and Number Representation
- Accessibility
- Online Collaboration Software
- Cloud Computing

Digi Award guided learning:
Course 1: 30 lessons
Course 2: 30 lessons
60 lessons to complete the full programme

Programming languages taught:
- Python
- Java

Fundamentals of Computing and Digital Literacy	
Part 1 - Examination: • Theoretical Component (Parts A and B)	45 minutes
• Practical Component (Parts C)	45 minutes
Part 2 Controlled Assignment	Approx. 8 hours' classroom time

Equipment Needed

Classroom equipment and materials

- Student Guide
- Teacher Guide
- Computers
- For certain activities, it would be beneficial to be able to share your screen with your class, either via digital whiteboard, large screen monitor / TV or suitable screen sharing software

Computer equipment specification and features

- 512MB RAM (1 GB minimum recommended)
- Functioning broadband or Internet connection
- Internet browser such as Internet Explorer, Google Chrome or Firefox
- An office suite, including word processing and spreadsheet applications, such as Microsoft Office
- Up to date anti-virus
- The ability for students to save work and perform routine and regular backups

Teacher guide contains all the student guide pages plus additional guidance notes and resources for each activity.

Activity Sample Pages

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Lesson 17: Capturing and Manipulating Digital Images

Objective(s):

By the end of this lesson you will be able to:

- Capture a digital image
- Manipulate a digital image

Activity 1

Look at the digital images below. What is different about each image?

1

2

3

- The **first** image is a photograph of an artist's drawing.
- The **second** image has been created using design software.
- The **third** image has been manipulated (changed).

Spot the differences between Image 2 and Image 3:

1. _____
2. _____
3. _____

We capture images using a digital camera, mobile phone or a webcam. Why would you take a photograph of a person or a place? Tell your teacher and write your answer below:

_____

Why would you take a photograph of an image?

_____

Digi Explorers

Activity 2

Take a picture of yourself using a digital camera or phone. Your teacher will help you.

Now your teacher will help you to upload your image onto the computer.

Use the design software to manipulate (change) your image.

Which is your favourite effect?

Can you make your photograph look like a drawing?

How about adding a frame and some text?

Remember to **save** your image!

TOPTIPS! You could put all your classmates' images together and make a class collage.

Guidance notes for teachers

Activity 1

Discuss the images in the student guide with the class. Explain that to manipulate an image means to make small changes.

Working in pairs, the students write down three differences. Their answers will likely include:
• Text has been added to image 3
• Image 2 is surrounded by a frame
• Image 3 has eyebrows (stickers)

Ask the children why we take photographs. It is usually to remember an event or family occasion. When we manipulate (change) an image it creates a mood. Give the example that sepia colours age an image and make it look like something happened in the past.

Activity 2

You may choose to arrange the class into groups of 2-3. Help the students to take portraits of one another and upload their images onto the computers.

Encourage the students to try as many variations as possible using the following image editing software (suggested, alternative resources may also be used):

- Photo Face Fun: http://www.photofacefun.com/

You may choose to demonstrate aspects of the software to the whole class and check understanding before the students start work on manipulating their own images.

If put together in a class collage, the final photographs would make a fun and interesting display.

Activity Sample Pages

Lesson 25: Programming a Robot Lawnmower

Objective(s):

By the end of this lesson you will know more about:

- How robotic machines are programmed

Activity 1

Do you have a garden or local park with a lawn?

Who cuts the grass there?

There are many different computer-controlled automated systems for your home. But there are also systems for people's gardens. Even robotic lawnmowers that can cut your grass!

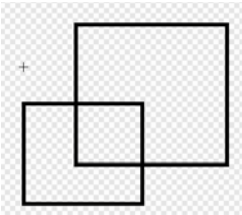
Your teacher will show you a robotic lawnmower in use.

Programming a machine like this means using **sensing** to respond to grass edges and objects.

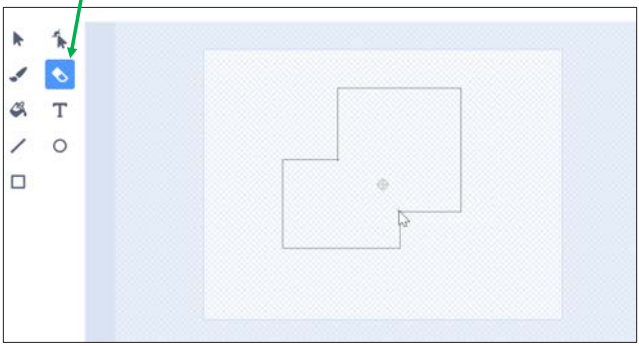
Let's practise: In this lesson we will program a robotic lawnmower using Scratch.

Firstly, create the grass area that the robot is going to cut:

Create a sprite like the one here by drawing two overlapping rectangles.



Use the **Eraser** to rub out the overlapping lines, like this:



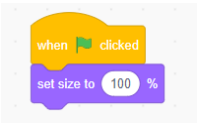
Now create a second sprite to be your lawnmower. Just a simple shape will do:

A small red circle (filled in) would be ideal, like this:

You can delete the cat sprite.

Here is the code for the grass area.

The size is set at 100 but if it is too small (or even too big) you may change the value to see the whole area in the workspace.



Activity Sample Pages

Lesson 29 – Data Analysis

By the end of the lesson you will understand more about:

- How to carry out simple data analysis

Activity 1

Work with your group again from the last lesson.

Pass a copy of your questionnaire to each Member of your class.

You will also receive a copy of each group's questionnaire to complete.

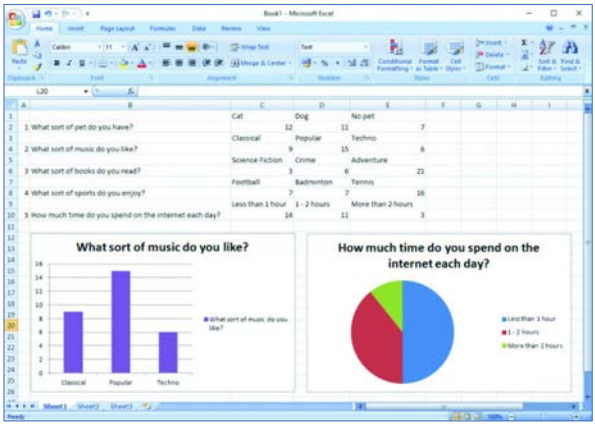
Return the completed questionnaires to the appropriate groups.

Activity 2

You are going to collate the data and analyse the answers using a spreadsheet.

You should be able to make a few early judgements about your data simply by reading the numbers.

Represent some of your data as a chart or graph, like the MS Excel example below:



Lesson 3: Understanding Computer Memory

Objective(s):

By the end of this lesson you will be able to:

- Explain the function of different types of memory

Activity 1

There are different types of internal memory inside computers. Each memory type has a different role to play.

Registers
The CPU of a computer contains a range of registers; each register does a different job.

Memory Address Register (MAR)
Stores a location in memory that the computer wants to read data from or write data to.

Instruction Register (IR)
Stores instructions that have been fetched from the main memory. The instruction is then passed to the Control Unit which decodes it in order for it to be executed.

Cache Memory
Temporarily stores data and instructions which are used frequently. If data is stored in a cache rather than the main memory it can be accessed quicker.

Random Access Memory (RAM)
Holds data temporarily, stores any programs that are being run (including the operating system) and the data being processed. When the computer is switched off, the content of the RAM is lost.

RAM exists in different formats such as DDR (Double Data Rate). The format found in most modern PCs is DDR3.

Read Only Memory (ROM)
Used when the computer is booted. ROM is pre-programmed and built into the computer and it provides start-up instructions. The content of this memory cannot be changed and the memory remembers its contents even when the computer is switched off.

The ROM exists in a small chip called the Basic Input Output System (BIOS) chip and it is fitted onto the motherboard of the PC. Newer PCs use a different type of chip called a Unified Extensible Firmware Interface (UEFI) instead of BIOS.

INSPIRING the NEXT GENERATION of DIGITAL INNOVATORS

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If you have any questions in relation to Digi, please contact **https://www.nccedu.com/qualifications-level/digi/**

To learn more about NCC Education, our programmes, affiliations and partnerships visit our website and connect with us throught our social platforms.

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