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IT AND COMPUTING

Curriculum Intent

Our Vision and Ambition

Our vision is for every child should have a world-leading computing and information technology education based on great teaching and outstanding resources.

We follow, embrace and strive to deliver the National Curriculum for Computing, which states *"Pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world."*

What Do Our Lessons Look Like?

In each lesson pupils will be led by passionate subject experts where they can "Think Big", be creative, solve problems and understand technology. Lessons are sequenced from Year 7 and 11 where pupil's knowledge, understanding and experience is built upon. Lessons are purposeful, use pedagogical approaches throughout (e.g. Rosenshine & NCCE Computing Pedagogy) and help pupils to be ready for post 16 education and future citizens.

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Inclusion

We believe that every individual, and group of individuals, should feel included and encouraged when engaging with computing and an information technology education. We make sure that inclusion is integral to our planning, our programmes and materials, the way we work and how we behave.

Now our curriculum intents breaks into two parts:

- Part 1- Computing Curriculum Intent
- Part 2- Creative Media Intent

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Part 1 – Computing Curriculum Intent

Our Curriculum Providers

For KS3 and KS4 Computing we have chosen and embraced the pedagogy and curriculum of "Teach Computing" (N.C.C.E) from September 1st 2021. Our new Computing curriculum and pedagogy is designed by The National Centre for Computing Education (NCCE). They are funded by the Department for Education and supporting partners, and marks a significant investment in improving the provision of computing education in England.

The NCCE is run by a consortium made up of STEM Learning, the Raspberry Pi Foundation and BCS, The Chartered Institute for IT. The NCEE provide us with a comprehensive range of evidence-informed, high-quality support, including free resources and training courses help us become inspirational computing teachers.

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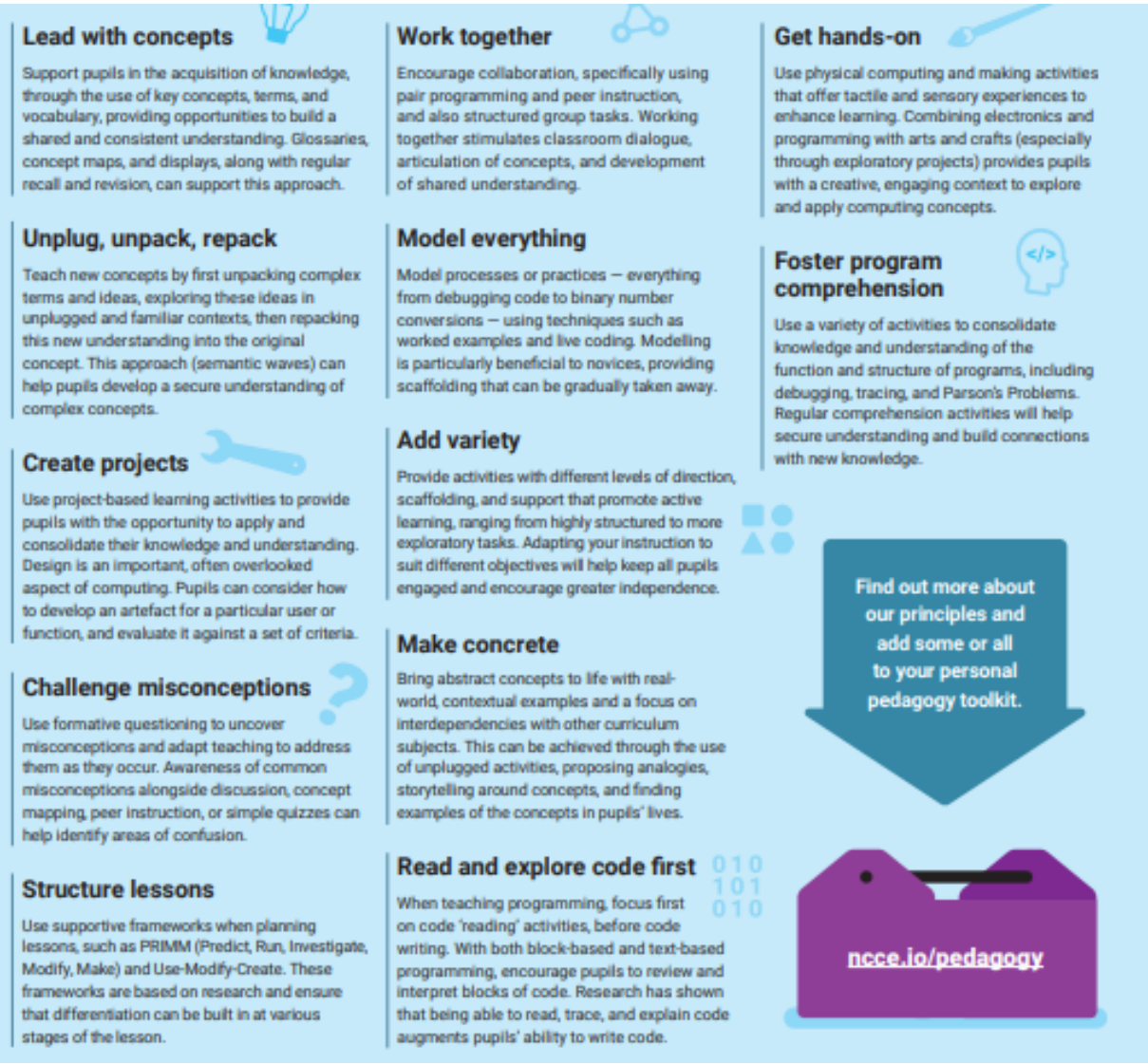
Our Pedagogical Approach For Teaching Computing At KS3 & KS4

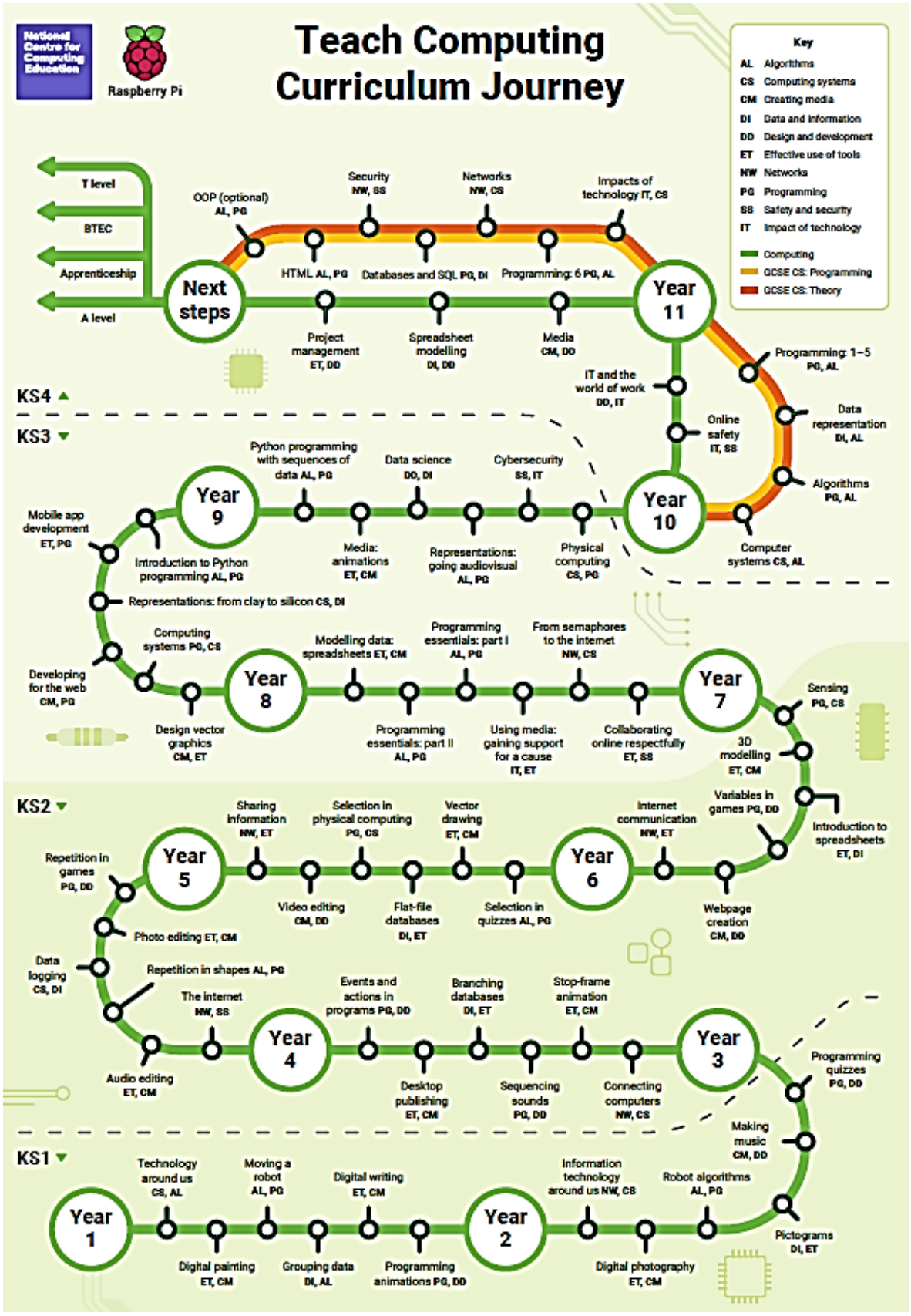
Computing is a broad discipline, and computing teachers require a range of strategies to deliver effective lessons to their pupils. The National Centre for Computing Education's pedagogical approach consists of 12 key principles underpinned by research: each principle has been shown to contribute to effective teaching and learning in computing. It is recommended that computing teachers use their professional judgement to review, select, and apply relevant strategies for their pupils.

These 12 principles are embodied by the Teach Computing Curriculum.



Our Computing Curriculum Map

Our curriculum has carefully crafted to sequence learning from KS1 to KS4 and links to the National Computing Curriculum.


National Centre for Computing Education
Raspberry Pi
Teach Computing Curriculum Journey
Key
AL Algorithms
CS Computing systems
CM Creating media
DI Data and information
DD Design and development
ET Effective use of tools
NW Networks
PG Programming
SS Safety and security
IT Impact of technology
Computing
GCSE CS: Programming
GCSE CS: Theory
T level
BTEC
Apprenticeship
A level
Next steps
OOP (optional) AL, PG
Security NW, SS
Networks NW, CS
Impacts of technology IT, CS
HTML AL, PG
Databases and SQL PG, DI
Programming: 6 PG, AL
Year 11
Project management ET, DD
Spreadsheet modelling DI, DD
Media CM, DD
Programming: 1–5 PG, AL
IT and the world of work DD, IT
Online safety IT, SS
Data representation DI, AL
Algorithms PG, AL
Computer systems CS, AL
KS4
KS3
Year 10
Python programming with sequences of data AL, PG
Data science DD, DI
Cybersecurity SS, IT
Physical computing CS, PG
Representations: going audiovisual AL, PG
Media: animations ET, CM
Year 9
Mobile app development ET, PG
Introduction to Python programming AL, PG
Representations: from clay to silicon CS, DI
Computing systems PG, CS
Developing for the web CM, PG
Design vector graphics CM, ET
Year 8
Modelling data: spreadsheets ET, CM
Programming essentials: part II AL, PG
Programming essentials: part I AL, PG
Using media: gaining support for a cause IT, ET
From semaphores to the internet NW, CS
Collaborating online respectfully ET, SS
Year 7
Sensing PG, CS
3D modelling ET, CM
Variables in games PG, DD
Introduction to spreadsheets ET, DI
Webpage creation CM, DD
KS2
Year 6
Internet communication NW, ET
Selection in quizzes AL, PG
Vector drawing ET, CM
Flat-file databases DI, ET
Selection in physical computing PG, CS
Video editing CM, DD
Sharing information NW, ET
Year 5
Repetition in games PG, DD
Photo editing ET, CM
Repetition in shapes AL, PG
Data logging CS, DI
Audio editing ET, CM
Year 4
The internet NW, SS
Events and actions in programs PG, DD
Branching databases DI, ET
Stop-frame animation ET, CM
Desktop publishing ET, CM
Sequencing sounds PG, DD
Connecting computers NW, CS
Year 3
Programming quizzes PG, DD
Making music CM, DD
Pictograms DI, ET
KS1
Year 2
Information technology around us NW, CS
Robot algorithms AL, PG
Digital photography ET, CM
Year 1
Technology around us CS, AL
Digital painting ET, CM
Moving a robot AL, PG
Grouping data DI, AL
Digital writing ET, CM
Programming animations PG, DD

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Our KS3 & 4 Computing Curriculum (Detailed)

a) Structure and Sequence

The Teach Computing curriculum is structured into units for each year group, and each unit is broken down into lessons. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that all pupils can succeed and thrive. Units can generally be taught in any order, with the exception of programming units - where concepts and skills rely on prior knowledge and experiences - and year 7 - where "Collaborating online respectfully" should be taught first. Lessons must be taught in numerical order.

b) Curriculum Design

Our curriculum is structured uses the National Centre for Computing Education's computing taxonomy to ensure comprehensive coverage of the subject. This has been developed through a thorough review of the KS1–4 computing programme of study, and the GCSE and A level computer science specifications across all awarding bodies. All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

■ Algorithms — Be able to comprehend, design, create, and evaluate algorithms

■ Computer networks — Understand how networks can be used to retrieve and share information, and how they come with associated risks

■ Computer systems — Understand what a computer is, and how its constituent parts function together as a whole

■ Creating media — Select and create a range of media including text, images, sounds, and video
■ Data and information — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
■ Design and development — Understand the activities involved in planning, creating, and evaluating computing artefacts
■ Effective use of tools — Use software tools to support computing work
■ Impact of technology — Understand how individuals, systems, and society as a whole interact with computer systems
■ Programming — Create software to allow computers to solve problems
■ Safety and security — Understand risks when using technology, and how to protect individuals and systems

c) Core Principles

i) Inclusive and ambitious

The Teach Computing Curriculum which we have adopted has been written to support all pupils. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that all pupils can succeed and thrive. Scaffolded activities provide pupils with extra resources, such as visual prompts, to reach the same learning goals as the rest of the class. Exploratory tasks foster a deeper understanding of a concept, encouraging pupils to apply their learning in different

contexts and make connections with other learning experiences.

ii) Research-informed

The subject of computing is much younger than many other subjects, and as such, there is still a lot more to learn about how to teach it effectively. To ensure that teachers are as prepared as possible, the Teach Computing Curriculum builds on a set of pedagogical principles (see the 'Pedagogy' section of this document), which are underpinned by the latest computing research, to demonstrate effective pedagogical strategies throughout. To remain up-to-date as research continues to develop, every aspect of the Teach Computing Curriculum is reviewed each year and changes are made as necessary.

iii) Time-saving for teachers

The Teach Computing Curriculum has been designed to reduce teacher workload. To ensure this, the Teach Computing Curriculum includes all the resources a teacher needs, covering every aspect from planning, to progression mapping, to supporting materials.

d) Our Curriculum vs National Curriculum Coverage & Exam Board

i) For KS3 Computing

The following topics are being studied (all from the Teach Computing curriculum)

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Year 7

Impact of technology – Collaborating online respectfully
Modelling data – Spreadsheets
Networks from semaphores to the Internet
Programming essentials in Scratch – part I
Programming essentials in Scratch – part II
Using media – Gaining support for a cause

Year 8

Computing systems
Developing for the web
Introduction to Python programming
Media – Vector graphics
Mobile app development
Representations – from clay to silicon

Year 9

Cybersecurity
Python programming with sequences of data
*~~Data science~~ **> Python- Going Further**
*~~Media – Animations~~ **> Python Project**
Physical computing
Representations – going audio visual

**For Year 9 Computer Science we are adding / adjusting this is to help fit more with their Year 10 Edexcel curriculum progression*

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National Curriculum Coverage — Key Stage 3	7.1	7.2	7.3	7.4	7.5	7.6	8.1	8.2	8.3	8.4	8.5	8.6	9.1	9.2	9.3	9.4	9.5	9.6
Design, use and evaluate computational abstractions that model the state and 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				✓	✓				✓			✓	✓					✓
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				✓	✓							✓	✓					✓
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]				✓	✓						✓							

National Curriculum Coverage — Key Stage 3 (cont.)	7.1	7.2	7.3	7.4	7.5	7.6	8.1	8.2	8.3	8.4	8.5	8.6	9.1	9.2	9.3	9.4	9.5	9.6
Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems		✓									✓							
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			✓			✓				✓					✓			
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, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns	✓																✓	

ii) For KS4 Computing vs National Curriculum

National Curriculum Coverage	GCSE													
	Programming part 1	Programming part 2	Programming part 3	Programming part 4	Programming part 5	Programming part 6	Algorithms part 1	Algorithms part 2	Computer systems	Data representations	Impacts of technology	Networks	Security	Databases and SQL	HTML
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.									✓				✓		

iii) Our KS4 Curriculum vs Exam Board

Our chosen exam provider is Edexcel Computer Science (9-1). We have checked carefully and the Teach Computing fits well.

Unit	Edexcel
Programming part 1: Sequence	✓
Programming part 2: Selection	✓
Programming part 3: Iteration	✓
Programming part 4: Subroutines	✓
Programming part 5: Strings and lists	✓
Programming part 6: Dictionaries and data files	✓
Algorithms part 1	✓
Algorithms part 2	✓
Computer systems	✓
Data representations	✓
Impacts of technology	✓
Networks	✓
Security	✓
Databases and SQL	✓

e) Progression across key stages

All learning objectives have been mapped to the National Centre for Computing Education's taxonomy of ten strands, which ensures that units build on each other from one key stage to the next.

f) Progression within a unit –learning graphs

Learning graphs are provided as part of each unit and demonstrate progression through concepts and skills. In order to learn some of those concepts and skills, pupils need prior knowledge of others,

so the learning graphs show which concepts and skills need to be taught first and which could be taught at a different time. Please note that the learning graphs often include statements with different wording than those shown in the lessons, as the learning graphs are designed for use by teachers, whereas the learning objectives are age-appropriate so that they can be understood by pupils.

g) Assessment

Formative assessment

Every lesson includes formative assessment opportunities for teachers to use. These opportunities are listed in the lesson plan and are included to ensure that misconceptions are recognised and addressed if they occur. They vary from teacher observation or questioning, to marked activities. These assessments are vital to ensure that teachers are adapting their teaching to suit the needs of the pupils that they are working with, and you are encouraged to change parts of the lesson, such as how much time we spend on a specific activity, in response to these assessments. The learning objectives are introduced in the slides at the beginning of every lesson. Every lesson has a starter activity and a plenary that can be used as an opportunity for formative assessment.

Summative assessment

Every unit includes an optional summative assessment framework in the form of either a multiple choice quiz

(MCQ) or a rubric. All units are designed to cover both skills and concepts from across the computing national curriculum. Units that focus more on conceptual development include an MCQ. Units that focus more on skills development end with a project and include a rubric. However, within the 'Programming' units, the assessment framework (MCQ or rubric) has been selected on a best-fit basis.

Multiple choice quiz (MCQ)

Each of the MCQ questions has been carefully chosen to represent learning that should have been achieved within the unit. In writing the MCQs, we have followed the diagnostic assessment approach to ensure that the assessment of the unit is useful to determine both how well pupils have understood the content, and what pupils have misunderstood, if they have not achieved as expected. Each MCQ includes an answer sheet that highlights the misconceptions that pupils may have if they have chosen a wrong answer. This ensures that teachers know which areas to return to in later units.

Rubric

The rubric is a tool to help teachers assess project-based work. Each rubric covers the application of skills that have been directly taught across the unit, and highlights to teachers whether the pupil is approaching (emerging), achieving (expected), or exceeding the expectations for their age group. It allows teachers to assess projects that pupils have created, focussing on the appropriate application of computing skills and concepts. Pedagogically, we want to ensure that we are assessing pupils'

understanding of computing concepts and skills, as opposed to their reading and writing skills. This has been carefully considered both in how MCQs have been written (considerations such as the language used, the cultural experiences referenced, etc) and in the skills expected to be demonstrated in the rubric.

Part 2- BTEC Tech Award Creative Media Production Intent (KS4)

Overview Of Course

This course is for learners who want to acquire technical knowledge and technical skills through vocational contexts by applying the learned knowledge and processes related to investigating, exploring and creating media products as part of their Key Stage 4 learning. The main focus is on four areas of equal importance, which cover the:

- **development** of key skills in creative media production such as investigating and developing ideas through pre-production, production and post-production of media products
- **process** that underpins effective ways of working in creative media production, such as responding to briefs and feedback, planning and generating ideas
- **attitudes** that are considered most important in creative media production, including personal management and communication
- **knowledge** that underpins effective use of skills, process and attitudes in the sector such as production processes and techniques.

Sequence Of Learning

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Pupils Year 9 receive a "skills building" set of courses designed to prepare them for their assessment. In KS4 the components are interrelated and they are best seen as part of an integrated whole rather than as totally distinct study areas. Therefore we teach each of the theory for the Components in the suggested order (Component 1 and then 2 and 3). We follow exam board learning, schemes of work and assessment objectives. We let Pearson know our assessment windows which includes the order and timescales of our assessments. Before each assessment we give all of the students' the knowledge needed to complete the assessments

Sequence Of Units of Work

Year 9

- "Empire Strikes Back" Project - Full Preparation Theory For Y10 Component 1 Assessment
- Photoshop Digital Graphics Skills Bootcamp
- Magazine Project

Year 10

- Component 1 LAA and LAB Assessment
- Component 2 Theory
- Component 2 LAA

Year 11

- Component 2 LAB/C
- Component 3

Post 16 Options and Careers

Study of the qualification as part of Key Stage 4 learning will help learners to make more informed choices for further learning, either generally or in this sector.

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Route 1

Learners who generally achieve at Level 2 across their Key Stage 4 learning might consider progression to:

• A Levels as preparation for entry to higher education in a range of subjects

• study of a vocational qualification at Level 3, such as a BTEC National in Media, which prepares learners to enter employment or apprenticeships, or to move on to higher education by studying a degree in the media sector.

Route 2

Learners who generally achieve at Level 1 across their Key Stage 4 learning might consider progression to:

• study at Level 2 post-16 in a range of technical routes designed to lead to work,

to progression to employment, to apprenticeships or to further study at Level 3.