The Complete Computing Curriculum

The myths around computing

1. Pupils are much better at computing than us.
2. All computing must be cross curricular.
3. Programming is too niche.
4. Wasn't ICT removed?
5. Computing should just be fun and easy.
6. Computing is just too hard so we don't teach it.

1. Not true! Digital native is a myth, can lead to SLT's lowering priority of computing.
2. Not true! It's a subject in its own right.
3. Not true! Most careers involve some form of programming. Device proliferation.
4. Not true! The subject changed its name and has become much more rigorous. ICT is still in the computing curriculum.
5. Not true! It needs to be in alignment with the 3i's, research supported and high expectations.
6. Not true! Needs high expectations, well led, time dedicated to it and CPD for teachers.

Factors to consider when implementing high quality computing.

Meeting the requirements of the national curriculum to an outstanding standard.

- Good and robust IT infrastructure and connection to the internet.
- Teacher subject and pedagogical knowledge (PCK).
- A comprehensive digital strategy linked to the SDP and supported by SLT.
- Time in the curriculum and time for subject leadership.
- A detailed and rigorous SoW.

Inspectors have had training in Computing

- Inspectors have had training in what to look for in Computing.
- They are interested in **research and knowledge.**

They are interested in:-

- Subject Leaders
- Teacher subject knowledge
- Retrieval practice
- Cognitive load
- Careful sequencing
- Overcoming misconceptions

Computing subject research

- Reading computing programs before writing them.
- Structured approaches to teaching programming (Use - Modify- Create, PRIMM, Paired programming).
- Computational thinking concepts and approaches.
- Design first approach.
- Concepts before code.
- Sequencing of programming concepts. (sequence, repetition and selection)
- Agile approach a cycle of ask, imagine, plan, create and improve.

https://teachcomputing.org/pedagogy

Intent

What intent looks like for computing

How do you deliver the computing curriculum to pupils?

Think about:

- Your vision
- Schemes of work
- Progression of knowledge and skills, informed by research
- Cross-curricular links
- Cultural capital

Having a clear vision for computing

- What is your vision of what pupils should do and understand by the end of their time with you?
- How does your curriculum fulfil your vision?
- Does it meet and exceed the needs of your pupils and the national curriculum?
- Beyond surface level to diving deep?
- Is it research informed?

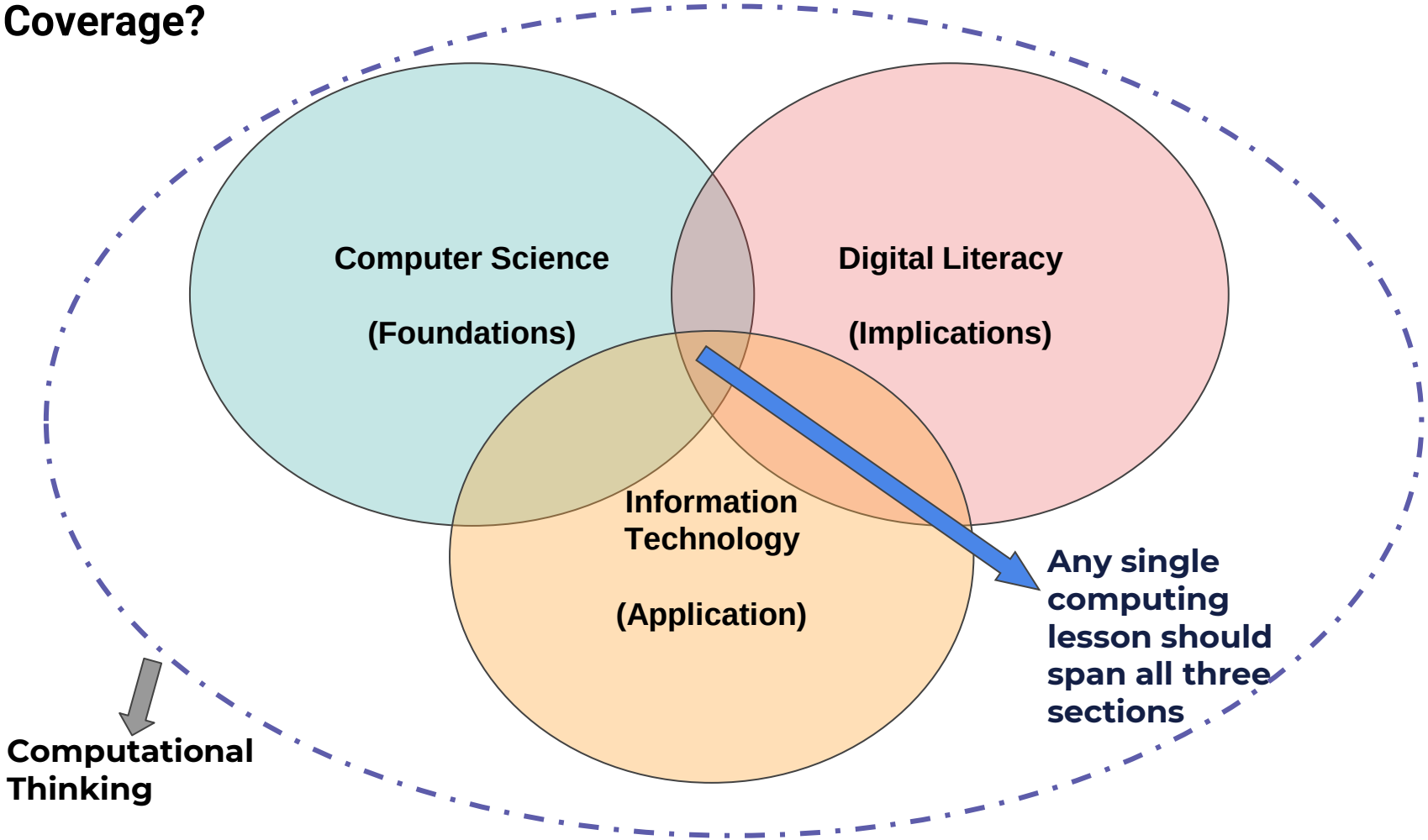
Example vision for primary

By the time the pupils have reached the end of KS2 they will have had strong understanding of the main constructs of programming sequence, repetition, selection, procedures and variables. Be able to apply computational thinking and approaches to problem solving.

They will have comprehensive knowledge of digital literacy and developed the IT skills, knowledge and understanding they will for the next phase of their education.

They will know how to manage their online lives and understand and apply principles of online safety to keep themselves and others safe.

Full Coverage?



Are you building knowledge?

Declarative knowledge

Static facts or knowledge stored in your memory (what)

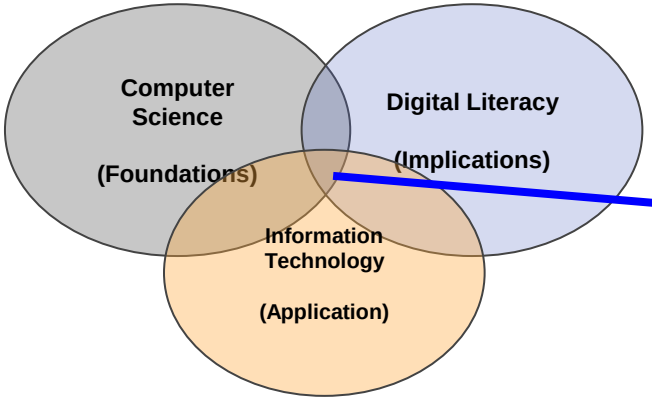
Procedural knowledge

How to perform a specific skill or task (how)

Conditional Knowledge

When to use declarative and procedural knowledge (when & why)

The 10 strand taxonomy



Each strand has a combination of skills and knowledge which feature throughout the curriculum.

Strand	Description
Algorithms	Comprehend, design, create, and evaluate algorithms
Creating media	Select and create a range of media including text, images, sounds, and video
Computing systems	What a computer is and how its constituent parts function together
Design and development	The activities involved in planning, creating, and evaluating computing artefacts
Data and information	How data is stored, organised, and used to represent real-world artefacts and scenarios
Effective use of tools	Use hardware and software tools to support computing work
Impact of technology	How individuals, systems, and society as a whole interact with computer systems
Networks	How networks can be used to retrieve and share information and come with associated risks
Programming	Create software to allow computers to solve problems
Safety and security	Understand risks when using technology and how to protect individuals and systems

Teach Computing Curriculum

Our curriculum contains everything you need to teach computing at key stages 1 to 4, including lesson plans, slides, worksheets, homework and assessment.

All of the content is completely free to access, and has been created by subject experts, based on the latest pedagogical research and teacher feedback. It also provides an innovative progression framework where computing content (concepts, knowledge, skills, and objectives) has been organised into interconnected networks we call learning graphs. You can get an overall view of progression using our curriculum journey poster, or download our individual key stage curriculum maps for more detail.

Choose resources by key stage

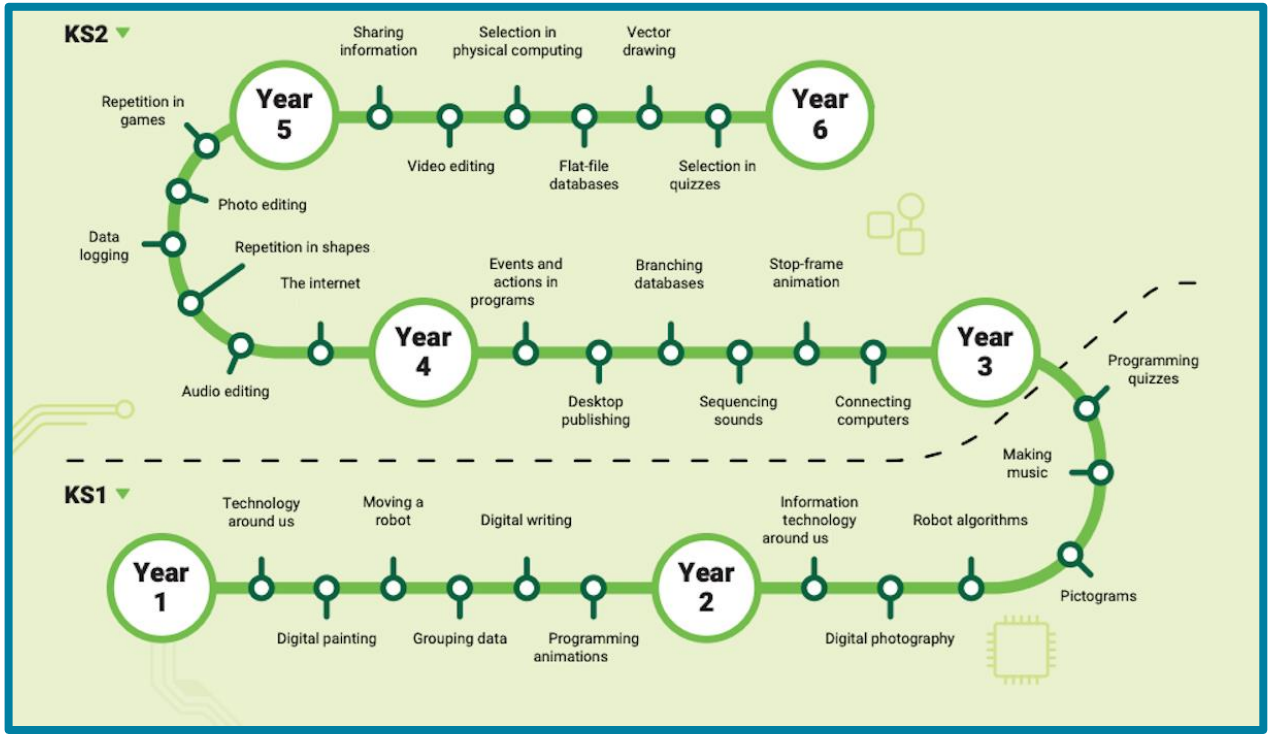
Key Stage 1	Key Stage 2	Key Stage 3	Key Stage 4
Year 1-2, Age 5-7	**Year 3-6**, Age 7-11	**Year 7-9**, Age 11-14	**Year 10-11**, Age 14-16

- Up to date
- Free curriculum to teach computing
- Includes lesson plans, resources, homework and assessments

www.teachcomputing.org/curriculum

Curriculum Journey Poster

Curriculum Journey Poster

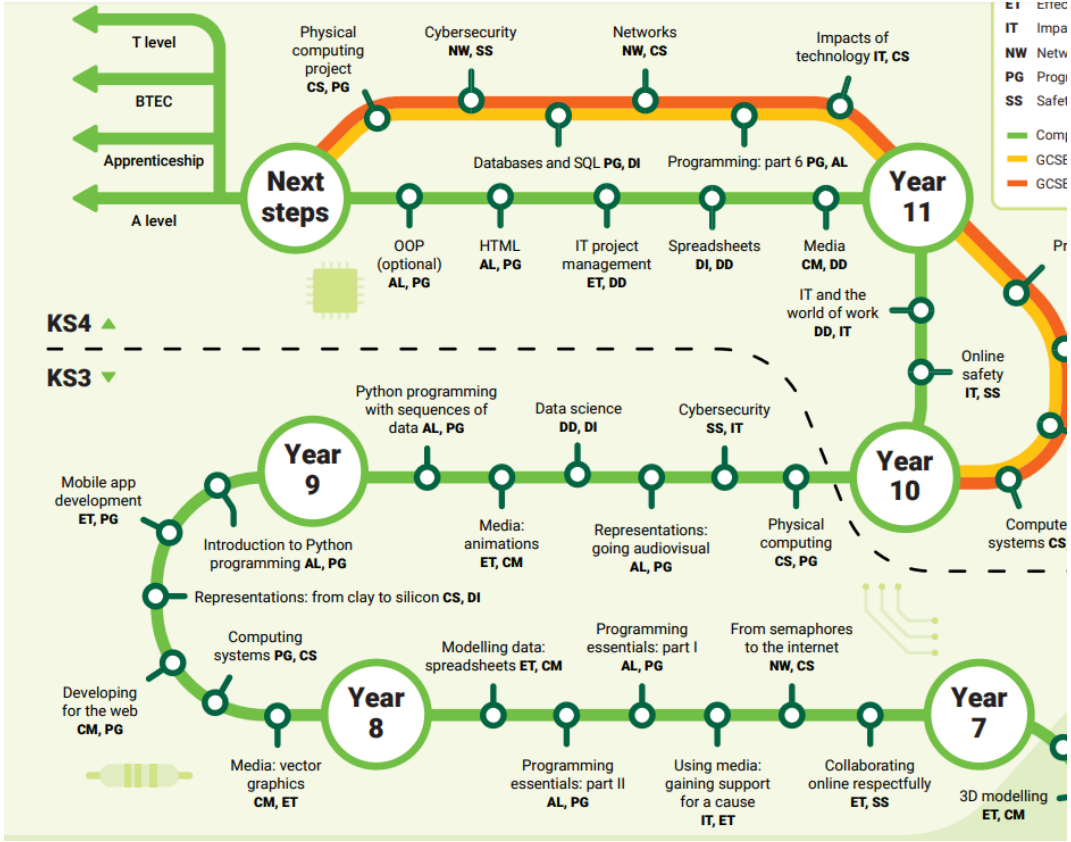


Key

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

The Journey Continues

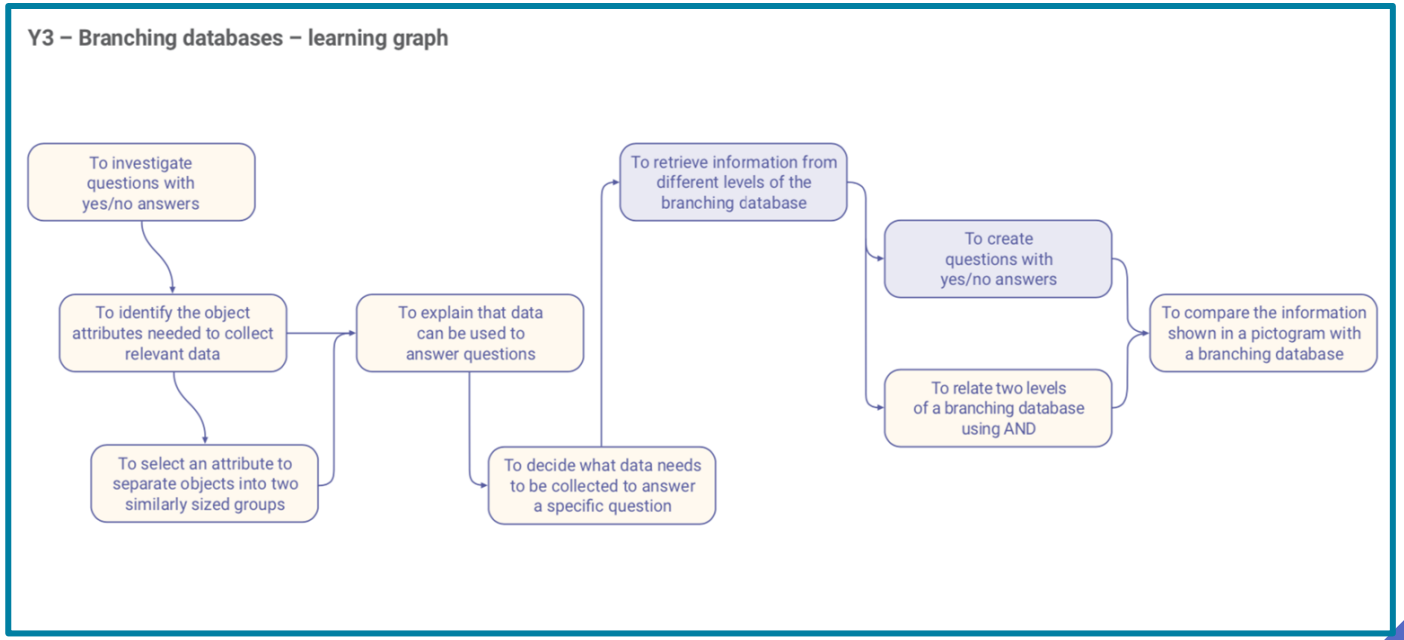


Themes in the Teach Computing Curriculum primary

	Computing Systems and Networks	Creating Media	Programming A	Data and Information	Creating Media	Programming B
Y1	Technology Around Us	Digital Painting	Moving a Robot	Grouping Data	Digital Writing	Programming Animations
Y2	Information Technology Around Us	Digital Photography	Robot Algorithms	Pictograms	Making Music	Programming Quizzes
Y3	Connecting Computers	Stop-Frame Animation	Sequencing Sounds	Branching Databases	Desktop Publishing	Events and Actions
Y4	The Internet	Audio Editing	Repetition in Shapes	Data Logging	Photo Editing	Repetition in Games
Y5	Sharing Information	Video Editing	Selection in Physical Computing	Flat-File Databases	Vector Drawing	Selection in Quizzes
Y6	Internet Communication	Webpage Creation	Variables in Games	Introduction to Spreadsheets	3D Modelling	Sensing

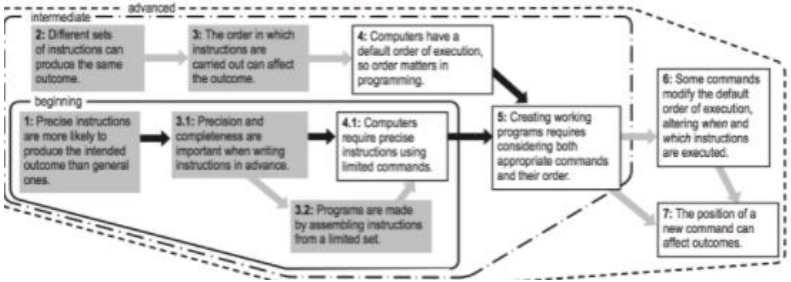
Learning graphs show progression

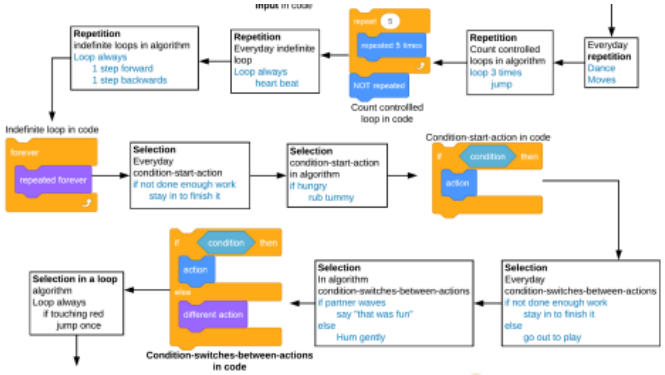
Cream = Concepts Purple = Skills



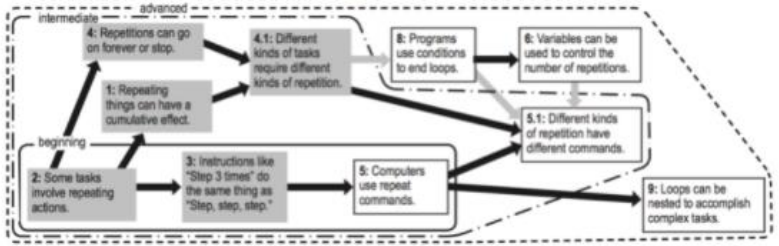
Researched informed progression

Sequence





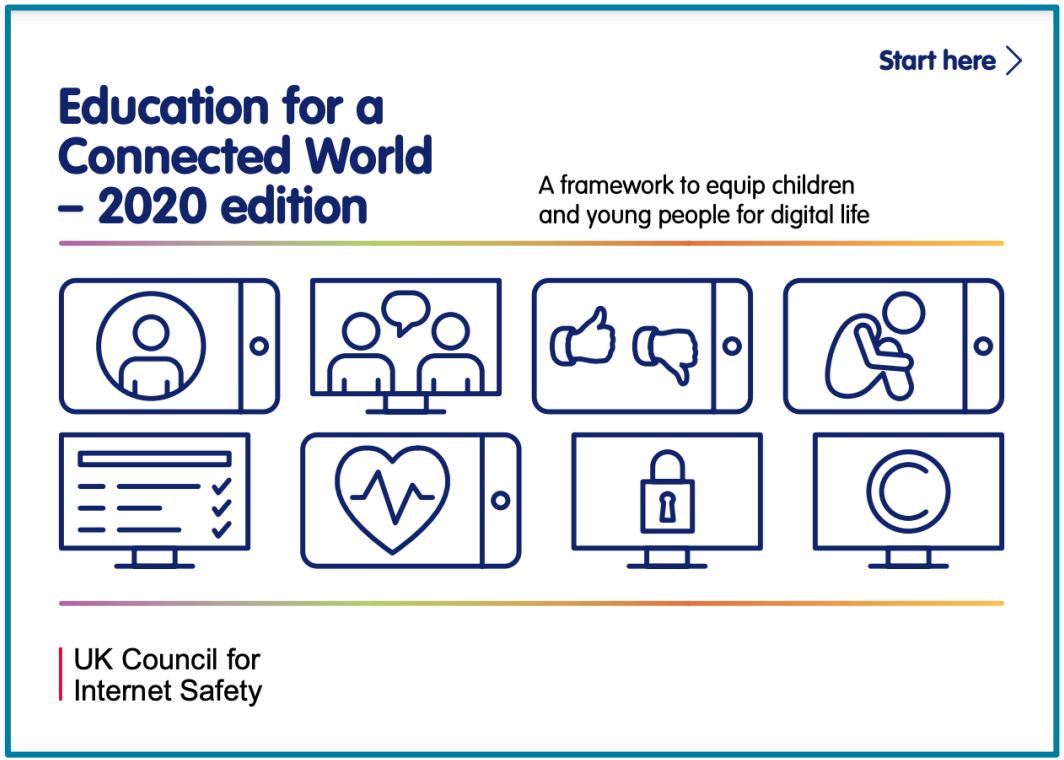
Repetition



http://everydaycomputing.org/

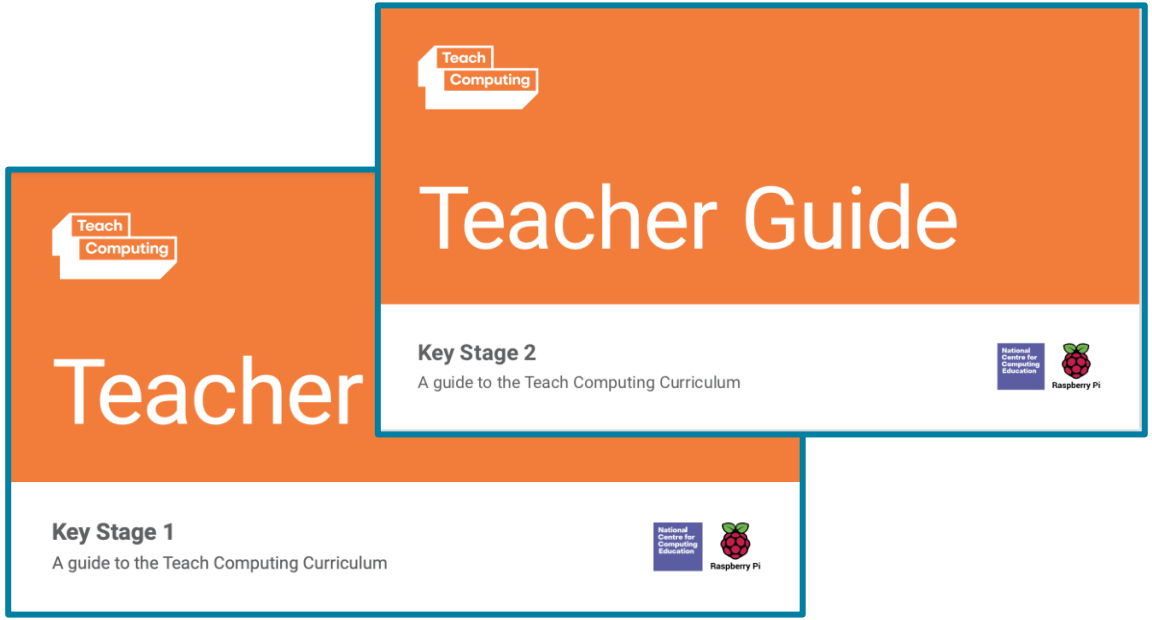
http://code-it.co.uk/

Online safety progression and links to PSHE



Education for a Connected World

Detailed Teacher Guides



These include:-

- Curriculum design and structure.
- Progression
- Pedagogy
- Assessment
- Resources (software and hardware)

Cultural capital in Computing

- **People** – Ada Lovelace, Alan Turing, Grace Hopper, Bill Gates, Steve Jobs, etc
- **Tech** – How it can be disruptive and improve lives, along with the negative impact.
- **Opportunities** – Extra-curricular activities, going to museums, entering events and competitions, talks by / visits to employers and further education running co-curricular programs such as code club or robotics club.

Planning for cultural capital

- Planning trips with a computing and STEM focus.
- Working with STEM ambassadors and links with local businesses.
- Developing computing co-curricular activities.
- Planning computing themed trips, visits and talks.
    - Such as the national museum of computing https://www.tnmoc.org/
- Promoting diversity in computing. (https://www.raspberrypi.org/blog/diversity-inclusion-computing-education-research-seminars/)
- Role models and challenging stereotypes.
- Motivating pupil premium children and access to technology.
- Present assembly to school.
- Celebrating computing, such as giving out certificates for computing.
- Themed computing days.

Implementation

What implementation looks like for computing

How are you teaching computing?

How are pupils remembering what they have learned?

How are you putting your plans into practice?

How are teachers being trained and supported to implement computing?

How well are you and others planning and assessing the pupils?

How well is the subject being monitored?

SEND and stretch and challenge?

Assessment? - MCQ, Rubrics, exit tickets and no stakes

The role of a Subject Leader

Has develop strong subject knowledge of computing.

Advocate and champion the subject.

Research and provide CPD for other staff.

Ensure coverage of computing across all phases.

Developed action plans, 3i’s and a strategy for computing.

Ensure sufficient resources are available to deliver high quality computing that is engaging for all learners.

https://www.computingatschool.org.uk/media/bpjadrp3/leadingprimarycomputingtoolkitv7.pdf

Subject Leaders folder

Development / action plan

Observation of lessons

Self evaluation (linked to above)

CPD Record - you / other staff

Audit / surveys (Staff)

Pupil / parent voice questionnaires

Policy

Budget / resources

Progression (including revisiting of topics)

Scheme of work (including endpoints)

Cross-curricular / topic links

Cultural capital

Moderation / examples of pupils' work

Acceptable use policy (AUP)

Online safety guidance and posters? Links to PSHE?

Impact

Impact questions to consider

How do you know that pupils are making progress?

How do you know that teachers are implementing the plans for computing?

Has the intent and implementation worked?

What is the potential impact on the subject teaching on the pupils?

Has the intent and implementation done what it is supposed to have done?

Have the children gained the knowledge and skills that they need?

Can you demonstrate clear progression?

Impact

What have work scruities shown? Are all pupils accessing the curriculum?

- Work scrutiny with a purpose

Can you show evidence that SEND and PP pupils make good progress through the curriculum?

- PP and SEND books and interviews

How can you show impact when Ofsted won't look at internal data?

- Get to know books well so you can show evidence of good progress through the curriculum.

Will pupils be able to answer questions relevant linked to the national curriculum?

- Check your curriculum compared to NC. It should be at least as good
- Do pupils embed their learning to long term memory? Plenaries and starters

Impact examples

- Online safety skills, knowledge and application.
  - Children knowing how to block, report, unfriending
- Presenting work and workflow.
- Pupil voice.
- Vocabulary!
- Computational thinking.
- Application of their learning.
  - Using physical computing can support here.

Intent

Your focus:

- Curriculum statement
- Plans

Ofsted will look at:

- Interview with subject leader
- Plans on the website

Implementation

Your focus:

- How well teachers plan, teach, assess pupils
- How well subject leader monitors

Ofsted will look at:

- Lesson visits
- Interviews with staff
- Interviews with pupils
- Work Scrutinies

Impact

Your focus:

- How well the pupils achieve

Ofsted will look at:

- Work scrutinies
- Interviews with pupils
- End of KS results
- NOT internal data

So what can the NCCE offer you?

CPD

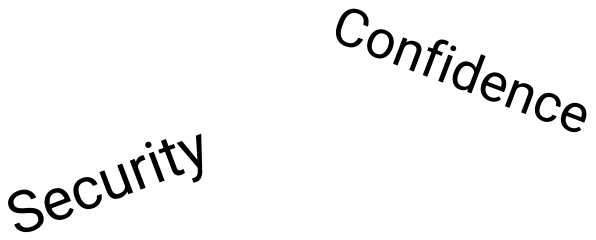
Resources

Guidance

Support

Certification

MONEY



Who are they? What do they want?

The **National Centre for Computing Education (NCCE)** is funded by the Department for Education and supporting partners, and marks a significant investment in improving the provision of computing education in England.

“**Our vision** is for every child in every school in England to have a world-leading computing education.”

Ambitious

We aim to transform the way computing is taught in schools across the country – and enable more young people to benefit from studying this important subject. Through this, we believe that their skills and career opportunities will be enhanced.

What have we achieved so far

- **39,000+ teachers engaged** across more than 20,000 schools in England
- **5500+ teachers have received training** through the Computer Science Accelerator
- **640,000+ lessons downloaded** from the Teach Computing Curriculum since launch

Figures as at October 2021

Thank you for listening

ANY QUESTIONS??