COMPUTING

Intent

To deliver a high-quality computing programme of study as set out in the national curriculum, using the built in progression model provided by Purple Mash.

Implementation

We implement this through embedding:

- Vocabulary relating to fundamental principles and concepts of computer science
- Problem solving skills to enable pupils to become competent users of information and communication technology.

Impact

For our pupils to:

- Access computing tools and programmes confidently
- Problem solve using technology
- Know how to be safe online and when using technology

‘We need technology in every classroom and in every student and teacher’s hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world’.
David Warlick

Computing Curriculum

Purpose

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which 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.

At Chellaston Fields, computing is taught explicitly from Y1 through to Y6 with opportunities to practice through cross curricular links. Key concepts are revisited each year to embed and build on prior knowledge.

Computing Curriculum

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
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

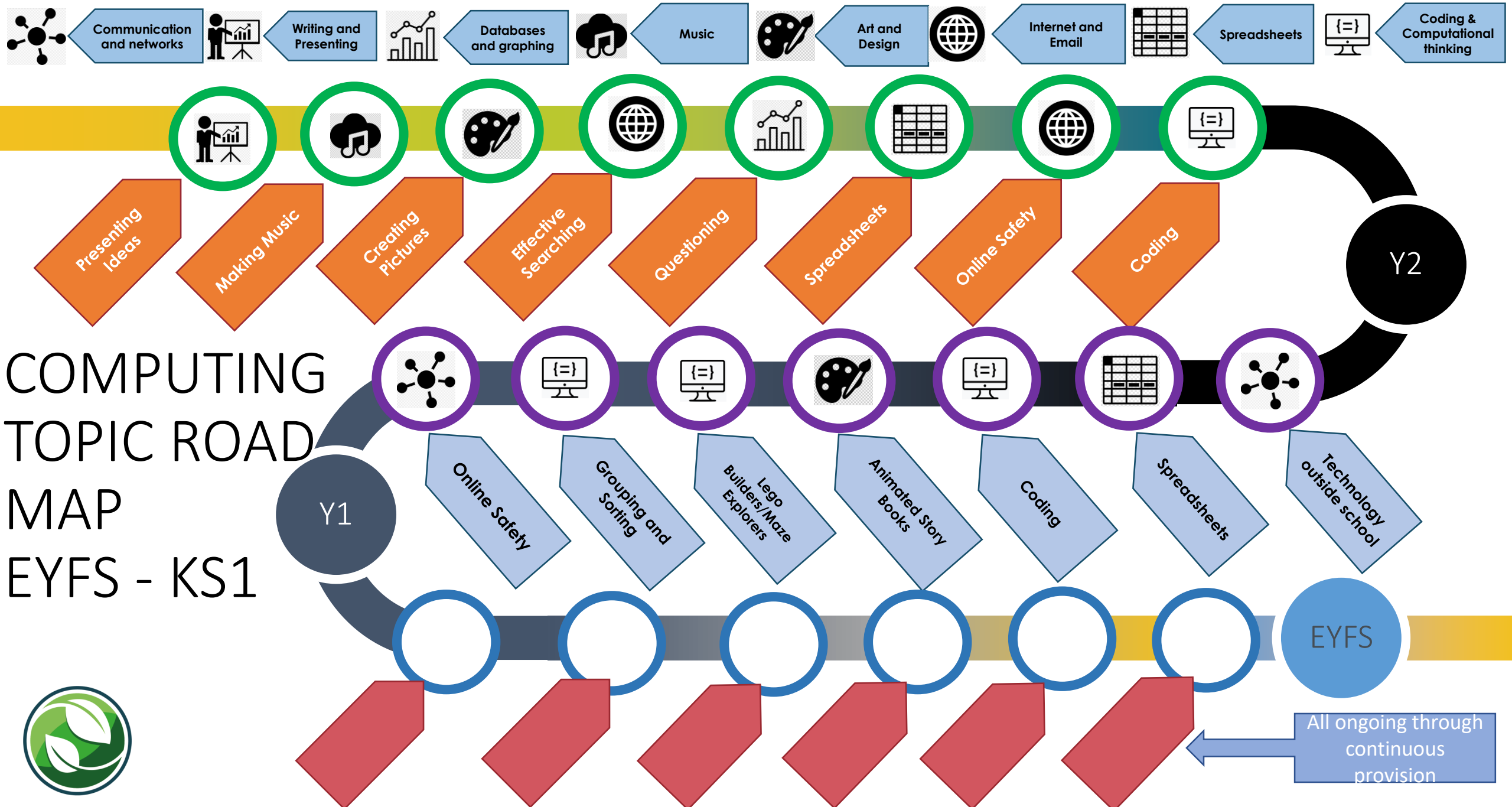
Computing Knowledge Progression

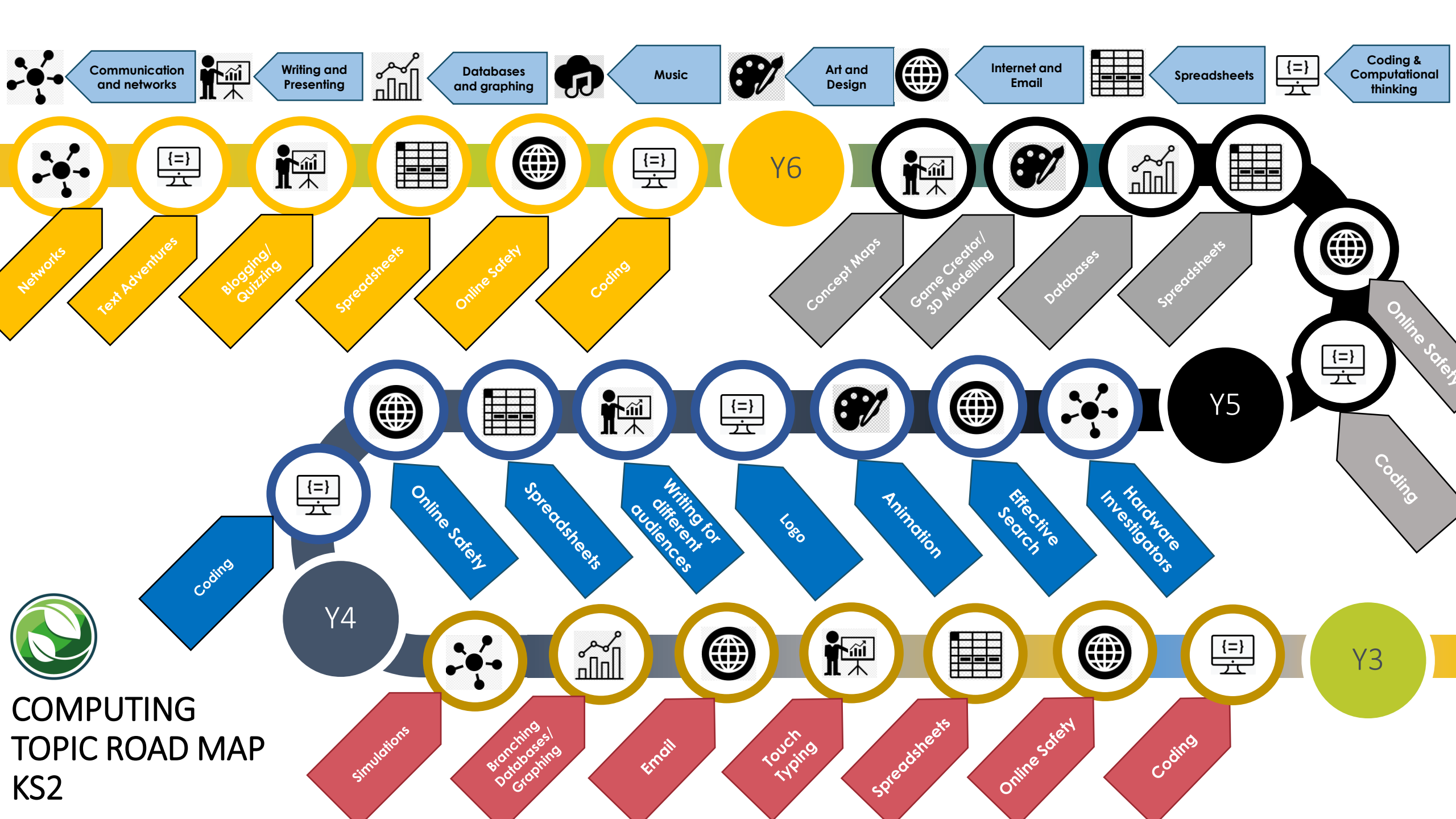
	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Computer Science		• Understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. • Know that an algorithm written for a computer is called a program. • Work out what is wrong with a simple algorithm when the steps are out of order. • Know that an unexpected outcome is due to the code they have created and can make logical attempts to fix the code. • Can read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program.	• Explain that an algorithm is a set of instructions to complete a task. • Show an awareness of the need to be precise with their algorithms so they can be successfully converted. • Can create a simple program that achieves a specific purpose. They can also identify and correct some errors. • Display a growing awareness of the need for logical, programmable steps. • Can identify the parts of a program that respond to specific actions and initiate specific actions.	• Turn a simple real-life situation into an algorithm by deconstructing it into manageable parts. • Show that they are thinking of the desired task and how this translates into code. • Identify an error within their program that prevents it following the desired algorithm and fix it. • Design and code a program that follows a simple sequence. • Use timers to achieve repetition effects. • Understand how variables can be used to store information while a program is executing. • The structure of a program is in logical, achievable steps. • Identify errors in algorithms and correct. • Read programs with several steps and predict outcome. • List a range of ways that the internet can be used to provide different methods of communication and use some of these methods. • Describe appropriate email conventions when communicating.	• Turn a real-life situation into an algorithm using coding structures for selection and repetition. • Make more intuitive attempts to debug their own programs. • Use timers to achieve repetition in a logical way, integrated into designs. • Understand 'if' statements, repletion and variables. • Trace code and use step-through methods to identify errors in code and make logical attempts to correct this. • Read programs with several steps and predict outcome accurately. • Recognise the main component parts of hardware which allows computers to join and form a network. • Have ag rowing understanding of online safety implications.	• Attempt to turn more complex real-life situations into algorithms for a program by deconstructing it into manageable parts. • Test and debug their programs as they go and use logical methods to identify the approximate cause of any bug but may need some support to identify the specific line of code. • Translate algorithms that include sequence, selection and repetition into code with increasing ease and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures. • Combine sequence, selection and repetition with other coding structures to achieve an algorithm design. • Begin to think about their code structure in terms of the ability to debug and interpret the code later. • Understand the value of computer networks and are aware of the dangers. • Recognise what personal information is and how this can be kept safe. • Select the most appropriate form on online communications contingent on audience and digital content.	• Turn a more complex programming task into an algorithm by identifying the important aspects of the task (abstraction) and then decomposing them. • Test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem. • Translate algorithms that include sequence, selection and repetition into code; utilise structures including nesting structures within each other. • Coding displays an improving understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks and the value of functions. • Interpret a program in parts and make logical attempts to put the separate parts of a complex algorithm together to explain the program as a whole. • Explain in some depth the difference between the internet and the World Wide Web. • Know what a WAN and LAN are and can describe how they access the internet in school.

Computing Knowledge Progression

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Information Technology	• Begin to follow instructions in the correct order. • Understand that instructions need to go in the correct order. If you mix them up then the task will not be completed correctly. Eg: making toast- you can't butter the bread and then put it into the toaster. • Explore games on Mini Mash that move forwards, backwards, left and left.	• Sort, collate, edit and store simple digital content.	• Demonstrate an ability to organise data and can retrieve specific data for conducting simple searches. • Edit more complex digital data. • Use a range of media in their digital content including photos, text and sound.	• Carry out simple searches to retrieve digital content by connecting to the internet and using a search engine. • Collect, analyse, evaluate and present data and information using a selection of software. • Consider what software is most appropriate for a given task. • Create purposeful content to attach to emails.	• Understand the function, features and layout of a search engine. • Appraise selected webpages for credibility and information at a basic level. • Make improvements to digital solutions based on feedback. • Make informed software choices when presenting information and data. • Create linked content using a range of software. • Share digital content within their community.	• Search with greater complexity for digital content when using a search engine. • Explain how credible a webpage is and the information it contains. • Make appropriate improvements to digital solutions based on feedback and comment on the success of the solution. • Objectively review solutions from others. • Collaboratively create content and solutions using digital features within software.	• Apply filters when searching for digital content. Explain in detail how credible a webpage is and the information it contains. Compare a range of digital content sources and rate them in terms of content quality and accuracy. • Make clear connections to the audience when designing and creating digital content. • Design and create blogs on the internet. • Use criteria to evaluate the quality of digital solutions and identify improvements, making some refinements.
Digital Literacy	• Know we need passwords to protect our work and will use them with an adult eg: for teachers to log onto their computers or a passcode for the iPads. • Sort different pieces of technology that they may find at school and what they may find at home eg: A washing machine in the kitchen not in the classroom.	• Understand what is meant by technology and identify a variety of examples both in and out of school. • Make a distinction between objects that use modern technology and those that do not. • Understand the importance of keeping information, such as their user names and passwords, private and actively demonstrate this in lessons. • Take ownership of their work and save this in their own private space.	• Can effectively retrieve relevant, purposeful digital content using a search engine. • Apply learning of effective searching beyond the classroom and share knowledge. • Make links between technology they see around them, coding and multimedia work they do in school. • Know the implications of inappropriate online searches. • Begin to understand how things are shared electronically. • Develop an understanding of using email safely and know ways of reporting inappropriate behaviours & content to a trusted adult.	• Demonstrate the importance of having a secure password and not sharing this with anyone else. • Explain the negative implications of failure to keep passwords safe and secure. • Understand the importance of staying safe and the importance of their conduct when using familiar communication tools. • Know more than one way to report unacceptable content and contact.	• Explore key concepts relating to online safety using concept mapping. • Help others to understand the importance of online safety • Know a range of ways of reporting inappropriate content and contact.	• Have a secure knowledge of common online safety rules and apply this by demonstrating the safe and respectful use of a few different technologies and online services. • Relate appropriate online behaviour to their right to personal privacy and mental wellbeing of others.	• Demonstrate the safe and respectful use of a range of different technologies and online services. • Identify more discreet inappropriate behaviours through developing critical thinking. • Recognise the value in preserving their privacy when online for their own and other people's safety.

COMPUTING TOPIC ROAD MAP EYFS - KS1





COMPUTING TOPIC ROAD MAP KS2

Autumn

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Online Safety (various) Grouping and Sorting (2DIY) Pictograms (2 Count) Lego Builders (2DIY)	Coding (2Code) Online Safety (various) Spreadsheets (2Calculate)	Coding (2Code) Online Safety (various) Spreadsheets (2Calculate)	Coding (2Code) Online Safety (various) Spreadsheets (2Calculate)	Coding (2Code) Online Safety (various) Spreadsheets (2Calculate)	Coding (2Code) Online Safety (various) Spreadsheets (2Calculate)

Spring

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Maze Explorers (2DIY) Animated Story Books (2CreateAStory)	Questioning (2Question, 2Investigate) Effective Searching (Browser)	Touch Typing (2Type) Email (2Email,2Connect, 2DIY)	Writing for different audiences (2Email, 2Connect, 2DIY) Logo (Logo)	Databases (2Question, 2Investigate) Game Creator (2DIY, 3D)	Blogging (2Blog) Text Adventures (2Code, 2Connect)

Summer

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Coding (2Code) Spreadsheets (2Calculate) Technology outside school (various)	Creating Pictures (2PaintAPicture) Making Music (2Sequence) Presenting Ideas (various)	Branching Databases (2Questions) Simulations (2Simulate, 2Publish) Graphing (2Graph)	Animation (2Animate) Effective Search (Browser) Hardware Investigators	3D Modelling (2Design&Make) Concept Maps (2Connect)	Networks Quizzing (2Quiz, 2DIY, Text Toolkit, 2Investigate)

Theme Key

Coding and Computational thinking	Spreadsheets	Internet and Email	Art and Design	Music	Databases and graphing	Writing and Presenting	Communication and networks

Reception Knowledge

30- 50 months

- Know how to operate simple equipment, eg, turn on CD player, use remote control.
- Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones.
- Knows how to make toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images.
- Knows that information can be retrieved from computers.

40 – 60 months

- Completes a simple program on a computer.
- Uses ICT hardware to interact with age appropriate computer software.

ELG

- Know that a range of technology is used in places such as homes and schools.
- Know how to select and use technology for a particular purpose.

Reception Statements

Exploring and Using Media and Materials

- Explores what happens when they mix colours.
- Experiments to create different textures.
- Understands that different media can be combined to create new effects.
- Manipulates materials to achieve a planned effect.
- Constructs with a purpose in mind, using a variety of resources.
- Uses simple tools and techniques competently and appropriately.
- Selects appropriate resources and adapts work where necessary.
- Selects tools and techniques needed to shape, assemble and join materials they are using.

Year 1 Knowledge

- Know how to login safety.
- Know some of the tools and key icons and be able to save, print, open and new.
- Give examples of when you might use a computer to sort items.
- To understand that data can be represented in a picture format (pictogram).
- Know that an algorithm are a set of instructions to follow when using a computer.
- To know why it is important to follow instructions on the computer.
- To know what is meant by ‘debug’.
- To know that you can change algorithms.
- To explain what a block of code is.
- To understand why a spreadsheet can be used.

Year 1 ‘knowledge rich’ assessment

Algorithms

- Create a series of instructions and plan a journey for a programmable toy.

Create programs

- Create , store and retrieved digital content.

Using technology

- Use a website and a camera.
- Record sound and play back.

Uses of IT beyond school

- Talk about some of the IT uses in their own home.

Safe use

- Use technology safely.
- Keep personal information private.

Year 2 Knowledge

- Can explain how to use the following terms in a computer program: Command, Repeat, Input, Output, Event, Collision Detection and Timer.
- Explain what debugging means and what they did so that their computer didn't work.
- Can explain how they know that certain objects can only move in certain ways.
- Can explain how things can be shared electronically for others to see on Purple Mash and on the Internet.
- Know how to refine searches using the search tool.
- To understand what is meant by a database.
- Can explain what rows and columns are in a spreadsheet. Can explain what they can use a spreadsheet for.
- Know how to carry out a search using the internet.
- To know that a computer program can be used to simulate the work of an artist.

Year 2 'knowledge rich' assessment

Algorithms
- Understand that algorithms are used on digital services.

Create programs
- Write a simple program and test it.

Reasoning
- Predict what the outcome of a simple program will be (logical reasoning).

Using technology
- Understand that programs require precise instructions.
- Organise, retrieve and manipulate digital content.

Uses of IT beyond school
- Know how technology is used in school and outside of school.

Safe use
- Know where to go for help if concerned.

Year 3 Knowledge

- Can explain what Object, Action, Output, Control and Event are in computer programming; what commands they have included in their program and what they achieve.
- Know what makes a good password for use on the internet and what happens if you don't keep your password safe.
- Know that some information held on websites may not be accurate or true.
- Know how to find specified locations in a spreadsheet.
- Know typing terminology, eg, names of fingers, top row, home row, bottom row, space bar.
- Know what cc means and how to use it.
- Explain how to use and debug their own branching database.
- Know that a computer simulation can represent real and imaginary situations.

Year 3 'knowledge rich' assessment

Create programs
- Write programs that accomplish specific goals.

Develop programs
- Design a sequence of instructions, including directional instructions.

Reasoning
- Discern when it is best to use technology and where it adds little or no value.

Networks
- Navigate the web to complete simple searches.

Search engines
- Use a range of software for similar purposes.
- Collect and present information.

Using programs
- Understand what computer networks do and how they provide multiple services.

Safe use
- Use technology respectfully and responsibly.
- Know different ways they can get help in concerned.

Year 4 Knowledge

- Can create an algorithm modelling the sequence of a simple event and manipulate graphics in the design view.
- Know how to stay safe online.
- Know that a spreadsheet can be used to help plan actions.
- Know how font size and style can affect the impact of a text.
- To know what makes a good animated film or cartoon and to create simple animations.
- To know why you should analyse the contents of a web page for clues about credibility of the information.
- Can name the different parts of a desktop computer and know their functions.

Year 4 'knowledge rich' assessment

Create programs
- Give an 'on-screen' robot specific instructions that takes them from A to B.

Develop programs
- Experiment with variables to control models.

Reasoning
- Make an accurate prediction and explain why they believe something will happen (linked to programming).

Networks
- Know how to search for specific information and know which information is useful and which is not.

Search engines
- Select and use software to accomplish given goals.

Using programs
- Produce and upload a podcast.

Safe use
- Recognise acceptable and unacceptable behaviour using technology.

Year 5 Knowledge

- Can explain what a variable is in programming.
- Know what SMART CREW is and have an understanding of how to stay safe online.
- Can explain why a spreadsheet can be used to model a real-life situation.
- Know what a database field is and can correctly add field information.
- Know how to create a game with instructions.
- To understand designing for a purpose, printing and making.
- To understand and use correct vocabulary when creating a concept map.

Year 5 'knowledge rich' assessment

Create programs
- Use technology to control an external device.

Develop programs
- Develop a program that has specific variables identified.

Reasoning
- Analyse and evaluate information reaching a conclusion that helps with future developments.

Search engines
- Understand how search results are selected and ranked.

Using programs
- Combine sequences of instructions and procedures to turn devices on and off.

Safe use
- Understand that they have to make choices when using technology and that not everything is true and/or safe.

Year 6 Knowledge

- Know how to design and write a more complex program that accomplishes a specific goal.
- Know the vocabulary used when coding.
- To explain the safety aspects of blogging.
- Can explain why a spreadsheet can be used to model a real-life situation.
- Know the key features of a blog.
- Know the difference between the World Wide Web and the Internet.
- Know about their school network.
- Know what Tim Berners-Lee is well known for.

Year 6 'knowledge rich' assessment

Create programs

- Write a program that combines more than one attribute.

Develop programs

- Develop a sequenced program that has repetition and variables identified.

Reasoning

- Design algorithms that use repetition and 2-way selection.

Search engines

- Be aware that some search engines may provide misleading information.

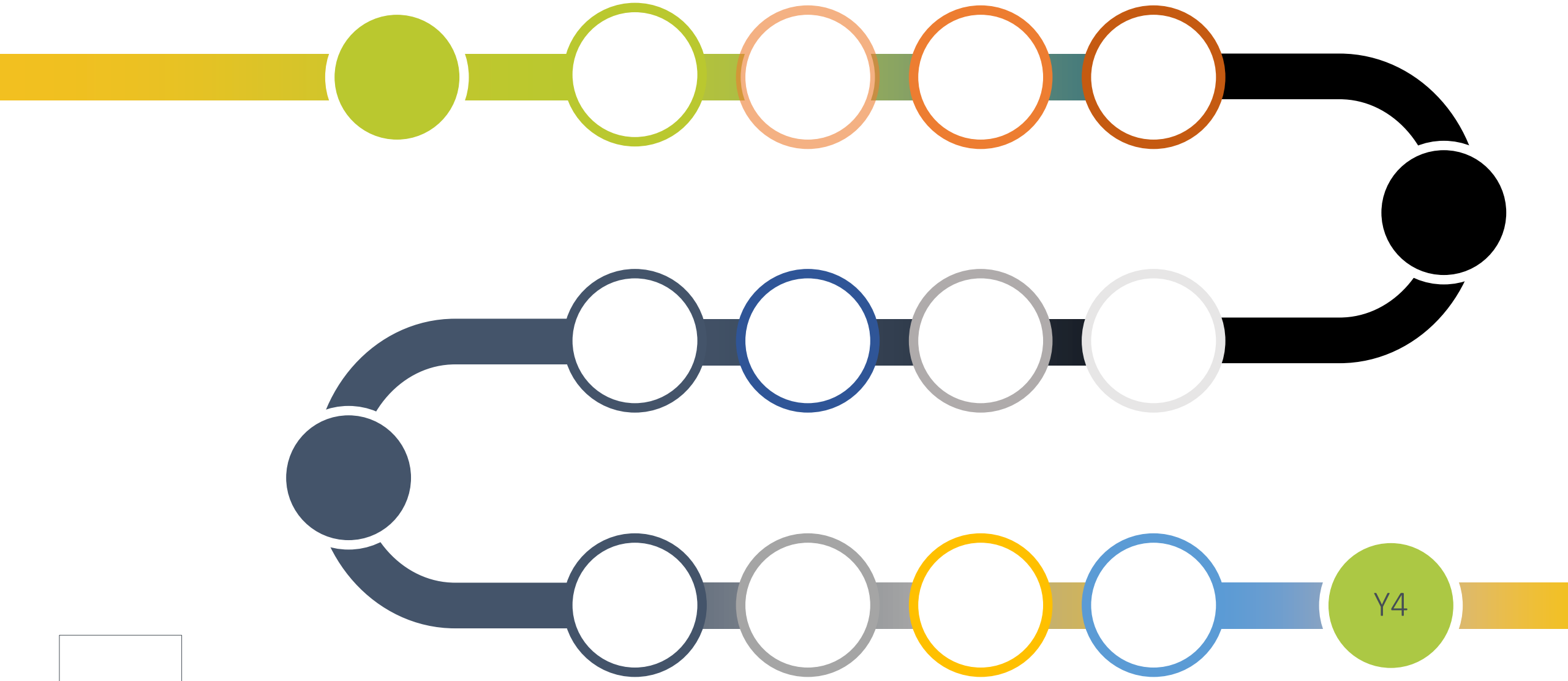
Using programs

- Present the data collected in a way that makes it easy for others to understand.

Safe use

- Be increasingly aware of the potential dangers in using aspects of IT and know when to alert someone if feeling uncomfortable.

Knowledge organisers


Y4