| Computing | Cycle A | | | | | |
|---|---|---|---|---|---|---|
| | Autumn | | Spring | | Summer | |
| Forest Class | Programming 1:<br>All about instructions<br>Algorithms unplugged<br>Online safety | Programming 1:<br>Algorithms and debugging | Programming 2:<br>Programming Bee-Bots | Programming 2:<br>Programming ScratchJr | Creating media:<br>Digital imagery | Creating media:<br>Stop motion |
| Meadow Class | Computer systems and networks 1:<br>Networks<br>Online safety | Computer systems and networks 2:<br>Collaborative learning | Programming:<br>Scratch | Programming 1:<br>Further coding with Scratch | Creating media:<br>Video trailer | Creating media:<br>Website design |
| Hillside Class | Programming:<br>Introduction to Python<br>Online safety | Computing systems and networks:<br>Bletchley Park | Data handling:<br>Mars Rover 1 | Data handing:<br>Big data 1 | Data handing:<br>Big data 2 | Skills showcase: Mars Rover 2 |
| | | | | | | |
| | Cycle B | | | | | |
| Forest Class | Computing systems and networks:<br>Using a computer and improving mouse skills<br>Online safety | Computing systems and networks 1:<br>Exploring hardware<br>What is a computer? | Data handing:<br>Introduction to data | Data handing:<br>International Space Station | Computing systems and networks:<br>Word processing | Skills showcase:<br>Rocket to the moon |
| Meadow Class | Computer systems and networks 2:<br>Emailing<br>Online safety | Computer systems and networks 3:<br>Journey inside a computer | Programming 2:<br>Computational thinking | Skill showcase:<br>HTML | Data handling:<br>Comparison cards databases | Data handling:<br>Investigating weather |
| Hillside Class | Programming 1:<br>Music<br>Online safety | Computing systems and networks:<br>Search engines | Programming 2:<br>Micro:bit | Creating media:<br>Stop motion animation | Creating media:<br>History of computers | Skill showcase:<br>Inventing a product |

# Computing - Online Safety

## Forest Class EYFS & Year 1

- Discuss what the internet is and how it can be used.
- Recognise that the internet may affect mood or emotions.
- Recognise how internet use can affect and upset others.
- Identify which information is appropriate to share and post online and which is not.

## Meadow Class Year 3

- Differentiate between fact, opinion and belief online.
- Explain how to deal with upsetting online content.
- Recognise that digital devices communicate with each other to share personal information.
- Explain what social media platforms are used for.
- Recognise why social media platforms are age-restricted.

## Hillside Class Year 5

- Understand that passwords need to be strong and that apps require some form of password.
- Recognise some types of online communication and know who to go to if they need help with any communication matters online.
- Search for simple information about a person, such as their birthday or key life moments.
- Know what bullying is and that it can occur both online and in the real world.
- Recognise when health and well-being are being affected in either a positive or negative way through online use.
- Offer some advice and tips to combat the negative effects of online use.

## Forest Class Year 2

- Explain what is meant by online information.
- Recognise what information is safe to be shared online.
- Explain why we need passwords and what makes a strong password.
- Understand that they need to ask permission before sharing content online and explain why.
- Understand that they have the right to deny their permission to information about them being shared online.
- Say who they can ask for help with online worries.
- Use some strategies to work out if online information is reliable or not.

## Meadow Class Year 4

- Describe how to search over multiple platforms and be aware of the accuracy of the results presented.
- Describe some of the methods used to persuade people to buy online.
- Explain the difference between fact, opinion and belief and recognise these online.
- Explain what a bot is and give examples of different bots.
- Explain some positive and negative distractions of using technology and small strategies for reducing the time spent on technology.

## Hillside Class Year 6

- Discuss various issues online that can leave pupils feeling sad, frightened, worried or uncomfortable and can describe numerous ways to get help.
- Explain how sharing online can have both positive and negative impacts.
- Be aware of how to seek consent from others before sharing material online and describe how content can still be shared online even if it is set to private.
- Explain what a digital reputation is and what it can consist of.
- Understand the importance of capturing evidence of online bullying and demonstrate some of these methods on the devices used at school.
- Describe ways to manage passwords and strategies to add extra security, such as two-factor authentication.
- Explain what to do if passwords are shared, lost or stolen.
- Describe strategies to identify scams.
- Explain ways to increase their privacy settings and understand why it is important to keep their software updated.

# Computing - Cycle A

## Forest Class

### Autumn 1

**Programming 1:**
**All about instructions**
**Algorithms unplugged**
**Online safety**

- Explain what an algorithm is.
- Write clear algorithms.
- Follow an algorithm.
- Explain what inputs and outputs are.
- Create an achievable program.
- Decompose a design into steps.
- Identify bugs in an algorithm and how to fix them.
- Explain what an algorithm is.
- Write clear algorithms.
- Follow an algorithm.
- Explain what inputs and outputs are.
- Create an achievable program.
- Decompose a design into steps.
- Identify bugs in an algorithm and how to fix them.

### Spring 1

**Programming 2:**
**Programming Bee-Bots**

- Recognise cause and effect when pressing buttons on a Bee-Bot.
- Discuss and demonstrate how the Bee-Bot works.
- Record video ensuring everyone is in the shot.
- Give a a number of clear instructions in sequence.
- Program a Bee-Bot to reach a destination.
- Identify and correct mistakes in their programming.

### Summer 1

**Creating media:**
**Digital imagery**

- Plan a pictorial story using photographic images in sequence.
- Explain how to take clear photos.
- Take photos using a device.
- Edit photos by cropping, filtering and resizing.
- Search for and import images from the internet.
- Explain what to do if something makes them uncomfortable online.
- Organise images on the page, orientating where necessary.

### Autumn 2

**Programming 1:**
**Algorithms and debugging**

- Decompose a game to predict the algorithms.
- Give a definition for 'decomposition'.
- Write clear and precise algorithms.
- Create algorithms to solve problems.
- Use loops in their algorithms to make their code more efficient.
- Explain what abstraction is.

### Spring 2

**Programming 2:**
**Programming ScratchJr**

- Explore a new application independently.
- Explain what the blocks on ScratchJr do and use them for a purpose.
- Recognise a loop in coding and why it is useful.
- Use a code to create an animation of an animal moving.
- Use code to follow *and* create an algorithm.
- Program code to run 'on tap'.
- Explain the role of the blocks in a program they have created.

### Summer 2

**Creating media:**
**Stop motion**

- Create a flip book animation.
- Decompose a story into smaller parts to plan a stop motion animation.
- Create stop motion animations with small changes between images.

# Computing - Cycle A

## Meadow Class

### Autumn 1

**Computer systems and networks 1:**
**Networks**
**Online safety**

- Recognise that a network is two or more devices connected and its purpose.
- Identify key components that make up the school's network.
- Explain the difference between wired and wireless connections.
- Recognise that files are saved on a server.
- Understand the role of the server in a network when requesting a website.
- Identify parts of a website's journey to reach your computer.
- Recognise that routers connect to send information.
- Understand that data is broken into packets.

### Spring 1

**Programming:**
**Scratch**

- Explain what some of the blocks do in Scratch.
- Explain what a loop is and include one in their program.
- Suggest possible additions to an existing program by remixing code.
- Recognise where something on screen is controlled by code.
- Use a systematic approach to find bugs.
- Understand the definitions of decomposition and algorithm and how they are used to create accurate code.

### Summer 1

**Creating media:**
**Video trailer**

- Describe the purpose of a trailer.
- Create a storyboard for a book trailer.
- Consider camera angles when taking photos or videos.
- Import videos and photos into film editing software.
- Record sounds and add these to a video.
- Add text to a video.
- Incorporate transitions between images.
- Evaluate their own and others' trailers.

### Autumn 2

**Computer systems and networks 2:**
**Collaborative learning**

- Understand the need to be thoughtful when working on a collaborative document.
- Use comments to suggest changes to a document and understand how to resolve comments.
- Use a variety of different slide styles to convey information including images and transitions.
- Create a Google Form with a range of different questions types that will provide different types of answers, e.g. text, multiple choice or numerical values.
- Export data to a spreadsheet, highlighting data, using conditional formatting and calculating averages and sums of numbers.

### Spring 2

**Programming 1:**
**Further coding with Scratch**

- Understand how to create a simple script in Scratch – be able to change sprite and prevent the sprite from rotating.
- Use decomposition to identify key features and understand how to decipher actions that make the quiz game work.
- Understand what a variable is and how to use the 'say' and 'ask' blocks.
- Create a variable and be able to use a variable to record a score.
- Understand what a variable is and how it works within a program.

### Summer 2

**Creating media:**
**Website design**

- Use most of the tabs (e.g. insert, pages, themes) on Google Sites on their website.
- Create a clear plan for their web page and begin to create it.
- Create a professional looking web page with useful information and a clear style, which is easy for the user to read and find information from.
- Create a clear plan by referring back to their checklist.
- Create four web pages with a range of features on their website.

# Computing - Cycle A

**Hillside Class**

## Autumn 1

**Computing systems and networks:**
**Search engines**
**Online safety**

- Explain what a search engine is, suggesting several search engines to use and explain how to use them to find websites and information.
- Suggest that things online aren't always true and recognise what to check for.
- Explain why keywords are important and what TASK stands for, using these strategies to search effectively.
- Recognise the terms 'copyright' and 'fair use' and combine text and images in a poster.
- Make parallels between book searching and internet searching, explaining the role of web crawlers and recognising that results are rated to decide rank.

## Spring 1

**Data handling:**
**Mars Rover 1**

- Identify some types of data the Mars Rover could collect (for example, photos).
- Explain how the Mars Rover transmits the data back to Earth and the challenges involved.
- Read any number in binary, up to eight bits.
- Identify input, processing and output on the Mars Rovers.
- Read binary numbers and grasp the concept of binary addition.
- Relate binary signals (Boolean) to a simple character-based language, ASCII.

## Summer 1

**Data handing: Big data 2**

- Recognise that data can become corrupted within a network and that data sent in packets is more robust, as well as identify the need to update devices and software.
- Recognise differences between mobile data and WiFi and use a spreadsheet to compare and identify high-use data activities and low-use data activities.
- Make links between the Internet of Things and Big Data and give a basic example of how data analysis/analytics can lead to improvement in town planning.
- Explain ways that Big Data or IoT principles could be used to solve a problem or improve efficiency within the school and prepare a presentation about their idea, considering the privacy of some data.
- Present their ideas about how Big Data/IoT can improve the school and provide feedback to others on their presentations.

## Autumn 2

**Computing systems and networks:**
**Bletchley Park**

- Explain that codes can be used for a number of different reasons and decode messages.
- Explain how to ensure a password is secure and how this works.
- Create a simple website with information about Bletchley Park including the need to build electronic thinking machines to solve cipher codes.
- Explain the importance of historical figures and their contribution towards computer science.
- Present information about their historical figure in an interesting and engaging manner.

## Spring 2

**Data handing: Big data 1**

- Understand why barcodes and QR codes were created.
- Create (and scan) their own QR code using a QR code generator website.
- Explain how infrared can be used to transmit a Boolean type signal.
- Explain how RFID works, recall a use of RFID chips, and type formulas into spreadsheets.
- Take real-time data and enter it effectively into a spreadsheet.
- Presenting the data collected as an answer to a question.
- Recognising the value of analysing real-time data.
- Analyse and evaluate transport data and consider how this provides a useful service to commuters.

## Summer 2

**Skills showcase: Mars Rover 2**

- Create a pixel picture, explaining that a pixel is the smallest element of a digital image and that binary is used to code and transfer this data.
- Save a JPEG as a bitmap and recognise the difference in file size as well as explaining how pixels are used to transfer image data.
- Explain the 'fetch, decode, execute' cycle in relation to real-world situations.
- Create a profile with a safe and suitable username and password and begin to use 3D design tools.
- Independently take tutorial lessons, applying what they have learnt to their design and understand the importance of using an online community responsibly.

# Computing - Cycle B

## Forest Class

### Autumn 1

**Computing systems and networks:**
**Using a computer and improving mouse skills**
**Online safety**

- Use computers more purposefully
- Log in and navigate around a computer
- Drag, drop, click and control a cursor using a mouse
- Use software tools to create art on the computer

### Spring 1

**Data handing:**
**Introduction to data**

- Represent animal-themed data in different ways, using objects and technology.
- Log in and use mouse and keyboard skills to navigate the computer.
- Represent the same data as a pictogram and a table or chart.
- Collect data about minibeasts using a tally chart and represent their data digitally.
- Click and drag objects to sort data using a branching database.
- Consider the types of input that would be used to gather different forms of data when designing an invention.

### Summer 1

**Computing systems and networks:**
**Word processing**

- Explain which are the home row keys and how to find them for typing.
- Use the spacebar and backspace correctly.
- Type and make simple alterations to text using buttons on a word processor.
- Search for, import and alter appropriate images for a text document.
- Modify text in a document.
- Use copy and paste to copy text from one document to another.
- Explain what information is safe to be shared online.

### Autumn 2

**Computing systems and networks 1:**
**Exploring hardware**
**What is a computer?**

- Name some computer peripherals and their function.
- Recognise that buttons cause effects.
- Explain that technology follows instructions.
- Recognise different forms of technology.
- Design an invention which includes inputs and outputs.
- Explain the role of computers in the world around them.

### Spring 2

**Data handing:**
**International Space Station**

- Describe and explain how astronauts' survival needs are met aboard the ISS.
- Identify and digitally draw items which fulfil basic human needs when aboard the ISS.
- Read the correct temperature on a thermometer.
- Design a display showing everything that needs to be monitored by sensors on the ISS.
- Create an algorithm that addresses all plants' needs.
- Explain how space exploration can benefit life on Earth.
- Read data to identify whether a planet might be habitable.

### Summer 2

**Skills showcase: Rocket to the moon**

- Use a computer to make a list
- Explain the benefits of making a list on the computer
- Use a basic range of tools on graphics editing software to design a rocket
- Sequence instructions
- Follow instructions to build their model rocket
- Input data about their rockets into a table or spreadsheet

# Computing - Cycle B

## Meadow Class

### Autumn 1

**Computer systems and networks 2:**
**Emailing**
**Online safety**

- Log in and out of email.
- Send a simple email with a subject plus 'To' and 'From' in the body of the text.
- Edit an email.
- Type in the email address correctly and send the email.
- Add an attachment to an email.
- Write an email using positive language, with an awareness of how it will make the recipient feel.
- Recognise unkind behaviour online and know how to report it.
- Offer advice to victims of cyberbullying.
- Recognise when an email may be fake and explain how they know.

### Spring 1

**Programming 2:**
**Computational thinking**

- Understand that problems can be solved more easily using computational thinking.
- Understand what the different code blocks do and create a simple game.
- Understand the terms 'pattern recognition' and 'abstraction' and how they help to solve a problem.
- Create a Scratch program which draws a square and at least one other shape.
- Understand how computational thinking can help to solve problems and apply computational thinking to problems they face.

### Summer 1

**Data handling:**
**Comparison cards databases**

- Explain what is meant by 'field,' 'record,' and 'data.'
- Compare paper and computerised databases.
- Put values into a spreadsheet.
- Sort, filter and interpret data in a spreadsheet.
- Create a graph on Google Sheets.
- Explain the purpose of visual representations of data.

### Autumn 2

**Computer systems and networks 3:**
**Journey inside a computer**

- Recognise inputs and outputs and that the computer sends and receives information.
- Explain that the parts of a laptop work together and the purpose of each part.
- Explain what an algorithm is.
- Suggest what memory is for inside a computer.
- Make comparisons between different types of computer.

### Spring 2

**Skill showcase:**
**HTML**

- Recognise the role of HTML in a web page.
- Add text between the heading and paragraph tags.
- Explore a web page using the 'Inspect' tool.
- Explain how they altered the HTML to create their posters.
- Alter the basic elements within a web page using the 'Inspect' tool.
- Replace the text and images in a webpage.

### Summer 2

**Data handling: Investigating weather**

- Search the web efficiently to find temperatures of different cities and record this accurately.
- Design a weather station that gathers and records sensor data, explaining how it works and the units of measurement it would use.
- Design an automated machine that uses selection to respond to sensor data.
- Search for and record weather forecast information in a spreadsheet and explain how this data is collected.
- Create a video which includes weather forecast information.

# Computing - Cycle B

**Hillside Class**

## Autumn 1

**Programming 1: Music**
**Online safety**

- Iterate ideas, testing and changing throughout the lesson.
- Explain what the basic commands do: 'play', 'slee'p, '2.times do'.
- Explain how their program links to the theme. Include a loop in their work. Correct their own simple mistakes.
- Explain their scene in the story. Link musical concepts to their scene.
- Include a live loop and explain its function. Use samples effectively to enhance music.
- Code a piece of music that combines a variety of structures. Use loops in their programming.
- Recognise that programming music is a way to apply their skills.

## Spring 1

**Programming 2:**
**Micro:bit**

- Clip blocks together and predict what will happen. Make connections with previous programming interfaces they've used, e.g. Scratch.
- Create their own images to make the animation and recognise the difference between 'on start' and 'forever'.
- Recognise blocks they've used previously, identifying inputs and outputs used and make predictions about how variables work.
- Choose appropriate blocks to complete the program and attempt the challenges independently.
- Break a program down into smaller steps, suggesting appropriate blocks and match the algorithm to the program.

## Summer 1

**Creating media: History of computers**

- Explain how to record sounds and add in sound effects over the top.
- Produce a simple radio play with some special effects and simple edits which demonstrate an understanding of how to use the software.
- Create a document that includes correct date information and facts about the computers and how they made a difference.
- Demonstrate a clear understanding of their device and how it affected modern computers, including well-researched information with an understanding of the reliability of their sources.
- Describe all of the features that we'd expect a computer to have including RAM, ROM, hard drive and processor, but of a higher specification than currently available.

## Autumn 2

**Programming:**
**Introduction to Python**

- Iterate ideas, testing and changing throughout the lesson and explain what their program does.
- Use nested loops in their designs, explaining why they need two repeats.
- Alter the house drawing using Python commands; use comments to show a level of understanding around what their code does.
- Use loops in Python and explain what the parts of a loop do.
- Recognise that computers can choose random numbers; decompose the program into an algorithm and modify a program to personalise it.

## Spring 2

**Creating media:**
**Stop motion animation**

- Create a toy with simple images with a single movement.
- Create a short stop motion with small changes between images.
- Think of a simple story idea for their animation then decompose it into smaller parts to create a storyboard with simple characters.
- Make small changes to the models to ensure a smooth animation and delete unnecessary frames.
- Add effects such as extending parts and titles.
- Provide helpful feedback to other groups about their animations.

## Summer 2

**Skill showcase: Inventing a product**

- Evaluate code, understanding what it does and adapt existing to code for a specific purpose.
- Debug programs and make them more efficient using sequence, selection, repetition or variables.
- Design appropriate housing for their product using CAD software, including any input or output devices needed to make it work.
- Create an appealing website for their product, aimed at their target audience which explains what their product is and what it does, using persuasive language.
- Create an edited video of their project, articulating the key benefits.
- Describe and show how to search for information online and be aware of the accuracy of the results presented.