Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Computing systems and networks

The **BIG** Picture

Learning what a search engine is and understanding why keywords and phrases are important, identifying inaccurate information and recognising the terms 'copyright and 'fair use'. Children make parallels between book searching and internet searching, explaining the role of web crawlers and recognising that results are rated to decide rank.

NC Objectives- Key Stage 2

Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Unit Outcome

Pupils who are **secure** will be able to:

•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.

Key vocabulary

Algorithm
Copyright
Credit
Deceive
Fake
Incorrect
Information
Network
Rank
Search engine
Web crawler
Appropriate
Correct
Data leak
Fair
Inappropriate
Index
Keywords
Privacy
Real
TASK
Website

Key Skills

•Developing searching skills to help find relevant information on the internet.

•Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns.

•Learn about different forms of communication that have developed with the use of technology.

•Recognising that information on the Internet might not be true or correct and learning ways of checking validity.

Key Knowledge

•To know how search engines work.

•To understand that anyone can create a website and therefore we should take steps to check the validity of websites.

•To know that web crawlers are computer programs that crawl through the internet.

•To understand what copyright is.

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Music

The **BIG** Picture

Applying programming skills to create sounds and melodies leading to a battle of the bands performance.

NC Objectives- Key Stage 2
Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Unit Outcome

Pupils who are **secure** will be able to:

•Iterate ideas, testing and changing throughout the lesson. Explain what the basic commands 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 repeat and explain its function 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

Key vocabulary

Beat
Coding
Debug
Error
Loop
Mindmap
Output
Pitch
Play
Bugs
Command
Decompose
Instructions
Melody
Music
Performance
Plan
Predict
Programming
Rhythm
Soundtrack
Tempo
Tinker
Typing
Repeat
Scratch
Spacing
Timbre
Tutorials

Key Skills

•Predicting how software will work based on previous experience.
• Writing more complex algorithms for a purpose.
• Iterating and developing their programming as they work.
• Confidently using loops in their programming.
• Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.
• Writing code to create a desired effect.
• Using a range of programming commands.
• Using repetition within a program.
• Amending code within a live scenario.
• Using logical thinking to explore software more independently, making predictions based on their previous experience.
• Using a software programme (Scratch) to create music.
• Identify ways to improve and edit programs, videos, images etc.

Key Knowledge

•To know that a soundtrack is music for a film/video and that one way of composing these is on programming software.

•To understand that using loops can make the process of writing music simpler and more effective.

•To know how to adapt their music while performing.

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Mars Rover 1

The **BIG** Picture

Identifying some of the types of data that the Mars Rover collects and explaining how the Mars Rover transmits the data back to Earth. Children will read binary numbers, and understand binary addition as well as identifying input, processing and output on the Mars Rovers.

NC Objectives- Key Stage 2
Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Unit Outcome

Pupils who are **secure** will be able to:

•Identify some of the types of data that the Mars Rover could collect (for example, photos).

•Explain how the Mars Rover transmits the data back to Earth and the challenges involved in this.

•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.

Key vocabulary

8-bit binary
ASCII
Boolean
Communicate
CPU
Decimal numbers
Discovery
Hexadecimal
Instructions
Addition
Binary code
Byte
Construction
Data transmission
Design
Distance
Input
Internet
Mars Rover
Numerical data
Planet
RAM
Scientist
Signal
Space
Technology
Moon
Output
Radio signal
Research
Sequence
Simulation
Subtraction
Transmit

Key Skills

•Learning that external devices can be programmed by a separate computer.

• Recognising how the size of RAM affects the processing of data.

• Learning the vocabulary associated with data: data and transmit.

• Recognising that computers transfer data in binary and understanding simple binary addition.

• Relating binary signals (Boolean) to the simple character-based language, ASCII.

• Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.

• Understanding how data is collected in remote or dangerous places.

• Understanding how data might be used to tell us about a location.

• Learn about different forms of communication that have developed with the use of technology.

Key Knowledge

•To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock.

•To know what numbers using binary code look like and be able to identify how messages can be sent in this format.

•To understand that RAM is Random Access Memory and acts as the computer's working memory.

•To know what simple operations can be used to calculate bit patterns.

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Micro:bit

The **BIG** Picture

Clipping blocks together in a program and predicting what will happen while making connections with previously used programming interfaces. Children create animations, recognise inputs/outputs, choose appropriate blocks, and break programs down into smaller steps.

NC Objectives- Key Stage 2
Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
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Unit Outcome

Pupils who are **secure** will be able to:

•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.

Key vocabulary

Algorithm
App
Bluetooth
Connection
Debug
Designing
Device
Images
Instructions
Variables
Wireless
Animation
Blocks
Code block
Create
Decompose
Desktop
Download
Input
Laptop
Wifi
Wires
Load
Micro:bit
Pairing
Polling
Program
Reset
Scoreboard
Systematic
Tinkering
Loop
Outputs
Pedometer
Predict
Repetition
Sabotage
Screen
Tablet
USB

Key Skills

•Decomposing a program without support.
• Predicting how software will work based on previous experience.
• Writing more complex algorithms for a purpose.
• Programming an animation.
• Iterating and developing their programming as they work.
• Confidently using loops in their programming.
• Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.
• Writing code to create a desired effect.
• Using a range of programming commands.
• Using repetition within a program.
• Using logical thinking to explore software more independently, making predictions based on their previous experience.
• Identify ways to improve and edit programs, videos, images etc.

Key Knowledge

•To know that a Micro:bit is a programmable device.

•To know that Micro:bit uses a block coding language similar to Scratch.

•To understand and recognise coding structures including variables.

•To know what techniques to use to create a program for a specific purpose (including decomposition).

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Stop motion

The **BIG** Picture

Storyboarding ideas, taking photographs and editing to create a video animation.

NC Objectives- Key Stage 2

Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
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Unit Outcome

Pupils who are **secure** will be able to:

•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.

Key vocabulary

Animation	Animator
Background	Character
Decomposition	Design
Digital device	Edit
Evaluate	Flip book
Fluid movement	Frames
Model	Moving images
Onion skinning	Still images
Stop motion	Storyboard
Thaumatrope	Zoetrope

Key Skills

•Decomposing animations into a series of images.

•Decomposing a story to be able to plan a program to tell a story.

•Using video editing software to animate.

Key Knowledge

•To know that decomposition of an idea is important when creating stop-motion animations.

•To understand that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph.

•To know that editing is an important feature of making and improving a stop motion animation.

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Mars Rover 2

The **BIG** Picture

Learning about pixels and binary, creating a pixel picture and saving a JPEG as a bitmap to understand the transfer of image data. Children will learn about the 'fetch, decode, execute' cycle and its real-world applications while beginning to use 3D design tools.

NC Objectives- Key Stage 2
Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
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Unit Outcome

Pupils who are **secure** will be able to:

•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.

Key Skills

•Learning the difference between ROM and RAM.
• Recognising how the size of RAM affects the processing of data.
• Understanding the fetch, decode, execute cycle.
• Learning how the data for digital images can be compressed.
• Recognising that computers transfer data in binary and understanding simple binary addition.
• Understanding how bit patterns represent images as pixels.
• Using logical thinking to explore software more independently, making predictions based on their previous experience.
• Independently learning how to use 3D design software package TinkerCAD.
• Learn about different forms of communication that have developed with the use of technology.

Key vocabulary

3D
Binary image
Compression
Data
Fetch, decode, execute
Input
Memory
Operating system
Pixels
Responsible
ROM
Algorithm
CAD
CPU
Drag and drop
ID card
JPEG
Online community
Output
RAM
RGB
Safe

Key Knowledge

•To understand that bit patterns represent images as pixels.

•To understand that the data for digital images can be compressed.

•To know the difference between ROM and RAM.

•To understand various techniques that will improve the design of a 3D object (using CAD software).

Murdishaw West Community Primary School
Computing Curriculum Overview

Year 5 Computing: Online Safety

The **BIG** Picture

Learning about potential online dangers and safety.

NC Objectives- Key Stage 2
Pupils should be taught:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems;
- solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
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Unit Outcome

Pupils who are **secure** will be able to:

•Understand that passwords need to be strong and that apps require some form of passwords.

•Recognise a couple of the different 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 wellbeing are being affected in either a positive or negative way through online use.

•Offer a couple of advice tips to combat the negative effects of online use.

Key vocabulary

Accurate information
Advice
App permissions
Application
Apps
Bullying
Communication
Emojis
Health
In-app purchases
Information
Judgement
Memes
Mental health
Mindfulness
Mini-biography
Online communication
Opinion
Organisation
Password
Personal information
Positive contributions
Private information
Real world
Strong password
Summarise
Support
Technology
Trusted adult
Wellbeing

Key Skills

Pupils who are **secure** will be able to:
•Understand that passwords need to be strong and that apps require some form of passwords.
•Recognise a couple of the different 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 wellbeing are being affected in either a positive or negative way through online use.
•Offer a couple of advice tips to combat the negative effects of online use.

Key Knowledge

•Identifying possible dangers online and learning how to stay safe.

•Evaluating the pros and cons of online communication.

•Recognising that information on the Internet might not be true or correct and learning ways of checking validity.

•Learning what to do if they experience bullying online.

•Learning to use an online community safely.