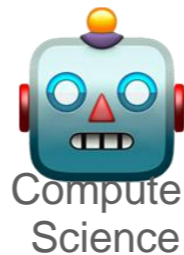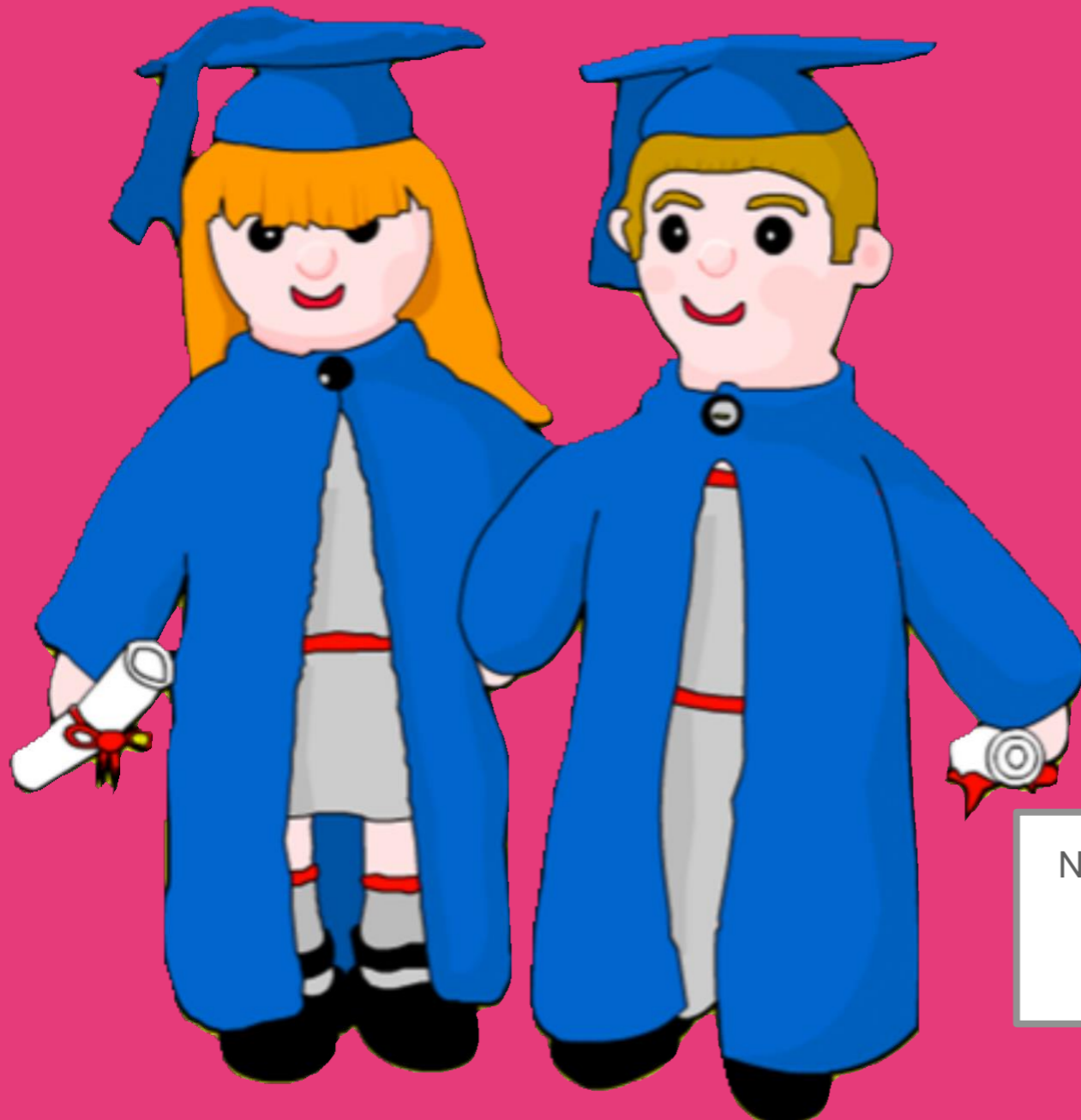# My Knowledge Organiser

Computer Science

Information Technology
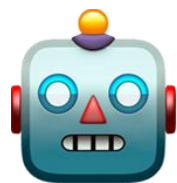
Digital Literacy

Computing Knowledge Organiser for Year 4

Name:

Computing in Year 4

Computing is full of important skills and it helps us understand the digital world around us. Computing has three parts.

Computer Science

Computer Science teaches us about problem-solving, how computers work and coding languages.

Information Technology

Information Technology teaches us about how to use devices and apps to be creative and make digital content.

Digital Literacy

Digital Literacy teaches us about online life and how to stay safe and healthy when using technology.

Year 4's Important Person:

Dr Shirley Jackson

- The first black woman to earn a doctorate at the University of Massachusetts.

- The second black woman to earn a doctorate in physics in the United States of America.

- Her work helped to make many advancements in technology such as caller id, fibre-optic cables and touch tone telephones.

Watch video about Dr Shirley Jackson.

What Should I Already Know Checklist:

Can you create a flow diagram?

Can you turn an algorithm into a program?

Can you test and debug programs?

Can you create your own sprites?

Can you use repeat commands?

Can you create a variable?

Can you create a program that contains selection, inputs and outputs?

Can you use logical reasoning?

Do you understand the terms World Wide Web, network, search engine and Internet?

Can you send an email?

Can you use keywords effectively?

We will learn:

About designing algorithms.

About abstraction and decomposition.

About planning the structure of programs.

About writing complex programs.

About debugging programs.

About evaluating programs and considering how they could be improved.

About the key communication services on the internet.

About the main components (hardware) used to create computer networks.

About the algorithms that search engines use to sort websites.

Have you heard of AI?

Artificial intelligence (AI) is the ability of a computer program or a machine to think and learn. It is also a field of study, which tries to make computers "smart". John McCarthy came up with the name "artificial intelligence" in 1955.

What do you think?

Can video games really help children learn? Some studies have shown that children who played strategy-based games showed an improvement in problem-solving skills and thus, tended to get better marks in school. Simply open up an app store and there are thousands of choices of games aimed at educating children. But that doesn't mean every game claiming to be educational really is, so it's important to pick the right ones.

As for how long a you should spend playing video games, it depends on many factors. A recent study by the University of Oxford found that the ideal length of time for children to be playing video games is one hour per day. What do you think?

All games come from a basic idea that is then developed into a game. Find out how.

Artificial intelligence is everywhere and it's already making a huge impact on our lives. Watch this video to learn more about AI.

How would you rater these educational games?

Game - Crystal Explorers

Play as one of our brave, intrepid explorers on an adventure through five fantastic maze worlds.

Karate Cats English

Struggling with grammar, punctuation or spelling? The Karate Cats are here to help!

What is The Hour of Code?

The Hour of Code website is fantastic! It was created to demystify 'code' and 'programming', to show that anybody can learn the basics, and to broaden participation in the field of computer science. The website has 100s of one-hour activities to help you learn to code.

Important Words:

Algorithm: Steps or instructions to follow to achieve a task.

Application (App): A program such as a game or drawing app that performs a task on a computer.

Bugs: Mistakes or errors in code.

Code/Coding: Lines or blocks of instructions (see program).

Computer networks: Connected devices that make it possible to transfer data using an agreed method ('protocol').

Command: A step or line of programming (instruction for younger children).

Data: Numbers and information that can be represented by images, video, text and sound.

Debug: Finding and correcting errors (bugs).

Decomposition: Splitting things into smaller parts.

Input: A method of computers receiving data (Eg. keyboard, mouse, touch, sensors etc).

Object: An item on screen, such as an image, a button or some text.

Output: The information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly though the control of motors in physical systems.

Prediction: Make a guess about what happen in a program or how a problem might be solved. Also know as logical reasoning.

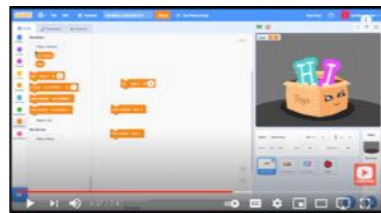**Program:** A series of instructions written in a computer language (Code).

Repeat (Loop): Instructions that can be repeated.

Sequence: A set of instructions that are followed in order.

Sprite: (in Scratch) an object that can be controlled by programming.

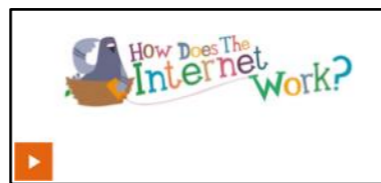**Testing:** Checking if a program works how it should.

Videos to watch:

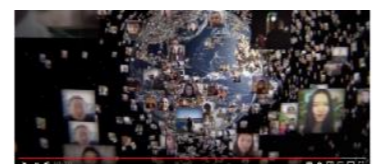

A basic explanation of variables is Scratch. Watch video.

Computer programs use **variables** to store information. Watch video.

How does the internet work? Watch video.

'what is the world wide web?? Watch video.

Introduction to the Hour of Code concept.

What is Decomposition?

When we solve computer programming problems we need to make choices about what to do and what order to do them in.

Sometimes the problem is so big or complex that we don't know where to start.

Decomposition is when we break a problem down into smaller parts to make it easier to tackle.

Decomposition is a useful problem-solving strategy. It can help you write a complex computer program, plan a holiday or make a model plane.

Visit the BBC Computing website.

What is an Algorithm?

An algorithm must follow a logical sequence.

A sequence is a series of logical steps that must be carried out in a specific order.

What is Abstraction?

Abstraction is one of the cornerstones of Computer Science. It involves filtering out, essentially ignoring the characteristics that we don't need in order to concentrate on those that we do. Reducing a problem down to the essential idea or problem that needs to be solved.
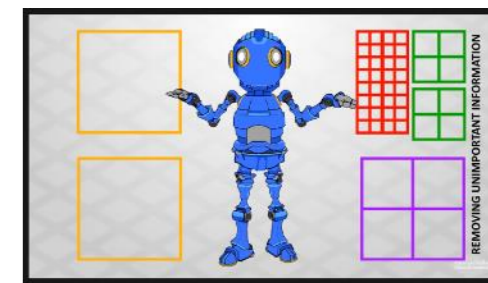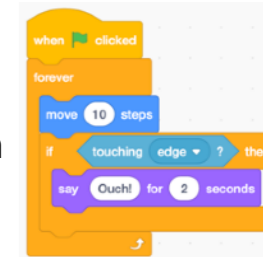

Watch Abstraction - Computational Thinking video.

What is a Repeat Command?

A repeat command or loop is a sequence of instructions that is continually repeated until a certain condition is reached.

In Scratch, "Forever" blocks are used to create loops.

What is a Variable?

A variable is something in a program or game that can be changed.

In computer programming we use variables to store information that might change and can be used later in our program. In a game, variables could be used to store the score, health or level.

If you were programming a computer game, you could make a variable called 'score'. This would store information about the number of points you have won during a game.

A supermarket till uses variables to store cost of all the items you buy. As more items are scanned the variable's total increases.

Automated barriers in a car park use variables to count cars in and out. These can then be used to see if there is any space to let more cars in.

Here is an example variable used in a Scratch program.

Try Text Based Programming

Try CodeMonkey's FREE hour-long coding courses. You will learn to code as you help a cute monkey catch bananas.

Conditional Events (Selection)

Selection is a way of making a program automatically choose to run some code when a specific condition is met.

For example:

'**If** Scratch the Cat touches the Ballerina, **then** run this code: Say Hello'.

Creating Flowcharts

Algorithms are usually written using a flowchart. A flowchart is used to show processes and decisions made in an algorithm, whilst the arrows are used to show the flow of the program. Processes are shown as squares and are used when we are doing something. Decisions are shown as a diamond and are used to represent when we are testing something.

Building a flowchart is very easy, simply drag and drop the shapes from the left hand side. Use app.diagrams.net to try for yourself.
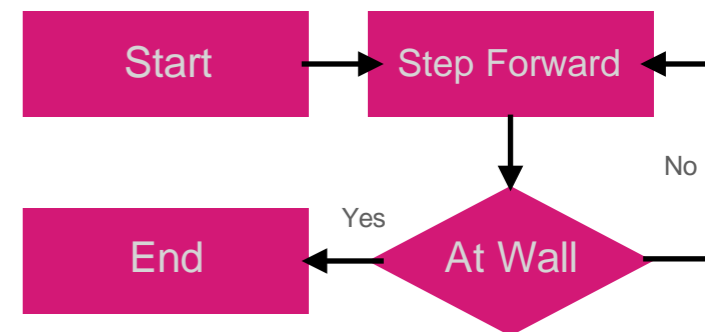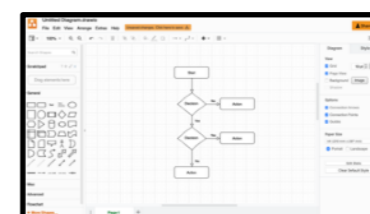
Shape	Name	What it means
(oval)	Start/End	An oval means the start or end.
(arrow)	Arrows (flow)	A line means what happens next and connects shapes.
(parallelogram)	Input or Output	A parallelogram means input or output.
(rectangle)	Process	A rectangle means - do something.
(diamond)	Decision	A diamond means a choice - "if"

What Should I Already Know Checklist:

Can you create a range of digital content?

Can you be creative and independent while using unfamiliar apps or technology?

Can you create a plan and storyboard?

Can you design a simple questionnaire to collect information and display the information in a graph or table?

Can you add information to a database?

Do you know how search results are ranked?

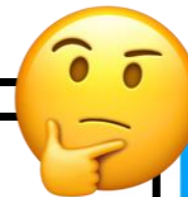Can you use advanced search tools to collect information?

We will learn:

How to produce documents and media content using advanced features.

Keyboard skills and spellchecking.

About presenting data and information.

About new forms of technology e.g. AR, Virtual Reality, Wearable Technology etc.

About how to search for and use information from a range of sources.

That not all sources of information including websites are accurate and can check information using a different sites.

Did you know?

"Toy Story" is the first feature-length film fully modelled and created with the help of 3D technology on computers.

Animation is a method in which figures are manipulated to appear as moving images. In traditional animation, images are drawn or painted by hand on transparent celluloid sheets to be photographed and exhibited on film. Today, most animations are made with computer-generated imagery (CGI).

What do you think?

You may have heard people talking about Traditional Media and New Media. Do you know about the different types of media? Traditional media refers to any form of mass communication available before the computers and the internet. New media are forms of media that are only accessible digitally.

Do you know about file types?

New media or digital media have their own types of file that require certain apps to open them. So understanding file types is very important as they can only be open by specific apps.

For example:

- The **.Doc** file can only be opened by a word processing app.
- The **.epub** file can only be opened by digital book reader app.

1955

Watch the The Evolution of Animation 1833 - 2017.

Traditional Media		New Media		
TV	Newspapers	Web Sites	Streaming Video	eBooks
Radio	Magazines	Apps	Virtual Reality	RSS Feeds
Music	Books	eMail	Digital Games	Social Networks
Music	Signs	Podcasts	Blogs / Vlogs	Streaming Music
Film	Billboards	Smart Phones	Wikis	Online Newspapers

Here is a quick guide to file types!

MP3 - Music or audio file. Requires a music player or audio creation app to open.

ePubs - Digital books. Requires book reader or creator app to open.

PDFs - Documents you can't edit. Requires a PDF reader app to open.

GIF - Moving image file. Requires a browser or image/ photo app to open.

MP4 - Video file. Requires a video player or creation app to open

DOC - A documents you can edit. Requires a word processing app to open.

Information Technology

Important Words:

Application/App: An application, also referred to as a mobile app or simply an app, is a computer program.

Attachment: An email attachment is a computer file sent along with an email message.

Audio: Music or sound recording or file.

Blog/Blogging: A blog (a shortened version of "weblog") is an online journal or informational website.

Data: Numbers that represent images, video, text and sound.

Digital Content: Any content that exists in the form of digital data. Also known as digital media.

eBook: A digital book that can be read on a computer.

Emoji: Images that show a mood, feeling or actions.

Font: A font is the specific style of text that's printed on a page or displayed on a computer screen.

Format: Changing or editing the look of your digital work.

Frame: Single image in a film or animation.

GigaByte: A unit of computer information consisting of 1,000,000,000 bytes.

Hyperlink: A way of connecting different Web pages together on the Internet. A hyperlink is a word or graphic display on one Web page.

Icon: Small image that can be used instead of words.

Illustration: Drawings showing ideas or characters.

Illustrator: A person who draws or creates pictures for magazines, books, advertising, etc.

Information: Data such as numbers, text, images presented in a meaningful way.

MegaByte: A unit of computer information consisting of 1,000,000 bytes.

Menu: A set of options when using a computer or app to help find information or do a task.

Multimedia: Different types of media. For example images, text, video and sound.

Palette: The range of colours available to the user of a computer.

Save: Keep and store your work on a computer.

Screenshot: An image of what is shown on a computer screen

Screencast: To broadcast a device's screen on another device e.g. TV.

Shortcut: A combination of keys that is a quicker way of doing something in order to save time or effort.

Soundtrack: the sounds, especially the music, of a film/movie, or a separate recording of this.

Storyboard: a series of drawings or images showing the planned order of images.

Tool: An item in an app that helps you do something on a computer. For example the pen tool can be used to draw.

Word Processor: An application for writing text on a computer.

Presenting Information on computers:

Let's say you have been learning all about the Rainforests. You have lots of facts and images you want to share with your teacher and class. A great way to do this is to use a computer or iPad. However, are so many different types of apps. You'll have to decide which app is the best for you and your project.

It's important to think about your audience who will see your final project. Information needs to be presented clearly and in the most appropriate way possible. The layout, design and format must suit the purpose and audience. The following are all possible formats:

Chosen Approach	Suitable Application	Media	PC	Chromebook	iPad
Write an essay	Word Processing	Text, Images/Photo and graph/chart	Microsoft Word	Google Docs	Apple Pages
Design a leaflet or poster	Desktop Publishing	Text, Images/Photo and graph/chart	Word or Publisher	Google Docs	Apple Pages
Create a graph or chart	Spreadsheet	Text, Images/Photo and graph/chart	Microsoft Excel	Google Sheets	Apple Numbers
Make a presentation or slideshow	Presentation	Text, image and photo, graph or chart, audio, video & animation.	Microsoft PowerPoint	Google Slides	Apple Keynote
Build a website or blog	Web Design		Google Sites, Adobe Spark	Google Sites	Google Sites, Adobe Spark
Shoot and edit a short film	Video Editing		Adobe Spark Video	Adobe Spark Video	Clips, iMovie
Create an animation	Animation		Pencil2D	Toontastic	Puppet Pals, Stop Motion
Digital Book	Publishing		Book Creator	Book Creator	Book Creator, Pages
Illustrations / edited pictures	Draw/Paint/Photo Editing	Photos, illustrations and text	Windows Paint	Google Draw	Sketchbook
Create a podcast	Podcasting/Audio Editing	Audio & Cover image	Anchor	Anchor	Anchor, Garageband

The last six cannot be used in print as they will contain multimedia. Before you start work on your information, ask yourself the following questions:

- What is its purpose?
- Who is going to read or look at it?
- What media best suit your message?

These questions will help you to decide the best way to present the information and the best app.
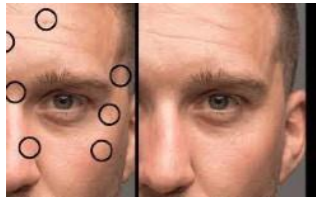
Photo Editing

You can change the appearance of an image to highlight something in it or to suggest a mood or feeling for example: coldness, magical, happiness. Here are some of the most commonly used photo editing tools.
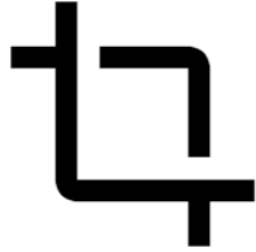
Crop lets you cut out parts you don't want.

Remove blemishes like dust, dirt or spots.

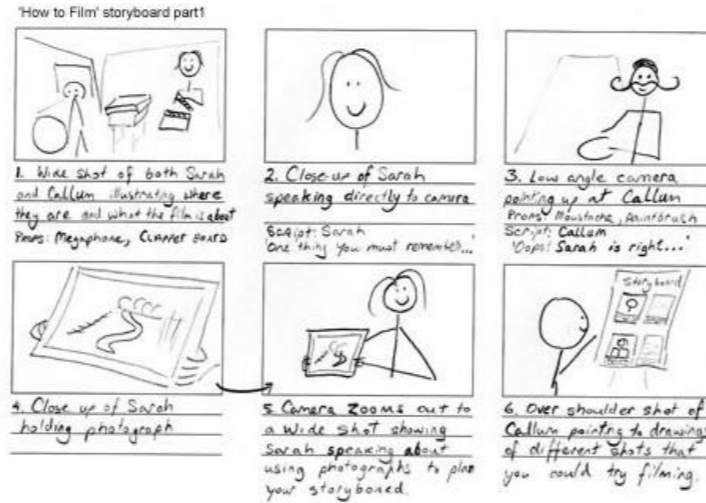Adjust the brightness and contrast so it is lighter or darker.

Apply filters or effects to change the colours.

Add a border or frame so it looks good.

Creating Storyboards:

A storyboard is not a script, it is about the position of the actors, type of shot and the things that are happening while you film. Sample image from BBC.

'How to Film' storyboard part1

1. Wide shot of both Sarah and Callum illustrating where they are and what the film is about Props: Megaphone, Clapper board

2. Close-up of Sarah speaking directly to camera. Script: Sarah 'One thing you must remember)...

3. Low angle camera pointing up at Callum Props: Moustache, Paintbrush Script: Callum 'Oops! Sarah is right...'

4. Close up of Sarah holding photograph

5 Camera zooms out to a wide shot showing Sarah speaking about using photographs to plan your storyboard

6. Over shoulder shot of Callum pointing to drawings of different shots that you could try filming.

Video Editing

If you want to be the next award winning YouTuber then plan your videos! Always start with a storyboard.

1. Insert and arrange clips on a timeline.

2. Trim and adjust clip duration.

3. Add text and titles.

4. Add a soundtrack eg. upbeat or scary.

5. Put in a transition between clips.

6. Record a voiceover narration.

7. Apply pan and zoom effects to create motion and highlight things.

What is Animation?

Animation is the process of giving the illusion of movement to drawings, models or inanimate objects. Animated motion pictures and television shows are highly popular forms of entertainment. Animation has developed and advanced greatly over the years. What are the different types of animation?

The three main types of animation use are:

- Traditional animation—2D / hand drawn.
- 3D animation—computer animation and CGI.
- Stop motion—Claymation and cut-outs.

Creating Animations:

An overview of how animation is made with traditional, 2D-rigged, stop-motion and CG techniques. Watch video.

HOW DOES ANIMATION WORK?

What is green screening?

Hollywood studios use green screen to create all kinds of incredible special effects. Using green screen in video replaces the background of a video with an image or video background of your choice. It offers the most natural-looking way to put your actors into incredible places e.g. outer space.

What Should I Already Know Checklist:

Do you know about the internet, services and networks?

Do you know about web sites and web terminology?

Can you make judgements about the usefulness and accuracy of information?

Can you recognise copyright material?

Do you know the SMART rules?

Do you know about personal information?

Do you know about seeking help and online concerns?

Do you know about how to send and reply to online messages?

Do you know about online bullying/cyberbullying and the different forms it can take?

Do you know about a balanced approach to the use of technology?

Do you know about recognising websites and games that are appropriate?

Do you know that passwords should never be shared?

Do you know about digital footprints?

We will learn:

About apps that use the Internet.

About communicate and collaborate.

About methods of collaboration over the internet.

About Fake News and how to identify Fake News.

About potential online risks.

About the safety features of websites and apps.

About reporting concerns to a trusted adult.

About online relationships.

About online privacy.

About the term 'digital footprint'.

About how to act appropriately & respectfully online.

About how to deal with online bullying.

About how photos can be altered digitally.

About copyright laws and plagiarism.

About the positive and negative effects technology may have on health.

About downloading, viruses and malware.

About choosing a secure password.

About using an avatar.
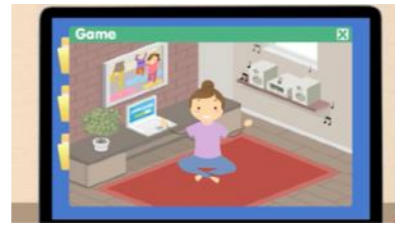
Did you know?

A computer can get sick too! Viruses and malware are programs that can attack computers, tablets, phones and other digital devices. A virus is a small program designed to cause trouble by gaining access to your device. It can copy your personal data or slow your device down.

A virus spreads by duplicating and attaching itself to other files.By combining the words 'malicious' (meaning 'harmful') and 'software' we get the word 'malware'. Viruses are just one type of malware. Other types include spyware, worms and trojans. Find out more.

What do you think?

Why do some apps need the Internet to function? The word "app" is an abbreviation for "application." It's a piece of software that comes pre-installed on your device or it's software that you install on the device. Apps can run locally on your device but typically most require access to the internet. You can find apps on your computer, smartphone, tablet or other electronic devices, including smart TVs, smart speakers and smartwatches. Apps connect to the internet because they require data to function properly. For example: a weather app requires real-time updates from the met office, you can only achieve this if the device is 'online'.

There are three main types of apps:
- Desktop apps: Built for computers with mouse and keyboard interactions.
- Mobile apps: Designed for smartphones and touch inputs.
- Web apps: Browser-based programs.
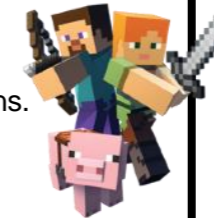
Can you spot the apps that use the Internet?
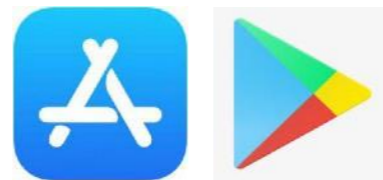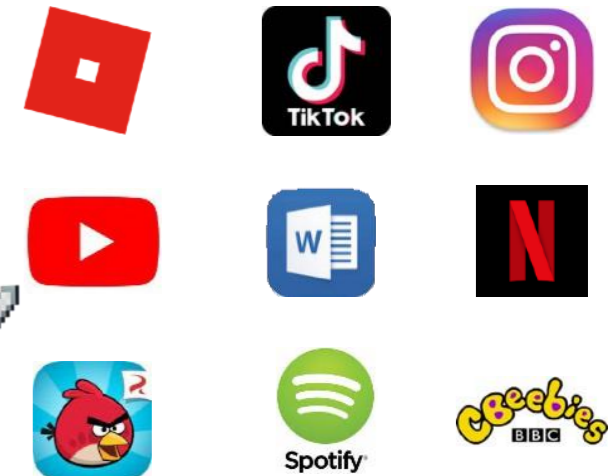
Where Can You Get Apps?

Finding and installing apps differs based on the type of application.

Mobile Apps: Every platform (iOS / Android) has a store where users can download both free and paid apps. For example, Android users can get apps from the Google Play Store and Amazon Appstore. iPhone, iPod touch and iPad users can only get apps through the iOS App Store straight from the device.

Desktop Apps: Desktop apps are more widely available from unofficial sources such as Softpedia and FileHippo.com. Be very careful downloading and installing apps from unofficial websites as they may contain viruses that could damage your computer. Official app stores include the Mac App Store for macOS apps and the Windows Store for Windows apps.

Web Apps: Web apps load within a web browser and don't require downloading unless you're talking about something like Chrome Extensions. When you download them to your computer and enable them, the browser runs small web-based apps based on the feature.

Digital Literacy

Important Words:

Bluetooth
Is a way of wirelessly exchanging of data over short distances.
Chat
To talk online in a friendly or easy manner.
Communication
To exchange thoughts, ideas, or information online. This could be talking, photos, video or text.
Digital
Storing, using, or sending information electronically in the form of numbers. A computer is a digital device.
Download
A computer file that is sent from one computer to another. She keeps all of her downloads in one folder.
Follow
To make friends with someone online and follow (see) what they share online.
Link
A button with a web address that when clicked will open that web page on your computer.
Online
Another name for using the internet or web.
Online bullying
The abuse and mistreatment of someone online.
Online game
A game that requires the internet. Also game were players can play against others who are not in the same room.
Personal information
Information about you, address, school, age, passwords etc.
Search
To use a search engine to find information online.
Send / Share
To send a message, photo or video using an online communication app to one or more people.
Sign-in / Log in
To join a particular online website or app. When signed in more features are available.
Trusted adult
A trusted adult is someone that you have a good relationship with. It is someone who you think has your best interests in mind. Parents and teachers etc.
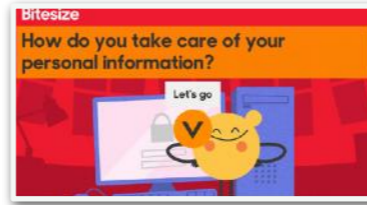**Website**
An information page online that can only be accessed using the internet.
Wireless (Wifi)
Is a way of connecting computers and digital devices to the internet and each other.

Videos to watch:

Personal information tells other people who you are and where to find you. Find out more.

Try to find balance, too much screen time can be bad for you. Find out more.

Can you spot Fake News?. Find out more.

How do you deal with nasty comments? Find out more.

Play Like Share aims to help 8-10 year olds learn how to stay safe online.

What is Digital 5 a day?

The digital 5 a day provides simple tips to help you stay healthy while you use technology.
It can also act as a base for family agreements about internet and digital device use throughout both the holidays and term time. It's easy to follow, with practical steps for children and parents to achieve a healthy and balanced digital diet.

What is "Griefing"?

Do you play Minecraft? Then you might have already experienced griefing. Griefing is a name for a type of bullying that can happen in Minecraft. It's when someone damages a person's buildings, sets harmful traps or steals all of their items on purpose, just to be mean. This can be frustrating for players, whose hard work can be destroyed very quickly.
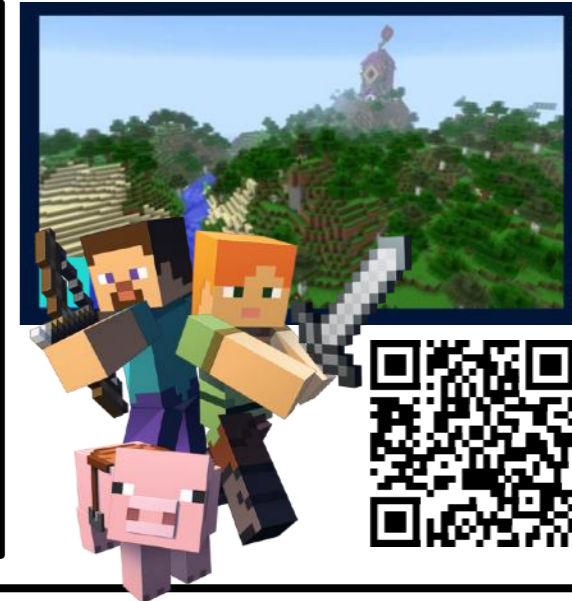
What is Online Bullying (Cyberbullying)?

Online Bullying is when a child is tormented, threatened, harassed, humiliated, embarrassed, excluded or targeted by another child using the internet. This can happen in video game chat, social media, direct messenger apps and mobile phone etc.

What is Copyright & Plagiarism?

Copyright is the law that gives the owner or creator of work (books, films, music, pictures or websites) the right to say how their work is used and by who. Plagiarism is copying another person's ideas, words or writing and pretending that it's their own work.

A strong password is your first line of defence

When was the last time you changed the password for your online accounts? Here are some tips for good password management.

Never give out your password to anyone. Except your parents. Never give it to friends, even if they're really good friends. A friend can accidentally pass your password along to others or even become an ex-friend and abuse it.

Make the password at least 8 characters long. The longer the better. Longer passwords are harder for thieves to crack. Include numbers, capital letters and symbols. Never just use one password for every site and app!

Don't fall for "phishing" attacks. Be very careful before clicking on a link (even if it appears to be from a legitimate site) asking you to log in, change your password or provide any other personal information. It might be legit or it might be a "phishing" scam where the information you enter goes to a hacker.

Make sure your computer is secure. The best password in the world might not do you any good if someone is looking over your shoulder. Never use open public wifi and enter passwords on other people's devices.

Create passwords that are easy to remember but hard for others to guess. When possible, use a phrase such as "I started primary school at Northway School in 2004" and use the initial of each word like this: "Isps@NWSi2004.".
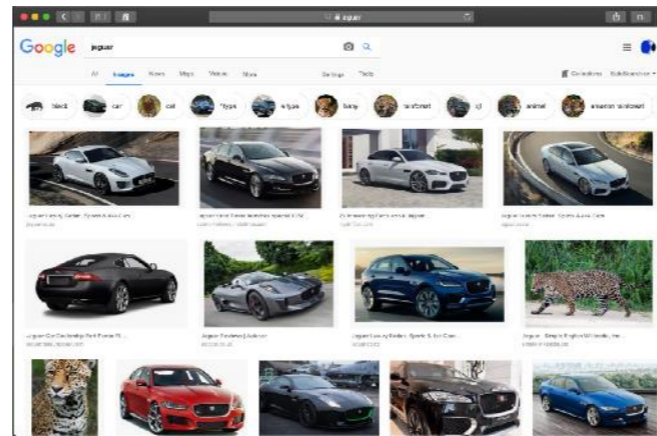
Use a "password" or "Pin" for your phone & iPad too.

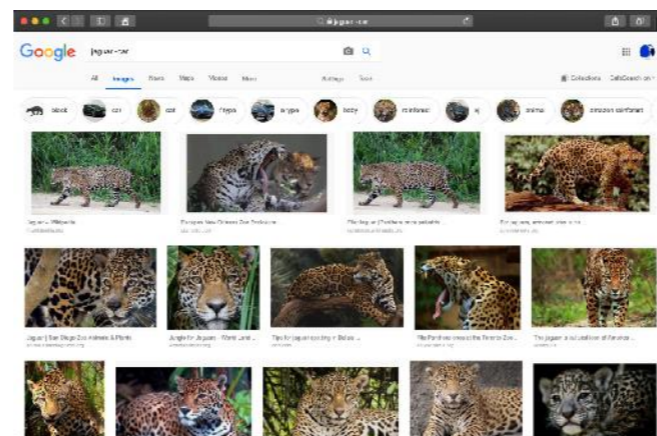How strong is your password?

Are you a Google expert?

Let's imagine we need an image of an animal. Let's say the jaguar. We open Google images and search for 'jaguar'.

Search for: "Jaguar"

That's not an animal! Try this Google trick. The minus sign excludes the keyword car, so you just get the animal images.

Search for: "Jaguar -cars"

Using Google Search settings you can also search by 'quality' and 'copyright free images'.

Did you know games have ratings?

To help you and your parents choose age-appropriate games most platforms will feature an age rating on the game. Due to the way certain platforms categorise games according to their content, at times the age rating for one game may not be the same across all platforms. So, it can be confusing when taking a call on whether a game is age-appropriate. PEGI ratings – What do the labels mean? The PEGI system is based on 5 age categories and eight content descriptors. So a 7-rated game is suitable for everyone who is seven or older, while an 18-rated game is deemed suitable for adults only.

PEGI 3 suitable for all ages

PEGI 7 suitable for young children

PEGI 12 suitable for children 12 and over

PEG 16 – suitable for children 16 and over

PEGI 18 – Only suitable for adults

Watch video.

What is a Digital Citizen?

Being a Digital Citizen means you are part of the group of people that uses technology to communicate. There are rules that you need to follow when you are a digital citizen to protect yourself and to protect others.