



Year 6 Programming in Scratch Knowledge Organiser



? What are we learning about programming in Scratch?

Scratch can be used to program using code blocks, including programming space and tennis games plus phone simulators. To do this we need to program interactions so that sprite can be controlled, sense other sprites/objects, make choices and score points. We can also program sprites to send messages to each other to game a project even more interactive.



National Curriculum Content

Design, write and debug programs that accomplish specific goals; 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.



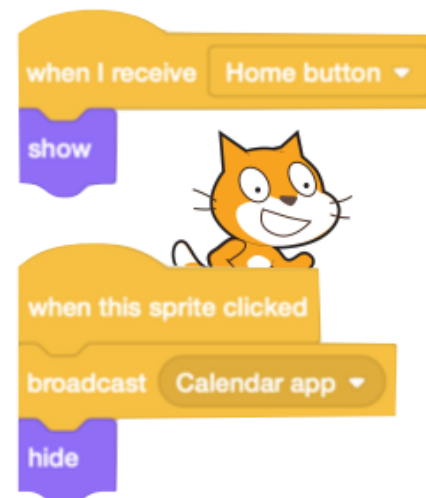
Key knowledge

- Know that sprites can be controlled in different ways using keyboard or touch screen inputs.
- Know that sprites can be programmed to sense other sprites or colours then make decisions. (*Eg if a ball sprite touches the colour of a goal it scores a point.*)
- Know how to program variables, including random variables that can be used to make a game unpredictable.
- Know how to program operators to add sums.
- Know how to program broadcasts, to send messages between sprites.



Important Vocabulary

Inputs	An example of an input are the keyboard arrow keys, which could be programmed to move a sprite.
Operators	Add sums to a program, such as more than, less than or equal to.
Sensing	A sensing block is triggered when a sprite touches another sprite or a colour.
Variables	Something that changes in a program, such as score or the speed of a car sprite. They can also be random to make the game more unpredictable.
Broadcasts	Send messages from one sprite to another.





Graphic Design Knowledge Organiser



? What are we learning about graphic design?

Graphic designers make the artwork for all sorts of publications, including magazines, websites, posters, packaging and much more. One use of graphic design that you see regularly is app icons on computers and mobile devices. App icons have to be designed so that they stand out from the other apps but should be simple because they are small. We can use different skills on a computer to make our graphic designs accurate but also speed up the process.



National Curriculum Content

Select, use and combine a variety of software on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.



Key knowledge

- Know how to add, adjust and fill shapes.
- Know how to group shapes to improve accuracy and speed.
- Know how to add and customise gradient effects.
- Know how to adjust transparency/opacity for a purpose.
- Know how to use a colour picker correctly (Keynote and PowerPoint only).
- Know how to accurately rotate shapes.



Important Vocabulary

Grouping	Grouping objects together makes it quicker to then move them around or change their colour. It also improve the accuracy by making all the objects the same.
Gradient	This is where one colour moves into another. For example, the top half of an app icon could be dark blue and the bottom half could be light blue.
Transparency/opacity	We can use tools to adjust how see through the object is; the more transparent the more you can see what is behind it.
Colour picker	A tool that allows you to click or tap any colour on the screen to add to your colour palette in design software. This is a great way to match the exact colour of something you are copying.
Arrange	Place objects in front or behind each other.



Quick tips

- If you make a mistake then use the undo tool to go back.
- When drawing a square or circle on a computer, hold down the Shift key while resize it, to make a perfect shape.
- Use guide lines to centre your shape in the middle of your icon.



Graphic Design





Computers: Past and Future Knowledge Organiser



What are we learning about computers past and future?

Since computers were invented over 100 years ago, they have changed dramatically from being the size of rooms to devices you can fit in your pocket. From being only capable of selecting simple numbers or making simple calculations to allowing people to work and communicate all over the world. Understanding important milestones in the history of computers helps us understand how computers work better today. It also helps us predict how computers will change and develop in the future.



Key knowledge

1. Show awareness of how computers and digital technology helps us today.
2. Understand how technology has changed over time and represent it as an interactive timeline.
3. Understand the impact (positive/negative) technological changes have on society.
4. Predict how technology will change in the future.

Important milestones in the history of computers

Binary Number	1	0	1	1	0	1	Decimal Number
Power of base	2^5	2^4	2^3	2^2	2^1	2^0	
Decimal equivalent	32	16	8	4	2	1	
Magnitude of each term	32	0	8	4	0	1	45

1679
Binary system
invented



1959
The Microchip was
invented



1971
E-mail is invented by
Ray Tomlinson



1983
Microsoft Windows is
created

1942
The first electronic
computer was invented



1963
Douglas Engelbart invented
the computer mouse.



1975 and 1976
Apple and Microsoft are
founded



1990
The Internet is invented





E-safety Knowledge Organiser (Ages 7-9)



? What are we learning about e-safety?

The internet can be amazing, helping us learn, play games and speak to other people. We need to make sure we are safe from people upsetting us and also understanding the dangers of sharing our personal information, such as our address, online.



National Curriculum Content

Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.



Key knowledge

1. Understand what to do if something upsets you online.
2. Understand why and how people can be nasty online.
3. Describe the term 'sharing online' and why we need to get permission to share photos and videos of other people.
4. Understand why people pretend to be someone else online.
5. Understand why we only talk to people we know in the real world, when online.
6. Understand why we should not always trust what we read online and how to check
7. Understand the importance of being kind in the real world and also online.



Important Vocabulary

 Personal information	This is information about us, including our name, address, telephone number or passwords. We need to make sure that we <u>do not</u> put this information on the internet for people we do not know to see as we would not do this in the real world. For example, if we are playing an online game then do not use your real name, use something else.
 Sharing	The internet allows us to post photos and videos online for others to see, this is called sharing. We do not want people we don't know to see personal photos or videos of us or our friends and family so we have to check with a grown up we trust before sharing them online. We would not give a photo of ourselves to a stranger in the real world so we do not do it online either.
 Permission	If we have taken a photo or video of someone else then we need to ask their permission before posting it online as they may not want others to see it.
 Report	If we see something online that upsets us or we think is wrong then we need to tell an adult we trust, such as a parent or teacher.
 Trust	Not everything that we see on the internet is correct and should be trusted. Always check the information with other websites or an adult we trust. People online can also pretend to be someone else so we need to be careful who we are talking to and only speak to people we know in the real world.
 Respect	When we are talking to people online then we need to make sure we being kind and respectful, treating people as we would want to be treated ourselves. If someone is not being kind then speak to an adult you trust.



Virtual Reality Knowledge Organiser



What are we learning about virtual reality?

We can use a computer to create virtual reality (VR) environments. There are many reasons why people use VR, including to train soldiers who go into dangerous places without putting them in harm. VR is also used in medical science to help train surgeons without putting patients at risk. You will also see virtual reality used in schools as children can visit landmarks and different places (e.g. underwater or the Pyramids of Egypt) without leaving the classroom.



National Curriculum 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.



Key knowledge

1. Understand what virtual reality is and how it can be used to help people.
2. Add, move and resize objects in a virtual reality environment
3. Animate objects for realism.
4. Use code blocks to add movement (with grouping) and interactions (conditions).
5. Create multiple scenes of VR environments



Important Vocabulary

Virtual Reality (VR)	A computer generated version of the real world. Putting on a virtual reality headset means you can see the computer generated world (virtual world) in 360 degrees. So everywhere you look is the virtual.
Immersive	The digital content that we are viewing is so realistic that it makes us forget that we are in the real world.
Animate	The objects in a VR environment can move, making them more realistic. For example, the underwater environment above would not be as realistic if the whales did not move.
Scenes	In the real world we can walk and move from place to place. We can do this in the VR world too by creating different places - these are called scenes.
Grouping	When making VR environments we may want to use the same objects more than once. We can group objects together and copy them to use in another scene or part of the environment.
Interactions (conditions)	We can use code blocks to make the objects in the VR world interactive, so they change when we select them. For example, when the user chooses a planet it shows facts or if they select an animal, it changes direction.



Artificial Intelligence and Machine Learning Knowledge Organiser



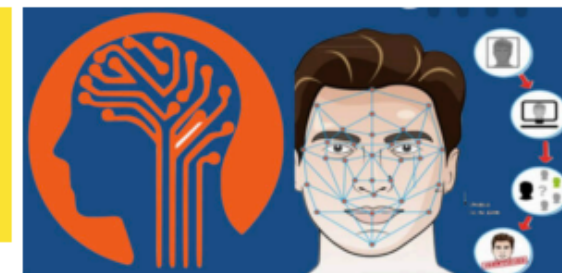
What are we learning about artificial intelligence and machine learning?

It is important to understand how computers work and how they learn like humans do. Humans constantly see, hear, touch, smell and taste new things, which goes into our memory. This helps us solve problems and perform new tasks. Computers are the same but they need a user to put the information into the computer's memory, helping it solve problems better and follow new instructions. For example, face and fingerprint unlocking of a phone or tablet. When we first use the device it takes a reading of our face or fingerprint but the more we use it, the computer is continually learning more about it, making it more and more secure each time. This is called *Machine Learning*. Computers can be programmed to do tasks by themselves, such as driverless cars or drones delivering mail - this is called *AI (Artificial Intelligence)*. As much as computers help us in these ways, it is important to understand the dangers of Machine Learning and AI too.



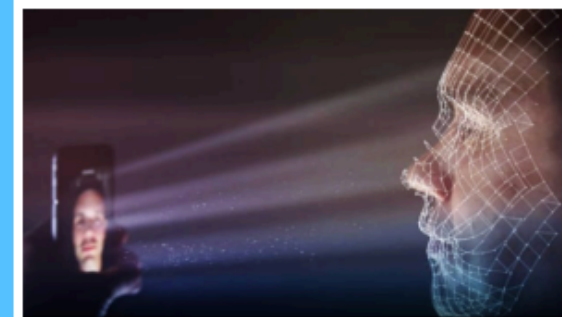
Key knowledge

1. Understand how computers use information to learn by solving new problems and following new instructions.
2. Understand and use examples of machine learning.
3. Understand how artificial intelligence is used to perform tasks often only performed by humans.
4. Understand the potential dangers of AI.



Important Vocabulary

Machine Learning	Computers learn new information, which helps them work better and follow new instructions. For example, they can recognise our face or fingerprint each time we unlock our device, making it more secure. Have you also noticed how a tablet or phone suggests words as you are typing? As we type more, the computer learns what words we like to use and suggests better words more suitable us.
Artificial Intelligence (AI)	Computers can be programmed to work by themselves to perform important tasks, such as driverless cars, drones delivering mail or as lifeguards. The computers in these are programmed with the information they need for the task (such as a route they need to take) and they use machine learning to gain more knowledge (artificial intelligence) about the task it is performing.





Binary Code Knowledge Organiser



? What are we learning with binary code?

A computer does not understand the same language as us (numbers and the alphabet), it uses binary code, which is a sequence of zeros and ones (e.g 101001). It will translate numbers and letters into binary by positioning the ones and zeros. The numbers that the computer uses with binary double each time (1,2,4,8,16, 32 etc). This is why when you buy a computer, iPad or mobile phone, the memory on it is measured in 16gb, 32gb, 64gb etc. Understanding binary helps understand how computers work but can also help with our mental maths skills.



National Curriculum Content

Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits.



Key knowledge

- Know that binary is how computers work and is made up of a sequence of zeros and ones (or on and off).
- Know how to match a sequence of binary code to create digital art.
- Know how to convert binary numbers to denary number (numbers we understand) and visa-versa by understanding that the position of the zeros and ones on a grid of 1, 2, 4, 8, 16, 32, 64, 128.



Quick tips

- Use the grid below to help you write binary code. The position of the ones and zeros will add up to the number. The number below is 38 ($32+4+2=38$)
- Binary code will never start with a zero, it will always be the position of the first 1. Binary numbers are always only 8 digits long.

128	64	32	16	8	4	2	1
		1	0	0	1	1	0



Important Vocabulary

Binary	A computer works on a the binary system, a sequence of zeros and ones, to represent things we understand, such as numbers.
Denary numbers	The numbers we understand (also known as decimal numbers) such as 1,2,3,4,5 etc.
Translate/ covert	Computers change the numbers we understand into the binary code sequence or change the binary code into numbers we understand.





Wordpress Web Design Design Knowledge Organiser



? What are we learning about web design?

The websites that we use have all been designed. The people who made them have thought about the colours, text size, image size and layout to make sure they are suitable for the audience who will be using them. We can use software to design, create and publish our own websites about a topic, making sure we think carefully about who will be using it.

Key knowledge

1. Create a static homepage.
2. Choose a suitable theme for your website.
3. Change the site identity to a suitable title, tagline and website icon.
4. Upload a suitable header and/or background image.
5. Adjust the website sidebar and add suitable widgets.
6. Add text and images to a page and edit them.
7. Add multiple pages and edit the navigation, including sub-menus.
8. Provide constructive feedback for your classmates' websites.

Tips

1. Before you start your website, think about what you want on each page and type the text into a word process such as Word, just in case you lose a web-page.
2. Do not add too many pages at once as Wordpress limits the amount of pages you can add in a short space time.



Important Vocabulary

 Wordpress	This is the software used to make websites. It is not the only one but is one of the most popular and is used to make about 40% of all websites and blogs, including iLearn2.
 Static page	A static page is a page on a website that does not change too much, such as welcome page. This is the opposite to a blog page, which shows the latest blog posts and changes more.
 Theme	The theme is the overall look of the website. There are different themes to choose from. For example, the navigation could be at the top of the website or down the side based on the theme.
 Header	The image or the title at the top of the web-page.
 Sidebar	A column down the left or right side of the page where text, images or other elements can be added.
 Widgets	An element which can be placed in the side bar, such as an image, text, calendar etc.
 Navigation	The menu and sub-menu the visitor uses to move between the different pages.
 Domain name	The link for your website, also known as a URL (Uniform Resource Locators).