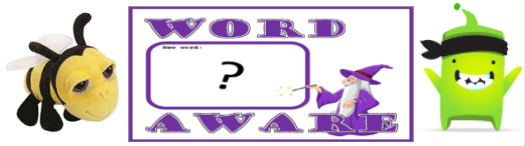
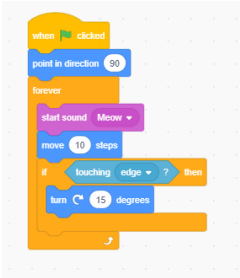
NPA Knowledge Organiser: Year 3 Computing (Autumn Term)

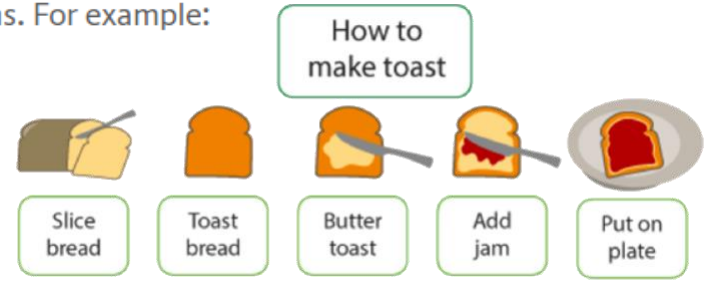


Action – types of commands, which are run on an object.
Algorithm – a precise step by step set of instructions used to solve a problem or achieve an objective
Bug – a problem in a computer program that stops it working the way it was designed
Code block – a group of commands that are joined together
Code design – design what your program will look like and do
Command – a single instruction in a computer program
Control – these commands determine whether parts of the program will run, how often and sometimes, when
Debug/Debugging – looking for any problems in the code, fixing and testing them
Event – something that causes a block o code to be run
If – a conditional command. This tests a statement. If the condition is true, then the code block will run.

Sequence

When we sequence things, we arrange them in a particular order. Sequence-based algorithms are made from a precise set of instructions. For example:





A sequence of instructions - an algorithm - for how to make toast.

What is programming?

Programming is the process of designing and writing a set of instructions (a program) for a computer in a language it can understand. This can be simple, such as a program making a robot toy trace out a square, or incredibly sophisticated, such as those behind search engines and weather forecasting.

Programming is a two-step process:

- First, you need to analyse the problem and design a solution, drawing on logical reasoning, decomposition, abstraction, patterns and algorithms.
- Secondly, you need to express these ideas in a particular programming language on a computer. This is called coding, referring to the set of instructions that make up the program, which we call 'code'

Charles Babbage (1791 - 1871)
Ada Lovelace (1815 - 1852)

Ada was an English mathematician and writer who was the first to realise that Babbage's calculation machine could do more, and invented algorithms!

https://www.youtube.com/watch?v=kM9ASKAni_s
https://www.youtube.com/watch?v=XMZFUnAgOqs

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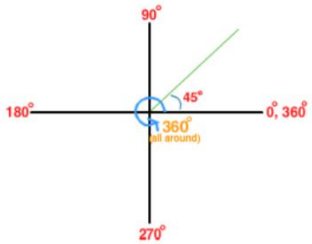
Input – information going into the computer e.g. mouse, keyboard, swipe
Output – information that comes out of the computer e.g. sound, printing
Object – an element in a computer program that can be changed using actions or properties
Properties - all objects have properties that can be changed e.g. colour, scale
Repeat – this command can be used to make a block of commands run a set number of times, or forever
Simulation – a program that models a real-life situation
Selection – this is a conditional / decision command. When selection is used, a program will choose a different outcome depending on a condition set.
Timer – use this command to run a block of commands after a timed delay or at regular intervals
Variable – a named area in computer memory. A variable has a name and a value. The program can change this variable value.

1. **Decomposition**
   Breaking a problem down into smaller parts. Each individual part is solved separately.
   Advantages:
   a. Makes a problem easier to solve.
   b. Different people can work on different parts of a problem.
   c. Parts of one program can be used in other programs.

Angles used for position and direction



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.

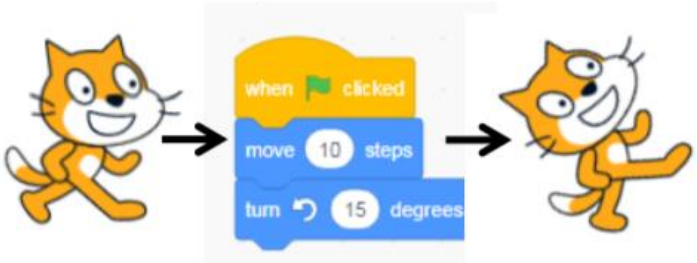
Processes are shown as **squares** and are used when we are doing something.

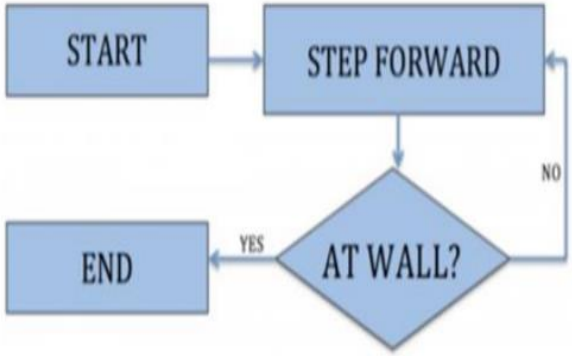
Decisions are shown as a **diamond** and are used to represent when we are testing something.

A simple sequence of commands used in Scratch. – When the flag is clicked, the sprite will move 10 steps, turn right 15 degrees and left 30 degrees.

	Used for direction of data flow.
	Process- Something that happens.
	Decisions- yes or no

Distance and angles can be used to alter the direction in a sequence of commands. Degrees are used to measure angles and can be used in simple commands.





By the end of this unit, you'll know:

- How to use sequences of instructions to make things happen
- How to describe, review and evaluate your use of ICT
- How to save and use stored information

By the end of this unit, you'll also know:

- How to debug your code
- How to select and record sounds, organize and re-organize sounds
- How to use a variety of commands and code blocks