



Alexandra Park Junior School

Computing at Alexandra Park Junior
School - Sum1 - July 23



Intent

At Alexandra Park Junior School we offer a structured sequence of lessons, ensuring that we have covered the skills required to meet the aims of the national curriculum. The content allows for a broad, deep understanding of computing and how it links to children's lives. It offers a range of opportunities for consolidation, challenge and variety. This allows children to apply the fundamental principles and concepts of computer science. They develop analytical problem-solving skills and learn to evaluate and apply information technology. It also enables them to become responsible, competent, confident and creative users of information technology. We want our Computer Scientists to:-

- Ask perceptive questions and develop deeper thinking;
- Think critically
- Form and justify own ideas



Implementation

Each lesson contains revision, analysis and problem-solving. Through the sequence of lessons, we intend to inspire pupils to develop a love of the digital world, see its place in their future and give build confidence. Cross-curricular links are also important in supporting other areas of learning and where possible this has been applied. The lessons and resources help children to build on prior knowledge at the same time as introducing new skills and challenges. In KSI, the focus is on developing the use of algorithms, programming and how technology can be used safely and purposefully. We do not teach KSI in Alexandra Park Junior school however a baseline assessment is carried out to assess if these have been covered. In KS2, lessons still focus on algorithms, programming and coding but in a more complex way and for different purposes. Children also develop their knowledge of computer networks, internet services and the safe and purposeful use of the internet and technology.



Impact

Learning in computing will be enjoyed across the school. The Computing Teacher has high expectations and quality evidence will be presented in a variety of forms. Digital and technological vocabulary will be promoted through each unit accurately, alongside a progression in their technical skills. Pupils will become confident using a range of hardware and software and will produce high-quality purposeful products. Children will see the digital world as part of their world, extending beyond school, and understand that they have choices to make. They will be confident and respectful digital citizens going on to lead happy and healthy digital lives.

Impact may be measured in a variety of ways, including:-

- Spotlights
- Learning walks
- Lesson observations and pop-ins
- Data analysis (December and June)



Year 3

Term	Unit	Strand	Sub strand
Autumn 1	Baseline / Basic Comp Intro / Computer Systems and Networks	CS	Technology in our lives
Autumn 2 Spring 1	Introduction to Scratch- Sequencing Sound	CS	Coding and Programming
Spring 1	Online Safety	DL	Multimedia Sound and Motion
Spring 2	Stop Frame Animation	IT	Multimedia Sound and Motion
Summer 1	Presentation Skills	IT	Multimedia Sound and Motion
Summer 2	Programming B - Events and Actions	IT	Coding and Programming



Year 4

Term	Unit	Strand	Sub strand
Autumn 1	Computer Systems and Networks	CS	Technology in our lives
Autumn 2	Programming A - Repetition in shapes	CS	Coding and Programming
Spring 1	Online Safety	DL	Online Safety
Spring 2	Animation	IT	Multimedia Sound and Motion
Summer 1	Photo Story	IT	Multimedia Sound and Motion
Summer 2	Programming B - Repetition in Games	CS	Coding and Programming



Year 5

Term	Unit	Strand	Sub strand
Autumn 1	Computer Systems and Networks	CS	Technology in our lives
Autumn 2	Programming A - Selection in physical computing	CS	Coding and Programming
Spring 1	Online Safety	DL	Online Safety
Spring 2	Flowol	CS	Coding and Programming
Summer 1	3D Sketchup	IT	Multimedia
Summer 2	Programming B - Selection in quizzes.	IT	Coding and programming



Year 6

Term	Unit	Strand	Sub strand
Autumn 1	Computer Systems and Networks	CS	Technology in our lives
Autumn 2	Programming A - Variables in Games	CS	Coding and Programming
Spring 1	Online Safety	DL	Online Safety
Spring 2	Kudo	CS	Coding and Programming
Summer 1	Spreadsheets	IT	Multimedia
Summer 2	Programming B - Sensing Movement - <u>Microbits</u> ???	CS	Coding and programming



Concept, Composite and Components Curriculum

Understanding the World (Technology)

Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.

Key Stage 1 National Curriculum Expectations	Key Stage 2 National Curriculum Expectations
<p>Pupils should be taught to:</p> <ul style="list-style-type: none">• understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions;• create and debug simple programs;• use logical reasoning to predict the behaviour of simple programs;• use technology purposefully to create, organise, store, manipulate and retrieve digital content;• recognise common uses of information technology beyond school;• use technology safely and respectfully; keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies;	<p>Pupils should be taught to:</p> <ul style="list-style-type: none">• 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.



Progression of Knowledge and Skills

Understanding the World (Technology)

Children recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.

Key Stage 1 National Curriculum Expectations

Pupils should be taught to:

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions;
- create and debug simple programs;
- use logical reasoning to predict the behaviour of simple programs;
- use technology purposefully to create, organise, store, manipulate and retrieve digital content;
- recognise common uses of information technology beyond school;
- use technology safely and respectfully; keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies;

Key Stage 2 National Curriculum Expectations

Pupils should be taught to:

- 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;

Key:

Substantive

Disciplinary



MTP – Year 3 – SUM2

SUM2 – MTP – Programming B – Events and Actions in Programming – Year 3

Unit introduction

This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. Learners begin by moving a sprite in four directions (up, down, left, and right). They then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of **Pen** blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze-tracing program.

There are two Year 3 programming units:

- Programming A – Sequencing sounds
- Programming B – Events and actions in programs

This is unit B, which should be delivered after unit A.

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Moving a sprite	In this lesson, learners will investigate how characters can be moved using 'events'. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project.	To explain how a sprite moves in an existing project <ul style="list-style-type: none">● I can explain the relationship between an event and an action● I can choose which keys to use for actions and explain my choices● I can identify a way to improve program
2 Maze movement	In this lesson, learners will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Learners will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended to	To create a program to move a sprite in four directions <ul style="list-style-type: none">● I can choose a character for my project● I can choose a suitable size for character in a maze● I can program movement



MTP – Year 4 – SUM2

SUM2 – MTP – Programming B – Repetition in Games – Year 4

Unit introduction

Learners will explore the concept of repetition in programming using the Scratch environment. The unit begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.

There are two Year 4 programming units:

- Programming A – Repetition in shapes
- Programming B – Repetition in games

This is unit B, which should be delivered after unit A.

It is recommended that learners use desktop or laptop computers to access Scratch (scratch.mit.edu). We recommend the use of teacher accounts in Scratch to make it easier to manage student accounts. For guidance on setting up teacher accounts, please visit the Scratch website. (<https://scratch.mit.edu/educators/faq>)

Throughout this unit, there are opportunities to model within Scratch or to demonstrate a concept through a video. Pedagogically, it is more beneficial to model the concepts to the learners, which allows for easier questioning and understanding. We recommend that you use the videos to see what needs to be modelled, but give a live demonstration within the lesson. However, the videos are provided on the slides if you wish to use them instead.

Overview of lessons

Lesson	Brief overview	Learning objectives
3, loops to create	In the first lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops. They consider what the different values in each	To develop the use of count-controlled loop in different programming environment <ul style="list-style-type: none">● I can list an everyday task as a set of instructions including repetition● I can predict the outcome of a snippet of code● I can modify a snippet of code to create a given outcome



MTP - Year 5 - SUM 2

SUM2 - MTP - Programming B - Selection in Quizzes - Year 5

Unit introduction

Learners will develop their knowledge of 'selection' by revisiting how 'conditions' can be used in programming, and then learning how the 'if... then... else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'. They represent this understanding in algorithms, and then by constructing programs in the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. They use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying how it meets the requirements of the task, the ways they have improved it, and further ways it could be improved.

There are two Year 5 programming units:

- Programming A - Selection in physical computing
- Programming B - Selection in quizzes

This is unit B, which should be delivered after unit A.

Overview of lessons

Lesson	Brief overview	Learning objectives
Exploring conditions	In this lesson, learners revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program. They are introduced to the blocks for using conditions in programs using the Scratch programming environment. They modify the conditions in an existing program and identify the impact this has.	To explain how selection is used in computer programs <ul style="list-style-type: none">● I can recall how conditions are used in selection● I can identify conditions in a program● I can modify a condition in a program
Selecting outcomes	In this lesson, learners will develop their understanding of selection by using the 'if... then... else...' structure in algorithms and programs. They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked. They identify the two outcomes in given programs and how the condition informs	To relate that a conditional statement connects a condition to an outcome <ul style="list-style-type: none">● I can use selection in an infinite loop to check a condition● I can identify the condition and outcomes in an 'if... then... else...' statement



MTP - Year 6 - SUM2

Sum2 - MTP - Programming B - Sensing Movement - Year 6

Unit introduction

This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables (introduced in Year 6 - 'Programming A'. It offers pupils the opportunity to use all of these constructs in a different, but still familiar environment, while also utilising a physical device - the micro:bit. The unit begins with a simple program for pupils to build in and test within the new programming environment, before transferring it to their micro:bit. Pupils then take on three new projects in Lessons 2, 3, and 4, with each lesson adding more depth.

Design features prominently in this unit. A design template is introduced in Lesson 3, initially scaffolded to give pupils the opportunity to create code from a given design. In Lesson 4 that scaffolding is gradually reduced, then in Lesson 5, pupils create their own design, using the same template. In the final lesson, pupils will apply their knowledge of the programming constructs and use their design to create their own micro:bit-based step counter.

There are two Year 6 programming units:

- Programming A - Variables in games
- Programming B - Sensing

This is unit B, which should be delivered after unit A.

Overview of lessons

Lesson	Brief overview	Learning objectives
Lesson 1	<p>Pupils will be introduced to the micro:bit as an input, process, output device that can be programmed. Pupils will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then run their programs on the device.</p> <p>Note: This unit is written assuming that you will be using a desktop or laptop computer (not a tablet) to connect micro:bits.</p>	<p>To create a program to run on a controllable device</p> <ul style="list-style-type: none">• I can apply my knowledge of programming to a new environment• I can test my program on an emulator• I can transfer my program to a controllable device



Our next steps

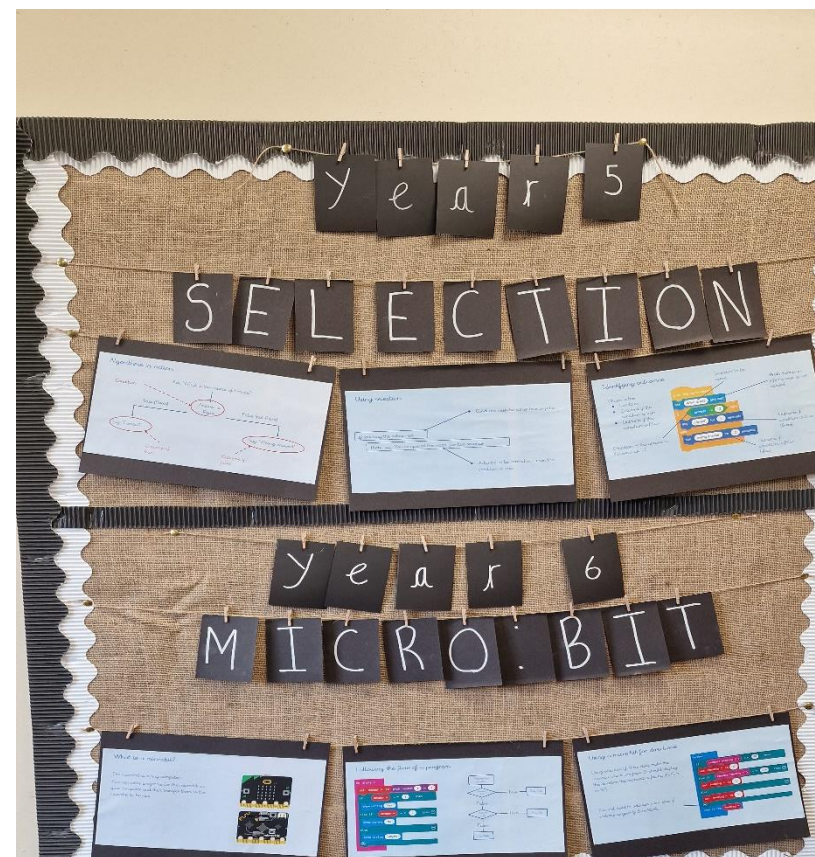
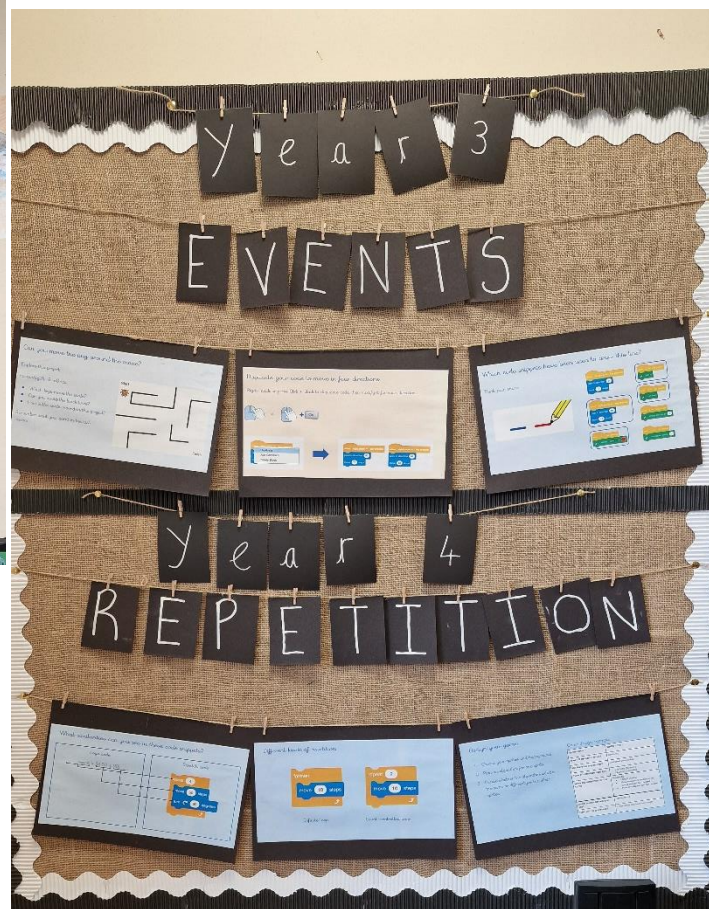
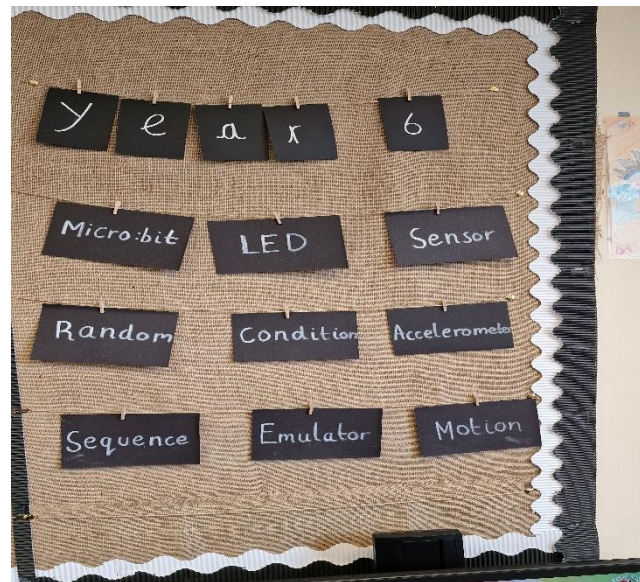
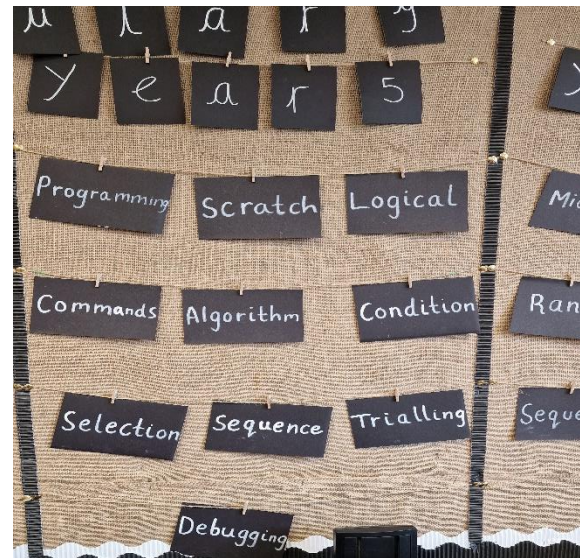
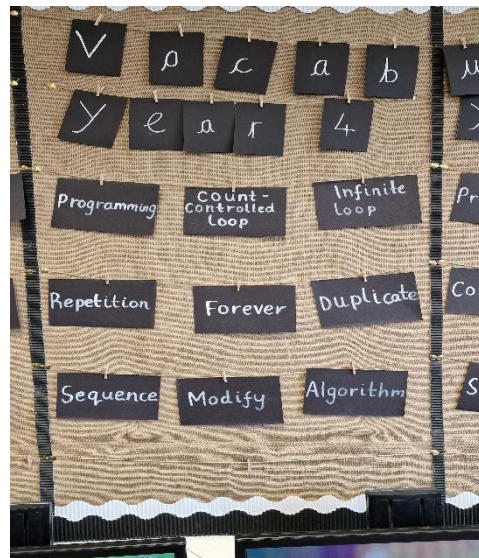
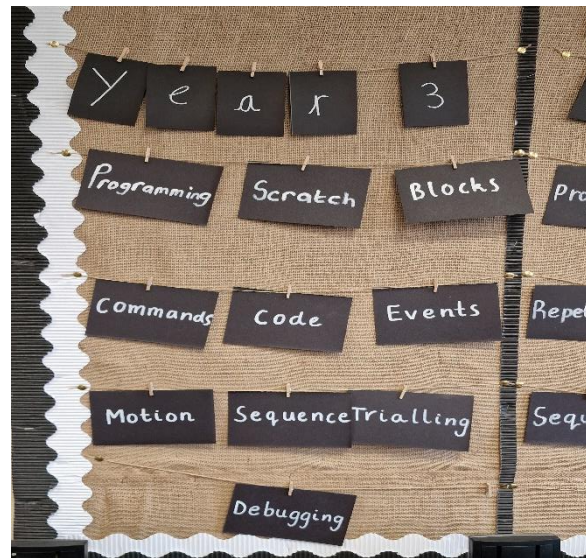
- Spotlight
- Data Analysis
- Action Plan for Next Year



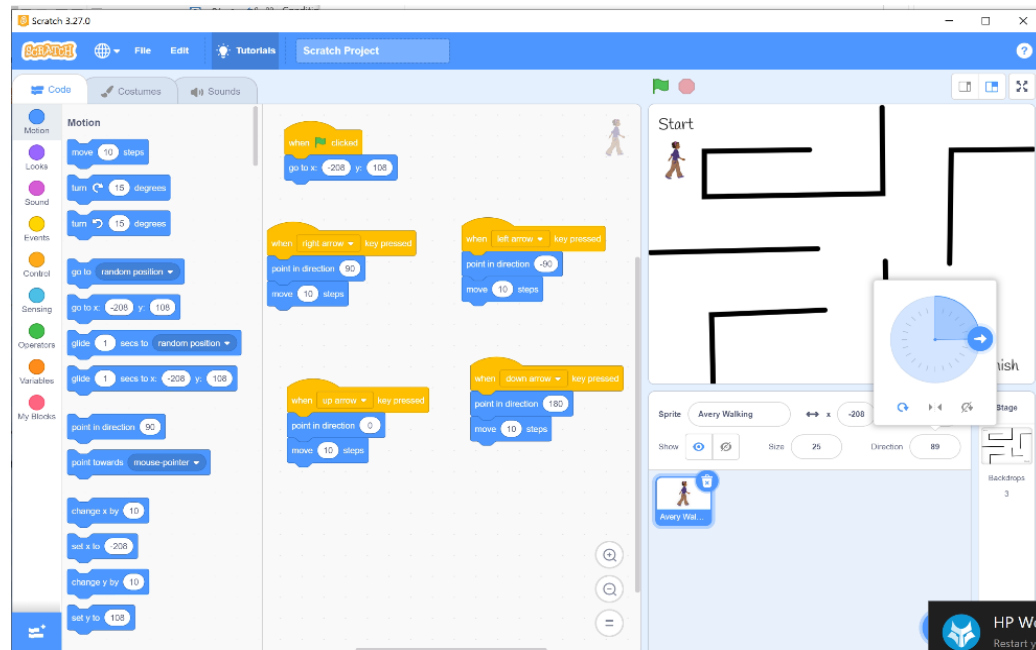
Displays



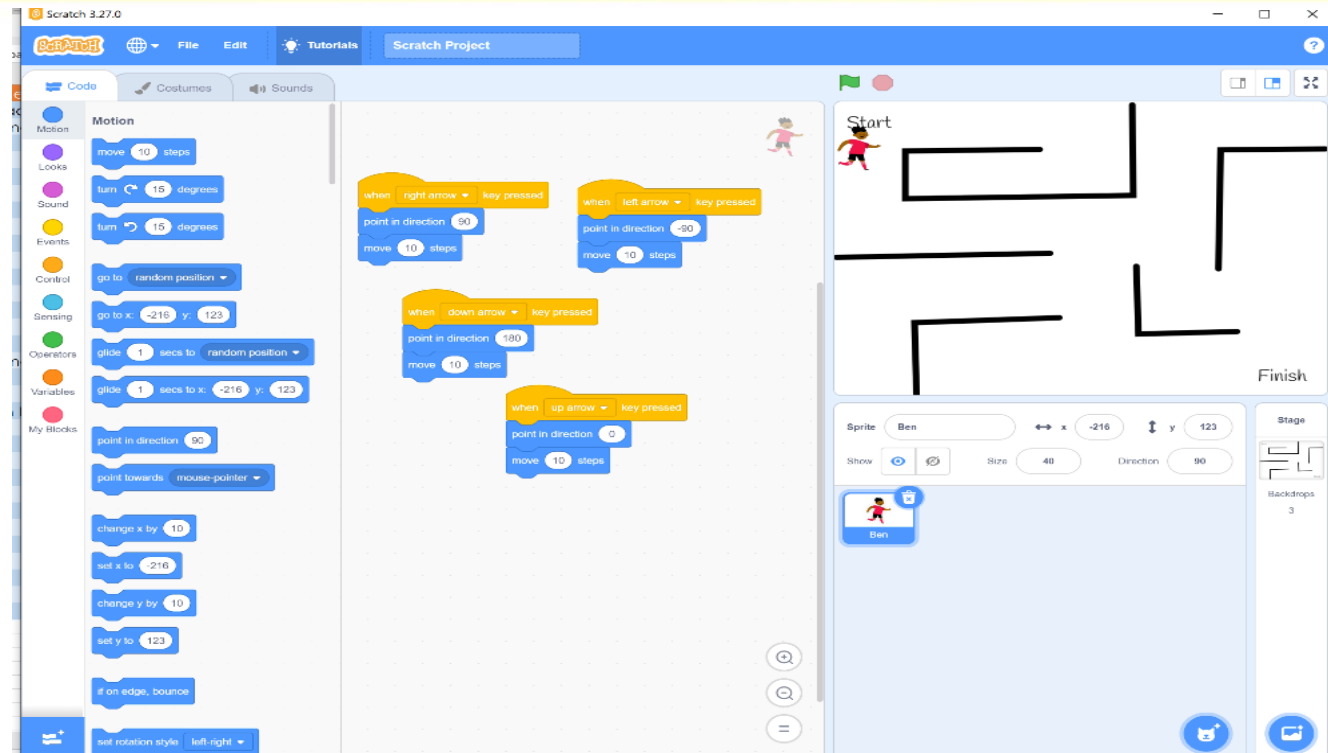
Alexandra Park Junior School



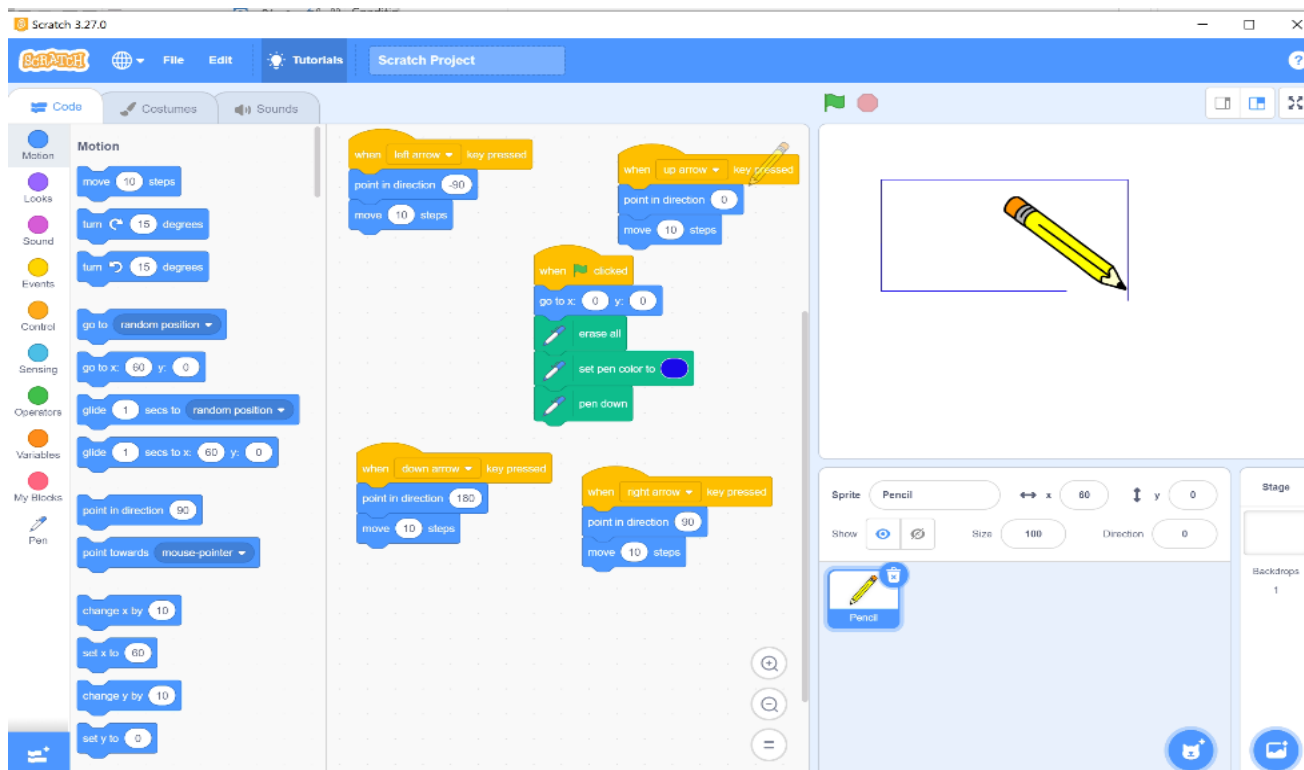
Year 3 - Scratch



Maze Game



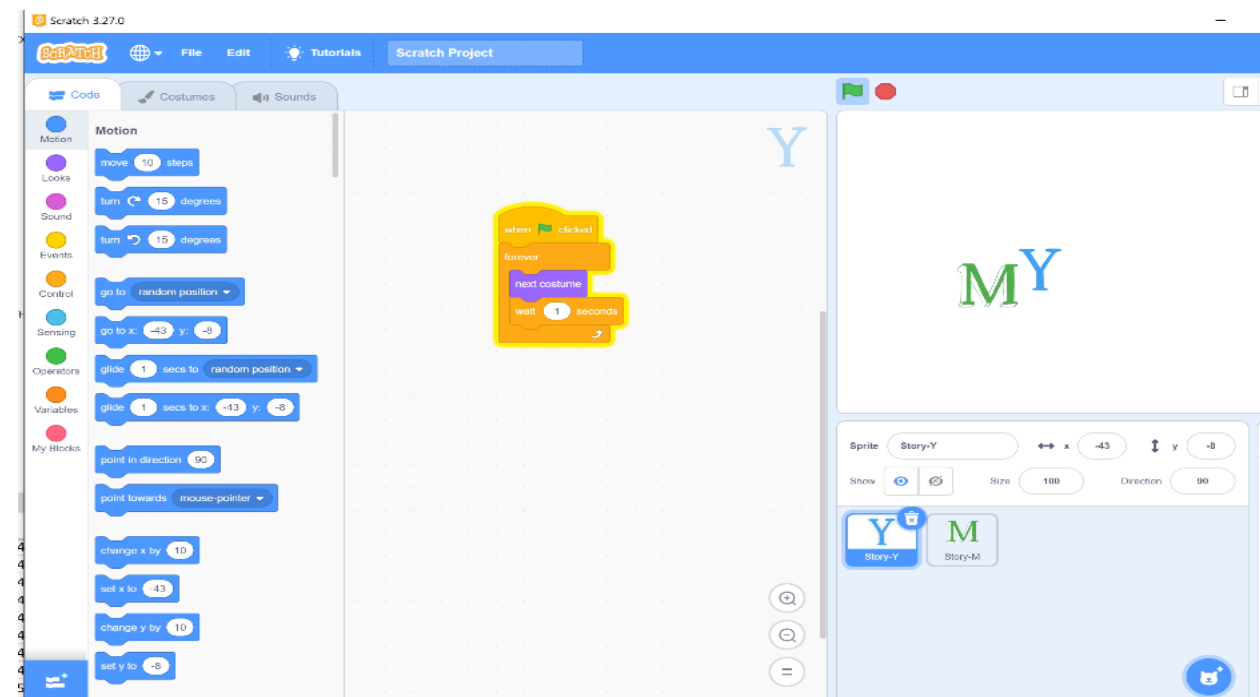
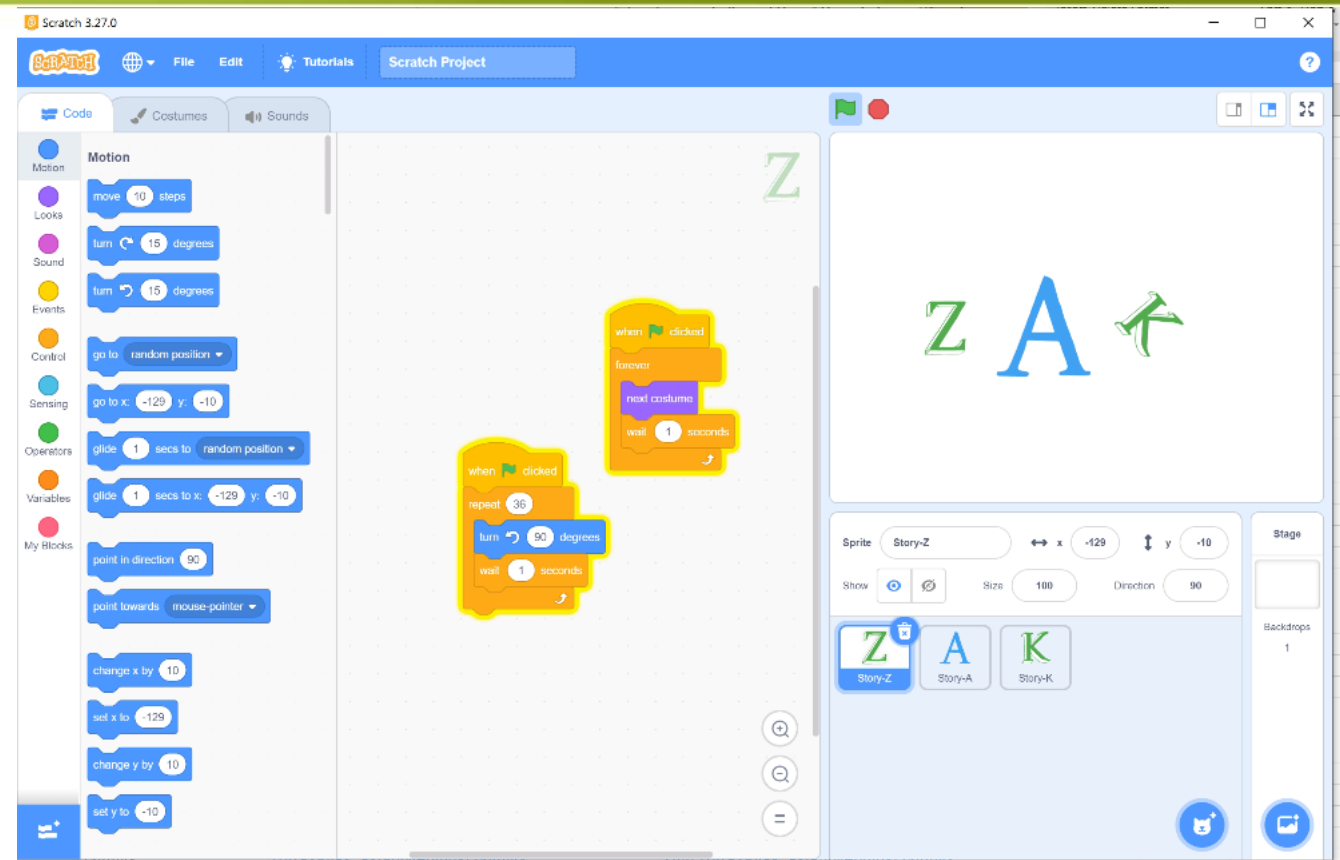
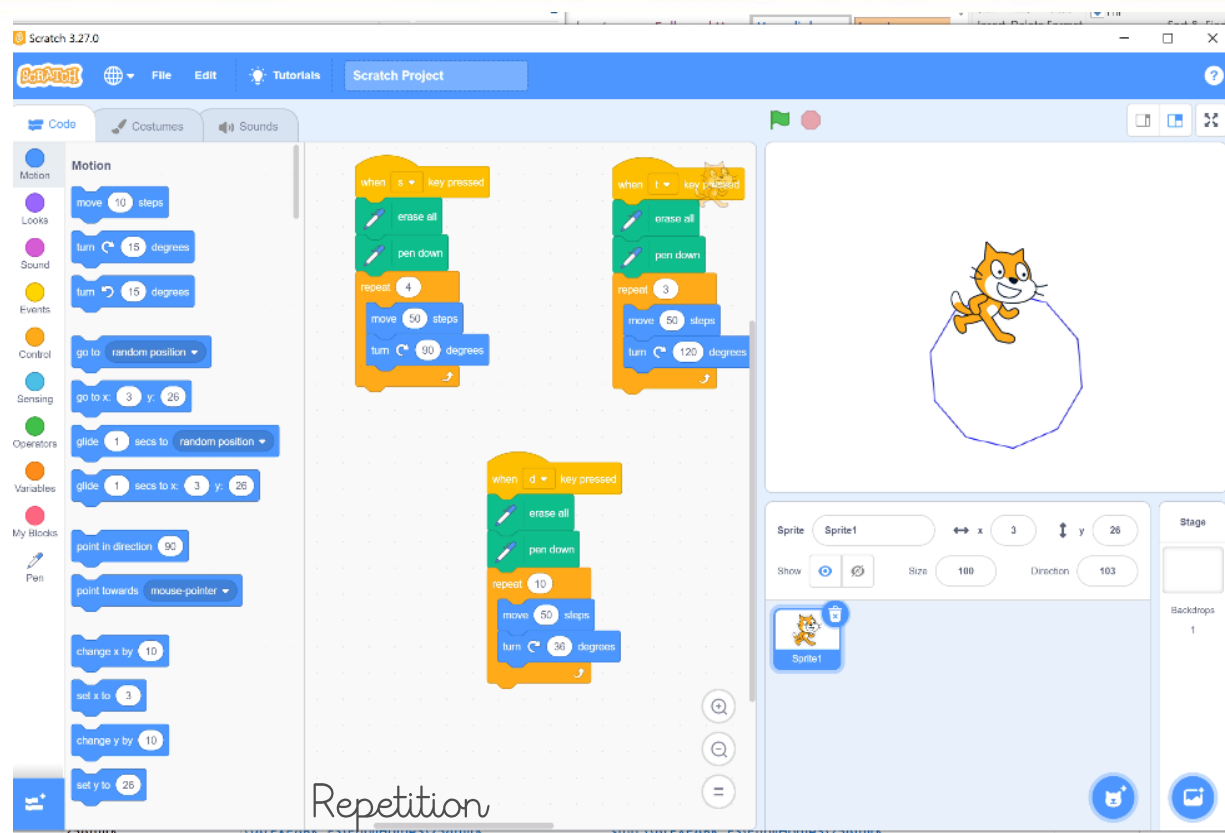
Maze Game



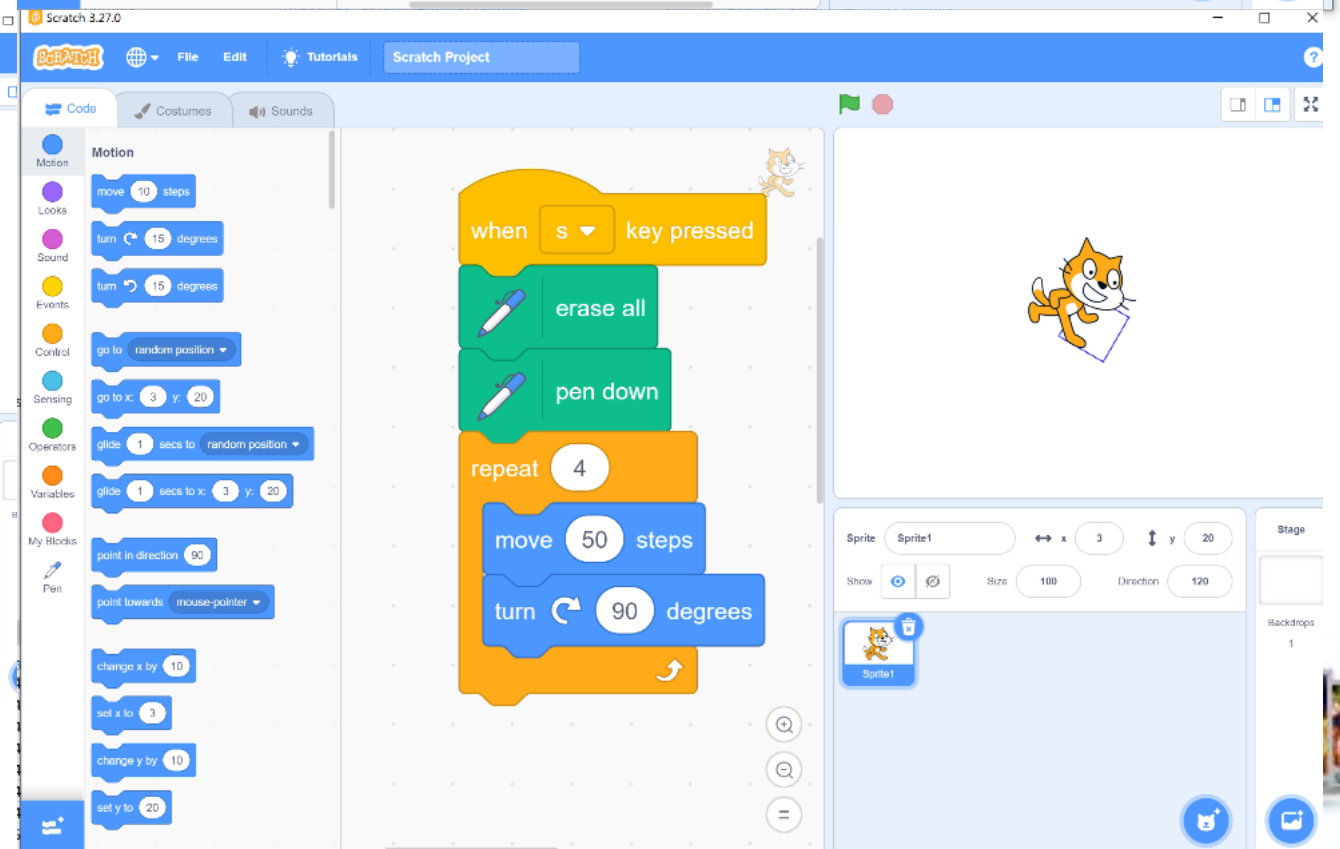
Drawing Game



Year 4 - Repetition in Scratch

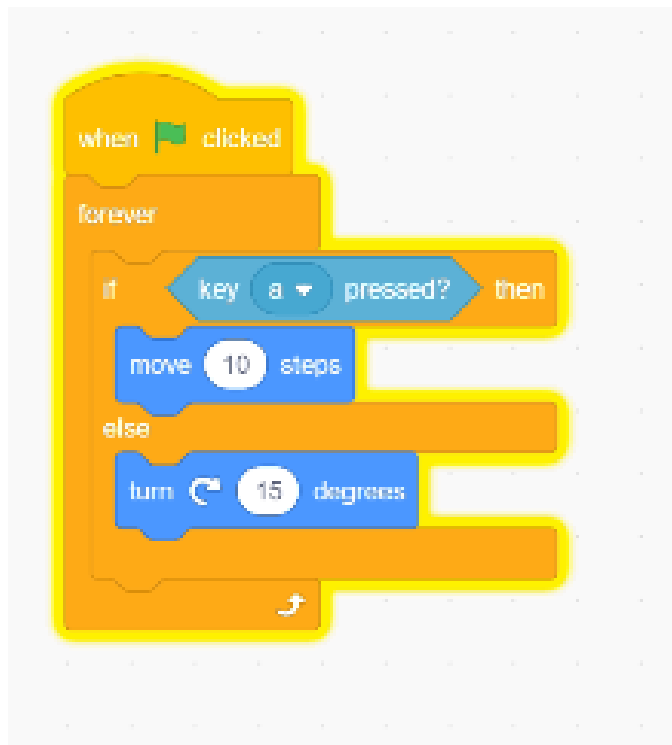


Using loops to animate name

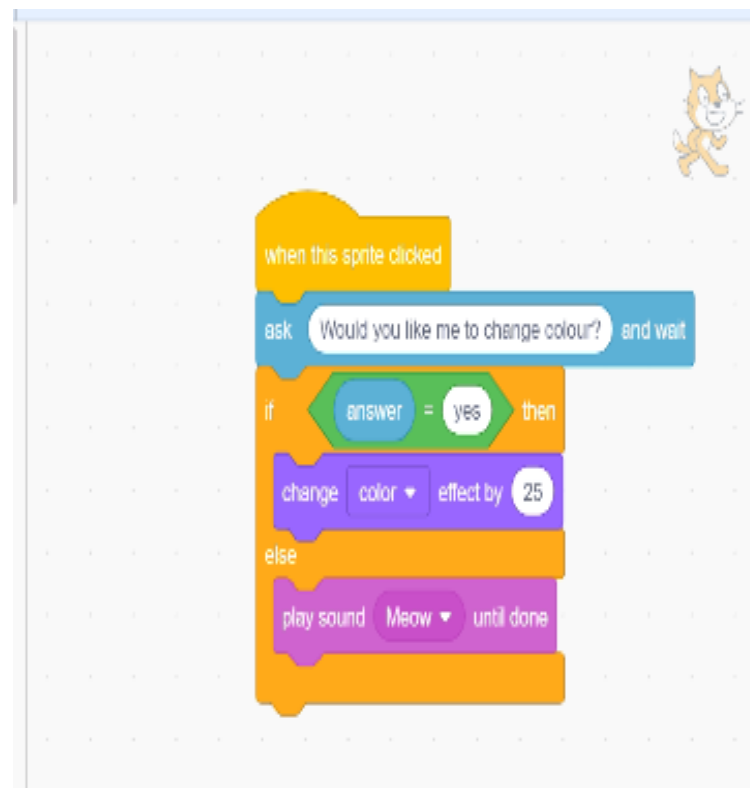


Making Shapes

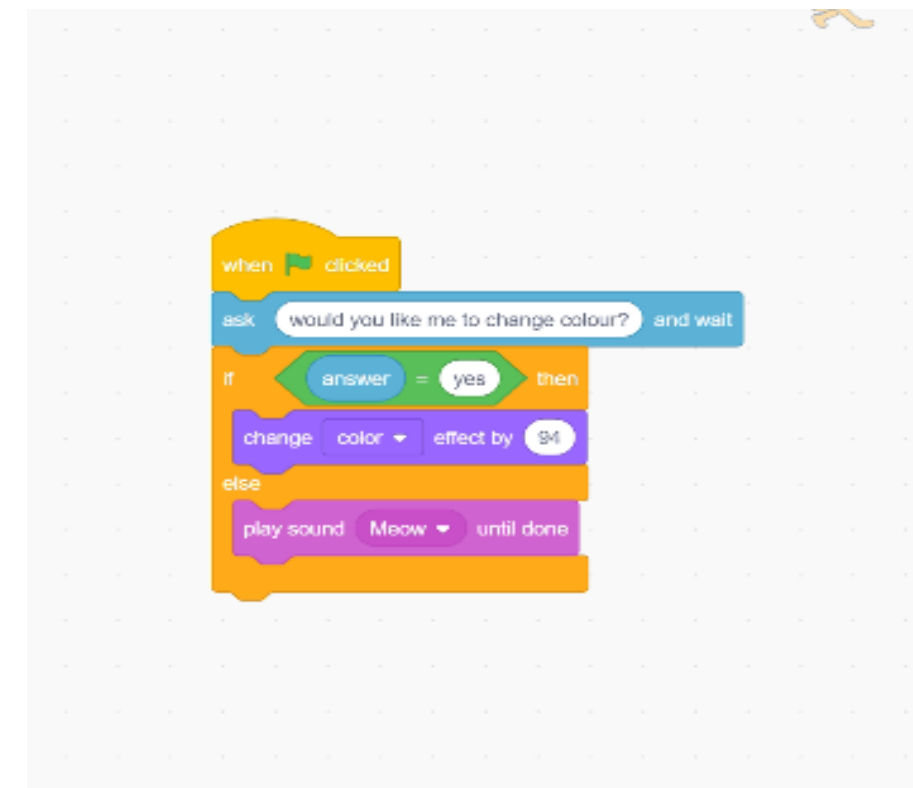
Year 5 - Selection in Scratch



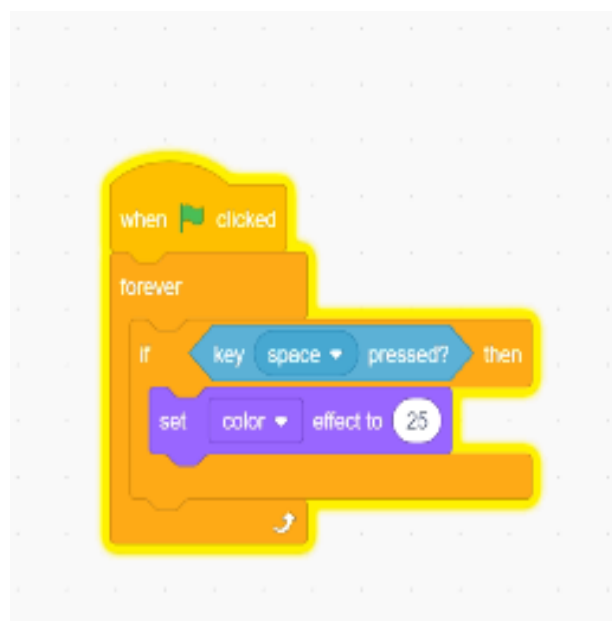
Using selection in scratch



Using Selection in Scratch



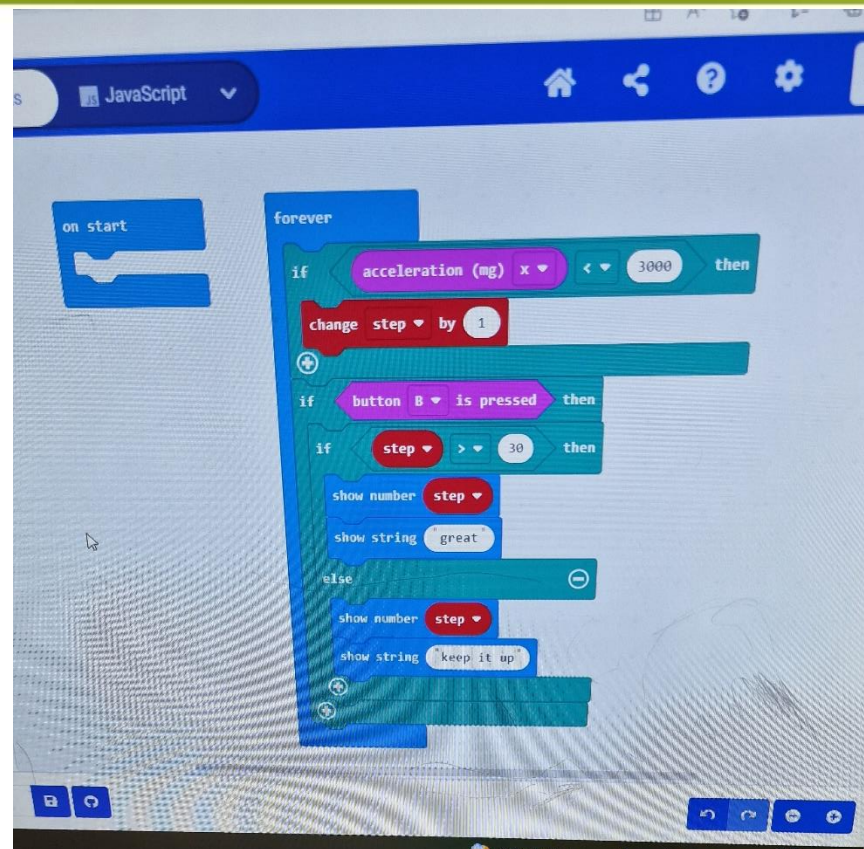
Using Selection in Scratch



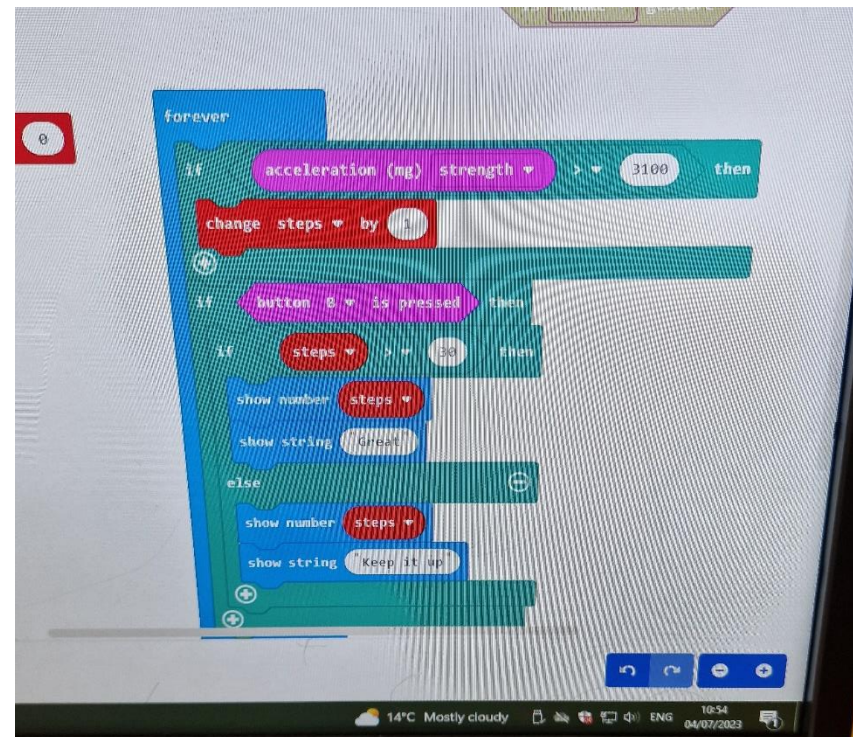
Using selection in scratch



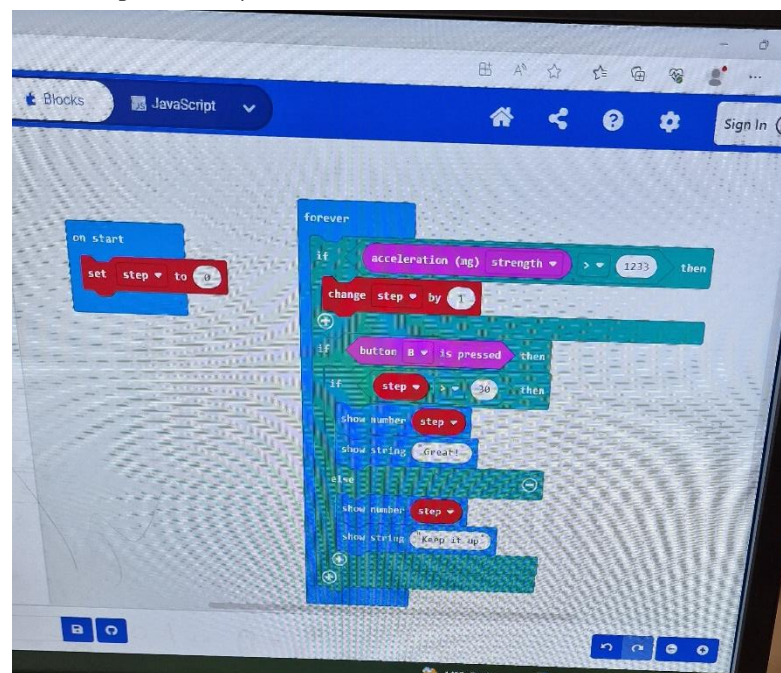
Year 6 - Microbits



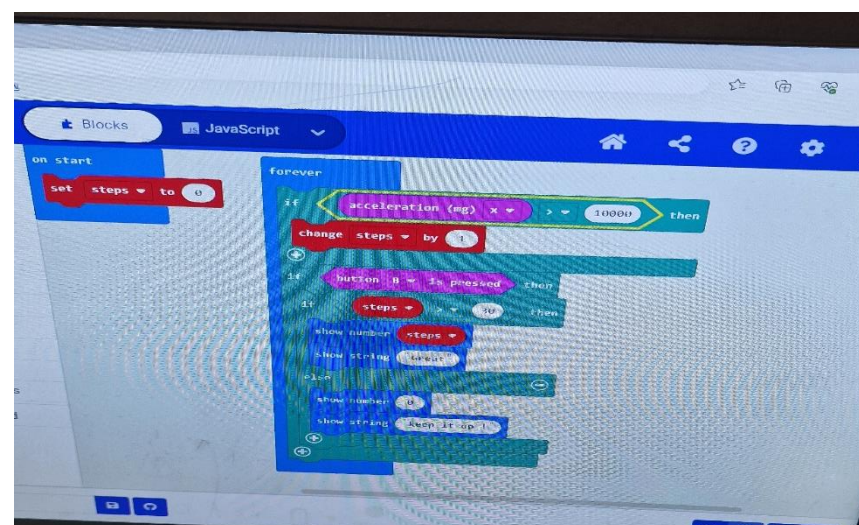
Making a step counter.



Making a step counter



Making a Step Counter



Making a Step Counter

