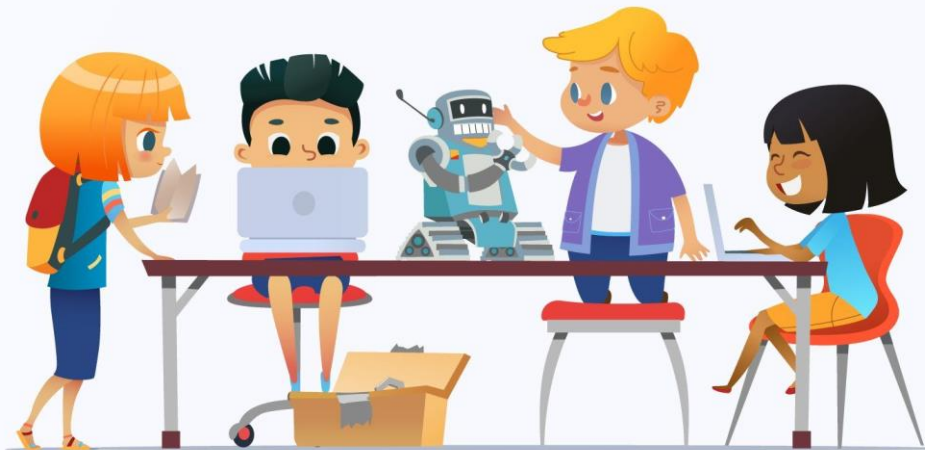# Coding with Kids

KS2/KS3

Maze Creation

Introduction

Hello!

We are a group of Stranmillis University College students who have created an online resource with the goal of encouraging young people to engage with coding using Co-Spaces. Due to the increase in blended learning and reliance on ICT, we have created a series of four lessons which can be delivered to KS2/KS3 pupils using their computers. All lessons are centred around the free version of the Co-Spaces software. Lessons can be shared with pupils online or completed in the classroom. Each lesson comes with its own video which will provide children with clear instructions and model the process of coding meaning the teachers do not need to become coding experts.

Throughout these lessons we have provided suggestions on timeframes and also how to assess learning however, these are only ideas and you should use whatever works best for your class.

Thinking Skills and Personal Capabilities (CCEA)

Managing Information
- plan and set goals and break a task into sub-tasks.
- use their own and others' ideas to locate sources of information.
- select, classify, compare and evaluate information.
- select the most appropriate method for a task.

Thinking, Problem-Solving and Decision-Making
- make links between cause and effect.
- justify methods, opinions and conclusions.
- generate possible solutions, try out alternative approaches, and evaluate outcomes.

Working with Others
- listen actively and share opinions.
- develop routines of turn-taking, sharing and cooperating; give and respond to feedback.
- suggest ways of improving their approach to working collaboratively.

Being Creative
- seek out questions to explore and problems to solve.
- experiment with ideas and questions
- make new connections between ideas/information.
- learn from and value other people's ideas.
- make ideas real by experimenting with different designs, actions, and outcomes.
- value the unexpected or surprising.
- see opportunities in mistakes and failures.

Self-Management
- organise and plan how to go about a task; focus, sustain attention and persist with tasks.
- review learning and some aspect that might be improved.
- learn ways to manage their own time.
- seek advice when necessary.

Overview of each lesson

Lesson 1

This lesson focuses on introducing pupils to co-spaces. Prior to this lesson, it is important that all pupils have created an account on Co-Spaces using their C2K email address and a memorable password. During this lesson, pupils will learn how to login to Co-Spaces, how to navigate around their virtual grid and how to insert, enlarge and remove an object.

Lesson 2

This lesson focuses on using objects such as walls to construct a maze. Prior to this lesson, it is important that all pupils have drawn a sketch of a maze using pencil and paper. This is what their online maze will be based off. During this lesson, pupils will learn how to rotate and move objects. They will also learn how to create a simple box using four walls and progress onto exploring how to create a maze.

Lesson 3

This lesson focuses on finalising their pupils' maze. By the end of this lesson, all pupils will have created their own simple maze using walls. The opportunity to explore their peers' maze should be offered (if completing the lesson during face to face learning). pupils will also learn how to insert their character who they will later code to move around the maze.

Lesson 4

During this final lesson, it may be necessary to split the activities into two separate lessons depending on the ability of your class. This lesson focuses on pupils learning to code. Pupils will be taught simple code and by the end of the lesson should be able to move their character throughout a maze using code. For example, moving forward and back, changing direction and rotating.

IMPORTANT

When delivering lessons online it is important to…

- Ensure video links are secure and no unauthorised access is granted.
- Ensure all resources are not accessible to outside parties.
- Discuss online safety with children.
- Ensure all children keep password and username safe and do not share with others.

Learning Intentions:	Introduction	Assessment Strategies	Resources
Pupils are learning to: • Develop an understanding of what is meant by the term 'coding.' • Plan, edit and present their work in a clear and coherent way. • Use co-spaces to insert and remove objects. • Use co-spaces to move, rotate and enlarge objects.	Stranmillis students will introduce themselves to the pupils and provide an overview of the series of lessons. Pupils will be shown how to login to Co-spaces. The pupils will be shown how to login to Co-spaces using modelling techniques. Pupils will also be shown how to overcome any issues they may find when creating their login details for the first time. Login details should be created prior to this lesson however, sufficient time will be provided to ensure all pupils are ready to begin. **Main Activity** Pupils will be shown around co-space and provided with basic information on the size of their plane and simple navigation techniques. The process of inserting and removing an object will be modelled for the pupils. Pupils will be given 60 seconds on the clock to copy this and insert their own object. This process will be repeated with various objects. For more advanced pupils, the process of enlarging an object will be modelled. Pupils will be given 5 minutes to insert various objects on their screen and remove these objects. **Activity 2** Moving objects- pupils will be introduced to how to move and rotate objects The process of moving an object will be modelled for the pupils. Pupils will be given 60 seconds on the clock to move their objects. Pupils will then progress into rotating objects. All processes will be modelled, and time provided for pupils to attempt this themselves. **Plenary** Pupils will be given 10 minutes to clear their screen and follow four simple instructions. 1. Insert a wall. 2. Enlarge the wall. 3. Rotate the wall 90 degrees. 4. Move the wall to the left. Pupils will then be given a further 10 minutes of 'free play' to explore the resource and insert their own objects.	Pupils will be asked to screenshot and show that they have successfully inserted and enlarged an object. This should be pasted into a word document and saved as ' Lesson one-enlarging objects' and can be forwarded to their teacher for written feedback. Pupils will be asked to screenshot their screen after instruction one and re screenshot after the final instruction. Again, these should be pasted into a word document and saved as 'lesson one- rotating an object.' – written feedback is encouraged for assessment. Pupils will be asked to leave a comment to their teacher evaluating their work, identifying two things they learnt throughout this lesson and one thing they need to work on. – this can be done via google classroom or whichever method is preferred by the school.	Laptop/ computer Co-spaces Word document Evaluations

Learning Intentions:	Main Activities/Key Content:	Assessment Strategies	Resources
Pupils are learning to: • Understand the key components of a maze. • Use co-space to duplicate objects. • Create 3D shapes using walls in co-space. • Plan, edit and correct their work.	**Introduction-** Stranmillis students will re-introduce themselves to the pupils and provide an overview of today's lesson. The process of drawing a maze will be modelled for pupils and should be similar to the work they have previously completed. Pupils will be introduced to the concept of creating mazes using co-space and encouraged to compare their mazes (created on paper) with those modelled and edit them to ensure they have a start and end point. **Main Activity** The process of duplicating a wall will be modelled for the pupils. Pupils will be given 60 seconds on the clock to copy this and insert and duplicate their wall. Pupils will then be shown how to move walls together to form a right angle and using four walls to create a box and given 10 minutes to create a box using four walls (floors and ceilings are not included). Pupils who can carry out this process with ease should be encouraged to use their extra time to enlarge and minimise their objects and explore the formation of other shapes. **Main activity 2** Creating a maze- once pupils have successfully duplicated walls, the process of forming a maze will be modelled. This will be done in simple terms to ensure all pupils are included. However, the video can be paused thus, all children can work at their own pace. (This part of the video may need replayed multiple times) **Plenary** Pupils will be given 10 minutes to recap on their learning for today. They must… 1.clear their screen. 2. Insert a wall. 2. Enlarge the wall. 3. Rotate the wall 90 degrees. 4. Duplicate the wall three times. 5. Move the walls in order to create a box Pupils will then be given a further 10 minutes of 'free play' to explore how to create a maze similar to their maze on paper. All work should be saved.	Prior to this lesson, the class teacher should check that all pupils have completed a simple maze using pencil and paper. Pupils can be assessed via verbal feedback on their work. Pupils will be asked to screen shot their screen and show that they have successfully created a box. This should be pasted into a word document and saved as ' Lesson two- creating a maze' and can be forwarded to their teacher if requested. Written feedback is encouraged for assessment purposes. Pupils will be asked to screen shot their screen after instruction one and re screenshot after the final instruction. Again, these should be pasted into a word document and saved as 'lesson two- creating a box.' Written feedback is encouraged for assessment purposes	Laptop/ computer Maze on paper Pencil, ruler and rubber

Learning Intentions:	Main Activities/Key Content:	Assessment Strategies	Resources
Pupils are learning to: • Develop 3D creation skills. • Use co-space to create simple mazes. • Create 3D arrangements using walls in co-space. • Plan, edit and correct their work. • Evaluate their learning using verbal and written feedback.	**Introduction**- Stranmillis students will re-introduce themselves to the pupils and provide an overview of today's lesson. Recap on last week. Pupils will be given 5 minutes to recap on learning from last week in order to test their knowledge and understanding. For example, "Can they move four walls together to form a box?" Pupils will be asked toKS" screen shot their screen after creating their box. This should be copied then pasted into a word document and saved as "lesson three- recap". If the teacher is present in the room, these instructions can be demonstrated before moving on or can be shared online if pupils are learning from home. **Main Activity** Recapping on the previous lesson, pupils will be reminded on how to create a simple maze by moving and rotating walls. The process of creating a simple maze will be modelled for the pupils. A more complex demonstration will also be included for pupils who are confident with the software. This will include the enlarging and minimising of objects as well as exploring the formation of other shapes to create their maze. **Main Activity 2** Pupils will be given time allocated by the teacher to complete their final maze. This should be checked by the class teacher to ensure there is a definitive start and finish with no gaps throughout the maze. **Plenary** Pupils will be given 10 minutes to recap on their learning and provided with the opportunity to work on areas they had previously struggled with. Pupils will now have created their final maze and should select their own character which will be modelled for the pupils. Pupils will then be given a further 5 minutes to select their character before saving their work and logging off.	Prior to this lesson, the class teacher should check that all pupils to decide whether to provide extra time for those who pupils are struggling. Assessment can be done by checking pupils have met the requirements of the task- was a box created? Areas of improvement should be shared. Pupils will be asked to screen shot their screen and show that they have completed their maze. This should be pasted into a word document and saved as 'Lesson three- my maze' and can be forwarded / shown to the teacher. Pupils will be asked to leave a comment for their teacher evaluating their work, identifying two things they learnt throughout this lesson and one thing they need to work on. – this can be completed via Google Classroom or whichever method is preferred by the school.	Laptop/ computer Maze on paper Pencil, ruler and rubber Co-spaces Word document Evaluations

Learning Intentions:	Main Activities/Key Content:	Assessment Strategies	Resources
Pupils are learning to: • Practise computational thinking. • Develop coding skills. • Move objects using simple coding instructions. • Plan, edit and correct their work. • Evaluate their learning using verbal and written feedback.	**Introduction** Stranmillis students will re-introduce themselves to the pupils re-capping on last week's lesson and provide an overview of today's lesson. Pupils will be introduced to coding and provided with a simple overview of how coding is done. The process of coding will be modelled for the pupils. Using the character they selected in the previous lesson, pupils will be shown how to move characters forward and back. Pupils will be given a set time, which is provided by their teacher to familiarise themselves with moving their character forward and back. **Main Activity** Pupils will be introduced to the process of rotating their characters and changing direction this will enable them to move their character clockwise and anti-clockwise to move around corners in the maze. A discussion about angles and direction may be required to ensure all pupils are working at the same level. Pupils will practise moving their character using rotations both clockwise and anticlockwise and using 90 degree and 180 degree turns. **Main Activity 2** Pupils should be given 10 minutes to explore moving their character forward and back, changing direction and rotating. Once pupils can confidently move their characters outside of the maze, they should place them at the beginning of the maze and attempt to move them throughout. Pupils can then swap with their peers and attempt to solve their partners maze in under 10 minutes. If pupils are given the opportunity to use their peers maze, feedback should be provided in the form of two stars and a wish. **Plenary** Pupils will now have created their final maze and be aware of how to code their character to move in simple ways. Pupils will then be given a further 10 minutes of 'free play' to explore how to create a maze similar to their maze on paper. All work should be saved.	After five minutes, the teacher may check in with the pupils or decide to provide extra time for those who are struggling. Assessment can be completed by checking pupils have met the requirements of the task- have pupils been able to move their character? Pupils will be asked to screen shot their screen after instruction one and re screenshot after the final instruction. Again, these should be pasted into a word document and saved as 'lesson four- coding for a maze.' Written feedback is encouraged for assessment purposes. Pupils will be asked to evaluate their learning to date using a feedback form. Pupils should tick the statements they can confidently do for example 'I can insert an object on co-space.'	Laptop/ computer, Maze on paper, Pencil, ruler, rubber, Co-spaces and Word document Evaluations

Useful Links

https://ccea.org.uk/learning-resources/coding-classroom

https://cospaces.io/edu/

https://cospaces.io/edu/teacher-management.html

https://www.youtube.com/watch?v=2WWCnNjeMzM