

Find the Afikoman

Teacher Workbook

Your students will make:

A maze on Scratch using conditionals (if statements), coordinates and repeat blocks

Equipment you will need:

- Laptops
- Logins for Scratch
- Makey Makey
- Alligator clips (6 per Makey Makey)
- Tin foil
- Coins
- Cardboard
- A range of materials that conduct and don't conduct electricity

Time needed:

1 - 3 lessons

Your students will learn:

In this lesson, your students will learn how to design a background in Scratch, as well as how to code using **events** to start their code, **coordinates** and **direction** to move sprites around the screen, **loops** for set amounts of time as well as **conditionals** so that code runs only when certain conditions are met.

They will also learn about **electricity** and what makes a **circuit** work using the Makey Makey. This will be done by testing their code with various materials to find out what does and does not conduct electricity.

Coding concepts and computational thinking:

Events: An event tells the program how it is going to start. This could be by clicking the green flag, tapping on a specific key on the keyboard or clicking on a sprite.

Loop: A loop repeats a certain action or section of code for a specific amount of time

Conditionals: Using a conditional means that the code can only run under certain conditions. Such as **if the car touches the blue background** it needs to go back to the beginning. The part of the statement in bold is the conditional. The code of going back to the beginning will only happen under those conditions.

Algorithm: A list of steps to follow in order to complete a task

Debug: Finding and fixing problems in the algorithm

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Mathematic links:

Coordinates: Sprites in Scratch are placed on the screen using a grid. When sprites want to move they need to change their coordinates. In this project, sprites are set at their start position on the x and y axis.

Direction: In this project, directions such as up, down, left and right are represented in degrees.

Up = 0

Right = 90

Down = 180

Left = -90

Science links:

Circuits: The Makey Makey uses circuits to work. One part of the circuit needs to be grounded and the other parts need to be connected to something that conducts electricity. Students need to understand that circuits need to be closed in order to work.

Electricity: Part Two of this lesson is a science exploration which encourages students to explore what does and does not conduct electricity and therefore how they can make their game controller work with the Makey Makey.

Lesson:

Introduction:

Start by showing your students the example project available [here](#). Do not show the code in the project as they will be coding the game themselves.

As we approach Pesach, traditionally the afikoman is hidden and it is the responsibility of the children to find it. In this game, the children 'hide' their afikoman at the end of the maze which they have to code their way around.

By the end of this unit, students should be able to use logical reasoning to explain how their algorithm (code) works. They should also be able to (with help for grades 3-4) debug any issues within their code.

Part One:

Students should be in pairs to follow the **student workbook** to create their maze. This should take 1 - 2 lessons to complete depending on the coding level of the students. Students should be able to work through this independently and the teacher should be available for support and guidance.

Part Two:

This lesson is the science exploration with the Makey Makey. Plug the Makey Makey into the USB port of the computer. If a popup appears asking to install a driver, close the window. This is not needed. Connect one alligator clip to the Ground bar on the Makey Makey. Connect a different alligator clip to the Spacebar. Hold onto the Ground Clip with one hand

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and with the other, touch the clip attached to Spacebar. Make sure you are touching the metal parts as this is needed to complete the circuit. More information on the Makey Makey setup can be found [here](#).

Have students test different materials to find out which ones work and which do not.

Extension: Us as humans conduct electricity which is how we are able to make the circuit work when we are connected to Ground. Can you work out how long a chain of people can be before the circuit stops working?

Part Three:

Students can choose which of the materials they wish to use for their game controller. In this lesson, they can work in their pairs to design a game controller that works with their maze.

Extension: Challenge the students to try each groups maze. Which maze was the easiest/hardest? Which controller was the easiest/hardest to use?