Grow a Tree for Tu Bishvat

Teacher's Workbook

Jewish Interactive

Your students will make:

At least two animations on the micro:bit to show the lifecycle of a tree

Equipment you will need:

- Laptop
- micro:bit

Time needed:

1 - 2 lessons

Your students will learn:

In this lesson, your students will learn how to use **inputs** on the micro:bit to control animations in a variety of patterns showing the **lifecycle** of a tree. Students will learn to **debug** their **algorithm** and will be challenged to use what they have learnt to code a new input on the micro:bit.

Coding concepts and computational thinking:

Input: The inputs on a micro:bit include the buttons A and B, the shake feature as well as the pins 0, 1 and 2 along the bottom of the device
Algorithm: A list of steps to follow in order to complete a task
Debug: Finding and fixing problems in the algorithm

Science links:

Lifecycles: Students will need to explain the lifecycle of a tree as they are working through this project

Lesson:

Introduction:
Start by showing your students a micro:bit and show them the A and B buttons. As this is an introductory activity to micro:bit, they won't have seen one before and will be unaware of how the program works.

Go to the website: makecode.microbit.org

Show students how to find the input buttons and where to find the show LED buttons.

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 debug any issues within their code.

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Part One:
This part of the workbook focuses on science and teaching students the lifecycle of a tree. Students can do research on a kid safe search engine to look for image of a tree which might help them with their program.

They can look at what trees look like at different stages of the year and how different species of trees differ in their looks.

Encourage students to write what they have found and to draw pictures which will help them when they start coding.

Part Two:
Students should follow the **Student Workbook** to create their tree patterns testing them on the micro:bit emulator as they go along. This should take 1 lesson to complete depending on the coding level of the students.
Button A should show the beginning of the lifecycle as the tree grows.
Button B will show the opposite
Students should be able to work through this independently and the teacher should be available for support and guidance.

Extension: Can students find the 'Shake' input and show the leaves falling off the tree when it is shaken? A video of this challenge can be seen here.

Once the students have finished their code, plug the micro:bit into the USB port of the computer and click the download button on the MakeCode website. Drag the downloaded file into the micro:bit external drive and wait for the program to load.

While the program is loading, the light at the back of the micro:bit will flash. When this light is solid yellow, then students can test the program on their micro:bits.

Students may now need to debug some of their algorithm so that the code works.