**Nature art**

**Lesson 4: Programming and evaluating representations**

**Introduction**

In this final lesson of the Nature art unit, pupils plan and program LED image representations of some of the flora and fauna observed on their nature walk using the MakeCode editor. They also evaluate their LED nature art and reflect on the elements of computational thinking they have used in this unit.

**Time:** @60 minutes

**Materials needed:** lesson presentation, images from nature walk, printout of images of pupils’ representations from lesson 1 or images used during lesson 1, printouts of LED planner, evaluation sheet and evaluation support sheet, laptops/computers, access to [the MakeCode editor](https://makecode.microbit.org/#editor), physical micro:bits (if you have them).

**Learning objectives**

* To use logical reasoning to predict the output of programs
* To plan and construct algorithms and programs to create LED image representations
* To evaluate programs

**Lesson summary**

* What will the program show? (5 minutes)
* Representations of the nature walk (10 minutes)
* Planning and programing representations LED Images (30 minutes)
* Evaluating LED representations (15 minutes)

**Introduction: What does the program show? (5 minutes)**

* Use **slide 3** to show the pupils 4 simple programs that all create an image on micro:bit using the LEDs. State the image (e.g. star) and ask pupils to select the program that will create that image. Discuss how abstraction has been used to create these representations and invite them to discuss and share how they worked it out to highlight their use of logical reasoning.

**Representations of the nature walk (10 minutes)**

* Display your chosen images taken during the nature walk and briefly ask pupils to recap the flora and fauna that they observed.
* Use **slide 4** to explain that pupils are going to plan and program LED representations of some of these images using micro:bit.
* Invite suggestions from the pupils as to the steps they will need to take in order to complete this task and record this as an algorithm on the whiteboard (you can also use **slide 5**).
* If a recap is needed, ask pupils to model how to create a program for a simple image using the [MakeCode](https://makecode.microbit.org/#editor) editor, and if you are using micro:bits demonstrate how to download and flash the program to a micro:bit.
* Ask a pupil to model how to add a **comment** to code (right-click on the block and select *add comment)* and invite suggestions as to why this is good programming practice (makes it easier for someone else to follow the code, helps in debugging etc). Have a brief discussion about what comments would be helpful (the image, why they have used that code etc).

**Planning and programing LED nature art (30 minutes)**

* Give pupils access to the digital images of the art work they created in lesson 1, or a selection of images taken on the nature walk.
* Ask them to work in pairs or small groups to choose and plan their LED nature art (using the image planner) before writing their programs using the [MakeCode](https://makecode.microbit.org/#editor) editor. If using micro:bit, pupils should also download their programs and flash them to their micro:bit.
* Remind pupils of the need to regularly test and debug their programs and add comments to their code.

**Evaluating LED representations (15 minutes)**

* Use **slide 6** to invite pupils to evaluate their LED nature art. Allow pupils to discuss their responses in their pairs/groups before giving them to sufficient time to independently complete the evaluation sheet.
* Use **slides 7-13** to recap on the computational thinking concepts developed in this unit (the slides give pupils a definition and they should identify the correct concept) and **slide 14** to review the learning objectives if you wish.

**Extension ideas:**

* Pupils could explore how to create a simple animation using the micro:bit by breaking their representation down into 3-5 stages. They can use the LED planner to sequence the construction of their LED nature art and then program using the MakeCode editor. An example of a completed program can be found [here](https://makecode.microbit.org/#pub:_R7ehgAa2cYPf).

**Support:**

* When evaluating, pupils could use the ‘Evaluating my LED nature art’ support sheet. If possible, this could be completed as an adult-led group where each question is discussed and a model answer scribed. In this case, pupils should complete this activity while others are discussing their evaluations.

**Stretch & challenge:**

* Pupils can be challenged to sequence their representations into one program to represent the order in which the wildlife was found on the nature walk.

**Opportunities for assessment:**

* Informal observations of pupils’ planning and programming.
* More formal assessment if wished of the pupils’ programs and evaluation sheets.