**Musical micro:bit**

**Lesson 3: Musical gestures**

**Introduction**

In this unplugged lesson, pupils revisit selection and consolidate their understanding by following algorithms that require them to carry out specified movements when conditions are met. They analyse and modify the algorithm to help them identify the structure of selection statements. Pupils consider the role of a conductor in an orchestra and how the musicians carry out actions when certain gestures are made. They then write algorithms to instruct others which notes to play on a pitched instrument when certain actions are carried out.

**Time:** @60 minutes

**Learning objectives**

* To analyse and modify algorithms
* To identify patterns in algorithms
* To write algorithms using repetition and selection

**Materials needed:** lesson presentation, printouts of slide 13, *planning an algorithm* sheet *bank of gestures* sheet, *algorithm support* sheet, a class set of pitched instruments i.e. glockenspiels, sheets of paper to write algorithms on.

**Lesson summary**

1. Introductory activity: Following an algorithm (10 mins)
2. Modifying and debugging an algorithm (15 mins)
3. Conductor algorithms (25 minutes)
4. Evaluating algorithms (10 minutes)

**Introduction: Following an algorithm (10 mins)**

* Give our copies of slide 13 and use **slide 3** to display the algorithm to the pupils. Invite pupils to make statements about the algorithm and to answer the questions on the slide.
* Explain that pupils are going to follow the algorithm displayed on **slide 4** and carry out the action when the condition in the selection statement (i.e. point at the ceiling) is met.
* Go through the algorithm together and check if pupils are carrying out the correct action. You may wish to discuss the number of times pupils carry out the action; as *forever* is used then pupils should continue doing the action until you change to another condition or stop doing that condition.

**Modifying and debugging an algorithm (15 mins)**

* Display **slide 5** and invite pupils to write further selection statements for the algorithm by adding to their copy of slide 13. When doing so, draw pupils’ attention to the pattern of indentation with the ‘If’ statement and the ‘then’ statement.
* Invite pupils to share their additional lines and add these to a class algorithm. After a few further statements have been added, select a pupil to act out the conditions in the algorithms while others respond with the appropriate action.
* Explain to pupils that the algorithm was written to get a person to carry out an action once (not repetitively) when a gesture is made. Discuss if this algorithm meets the goal and how it could be improved so it meets that goal (**slide 6**).
* Pupils work with a partner to debug the algorithm (again they should annotate their copy of slide 13).

**Conductor algorithms (20 minutes)**

* Watch the first minute of the [YouTube video](http://www.youtube.com/watch?v=aQU1i-7oCRs) which shows a conductor conducting an orchestra (**slide 7**). Highlight that the musicians have sheet music (an algorithm) to tell them what notes to play but the conductor instructs the musicians on how to play the music and when to come in. Invite suggestions on the similarities between the roles the conductor and the orchestra are carrying out and the roles they carried out when responding to the algorithm.
* Ask pupils to write a selection statement that represents the conductor’s gesture and the subsequent action of the orchestra (see example in slideshow speaker notes).
* Explain that pupils are going to write an algorithm that identifies the gestures that they will carry out to tell others what note to play on their pitched instruments (**slide 8**). Explain to pupils that they are going to use the notes low G through to middle G (commonly the first 8 notes on classroom glockenspiels).
* Ask pupils to identify any keywords or phrases they believe are essential to the algorithm. Ask pupils to explain the reasoning behind their suggestions and add words to a large sheet of paper to display during independent work.
* Display **slide 9** and explain how to use the planning sheet to identify the gestures before then writing their algorithm.
* Give pupils time to work with a partner to plan out the gestures they will use on the **planning an algorithmsheet** then to write an algorithm that shows other pupils what notes to play on a glockenspiel when certain gestures are carried out (see examples of pupils’ work on slide 14).

**Evaluating algorithms (10 minutes)**

* Give out pitched instruments and select an algorithm to share with the class by photocopying or displaying on the class interactive board. Invite the writers of the algorithm to take on the role of conductors and get them to conduct the class so they play one of their musical phrases from lesson one (**slide 10**).
* After the musical phrase has been successfully played, display the questions on **slide 11** and ask pupils to use these to help them evaluate the algorithm they just used. Invite feedback by allowing the pupils to respond to each question in turn. Suggestions of what pupils might identify in the algorithms have been included in the speaker note section of the lesson slide presentation.

**Extension ideas**

* Pupils could record a video journal of their work to explain what they have been doing and their learning.

**Differentiation**

**Support:** Pupils could use the **bank of gestures** **sheet** to help identify the movements and the **algorithm support sheet**.

**Stretch & challenge:** Pupils could be encouraged to write and test a more complex algorithm from scratch, featuring a range of conditions and gestures.

**Opportunities for assessment**

* Informal assessments of pupils’ understanding of algorithms through responding, modifying, debugging and evaluating activities carried out in whole class and paired situations.
* More formal assessment of pupils’ written algorithms if you wish.