**Data handling  
Lesson 1: Digital assistants**

**Introduction**

In this lesson that consolidates learning from the previous Microbit-based unit, students use unplugged activities to identify how more than one condition can be used with selection statements. They consider how selection might be used by digital assistants by planning and role-playing a program that selects clothes for the user based on the temperature. Students then write a program to use the BBC micro:bit as a digital assistant and compare it with other digital assistants. You will ideally need physical micro:bits to complete this lesson, although if you do not have these you can still use the simulator.

**Time:** @60 minutes

**Learning objectives**

* To read and write algorithms using selection
* To identify how a digital assistant might work
* To write a program to use a micro:bit as a digital assistant

**Materials needed:** coloured sports-bands (red, blue, green, and yellow), printouts of *micro:bit, what shall I wear today?* (**slide 10**)temperature cards (printout and cut up **slide 11**), printouts of *Digital assistant algorithm writing frame* (**slide 12** ), computers or laptops with access to the MakeCode editor, digital assistant starter and digital assistant starter support hex files, lesson presentation, micro:bits and associated hardware.

**Lesson summary**

1. Introduction: Please be quiet (10 minutes)
2. Digital assistants (20 minutes)
3. Writing programs (25 minutes)
4. Comparing digital assistants (5 mins)

**Introduction: Please be quiet (10 minutes)**

* Give out coloured sports bands to students so that each child is one of four colours (red, blue, green, yellow). Display **slide 3** and ask students to carry out the instructions based on the band they are wearing. Recap that those who meet the condition (wearing a green band) should clap five times while those who are not wearing a green band should put their fingers on their lips and make a ‘shh’ sound.
* Display **slide 4** and invite suggestions on how the algorithm has changed: the condition has changed to ‘if wearing a red band’; there is another section that says ‘else if a yellow band’; there are three possible actions to carry out. Remind students that when they use their existing understanding to make predictions on how something might work, they are using logic. Establish that those who are wearing red bands clap five times, those who are wearing yellow bands bark like a dog five times and those who are not wearing red or yellow bands put their fingers on their lips and make a ‘shh’ sound.
* Use the algorithms on **slides 5 and 6** to practise and develop students’ understanding. Display **slide 7** and invite students to create their own ‘If… then, if… else… then, else’ algorithms.

**Digital assistants (20 minutes)**

* Display **slide 8** and invite students’ ideas on what digital assistants are. Establish that they are devices that carry out actions when given instructions by a human voice. Discuss common brands that the students are familiar with (Alexa, Siri, Cortana, Google home, etc.) and the way people use them (to control lights in their home, to find out news and weather, to help with homework).
* Show **slide 9** and explain to the students that they are going to program a micro:bit to be a digital assistant that can advise them what to wear. Explore students’ initial ideas on how this might be achieved and remind them of their use of sensors, but do not over-prompt: it is acceptable for students not to formulate any ideas at this point.
* Display and provide students with printouts of **slide 10**. Ask students to suggest five items of clothing that could go in each part of the table. Allow students time to do this, then take feedback on the items and add to a class version. Explain to students that the digital assistant will pick the clothes from the list. How will it know which list to pick from? Establish that it can use the temperature sensor to check the temperature and then state the clothes from the appropriate list.
* Give out cut up temperature cards (**slide 11**) and explain to students to work in pairs and take it in turns to be the digital assistant and the user. Select two students and model how to do this.
  + The user asks the digital assistant “what shall I wear today?” In response, the digital assistant turns over one of the temperature cards that has been placed face down (this simulates the device checking the temperature) and then reads out the date values from the appropriate temperature range.
* In pairs, ask students to role-play being digital assistants and a user. After doing so, display **slide 12** and ask students to suggest how this algorithm can be completed to represent their role as a digital assistant (a completed example is included on **slide 13**). In pairs, students write an algorithm to represent the clothes they chose and their role as a digital assistant.

**Writing programs (25 minutes)**

* Explain to students that they are going to write a program to allow the micro:bit to tell them what clothes to wear based on the temperature. Display **slide 14** and click on the link (the image) to access the [digital assistant starter file](https://makecode.microbit.org/75694-49022-73484-86533) through the MakeCode editor.
* Discuss that all the blocks students need to write their program have already been selected but they have yet to be sequenced correctly into a program - this will be their task. Highlight that the ‘if button A is pressed’ block has been added to represent the question ‘what shall I wear today?’ being asked.
* Give students time to work in pairs to write a program that represents their digital assistant algorithm using the **digital-assistant-starter** hex file. Remind students to test and debug their program as they work and that blocks can be copied by right-clicking on the block and selecting ‘duplicate’*.* Note when testing using the MakeCode simulator, the temperature slider only becomes visible once button A is pressed.
* If you have access to physical micro:bits, students can download and transfer their programs to them and test out their digital assistants.
* A [completed example](https://makecode.microbit.org/#pub:_XaPeMpJ4xULW) program is also provided with the lesson downloads.

**Comparing digital assistants (5 mins)**

* Display **slide 15** and explain that digital assistants, such as Alexa, do not use temperature sensors when suggesting what you should wear, instead they use the weather forecast.
* Ask students to think, pair, share opinions on whether this is a better method than using a temperature sensor. Examples that the students could give are included in thespeaker notes section.
* Invite students to think/pair/share their learning in this lesson and the unit and discuss as a class, reviewing the learning objectives on **slide 16** if you wish.

**Extension ideas**

Students could design an application to run on a digital assistant. They could write an algorithm to show the voice commands and the actions and then present their ideas by role-playing.

**Differentiation**

**Support:** Students could use the **digital-assistant-starter-support** hex file which has a partially completed program.

**Stretch & challenge:** Students could be challenged to write their program without the support of the **digital-assistant-starter** hex file.

**Opportunities for assessment**

* Informal assessment of students’ understanding of using data with selection through discussion and role play.
* More formal assessment of students’ algorithms and programs.