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Grade	6	Subject	DT	Lesson number	1	Week number	8
Unit		Date		Time		Page number	
4		WC: 03/03/19		45 minutes		96-102	
Equipment required:				Learning objectives			
student book computer Ardublockly Software Maker				4.1 Understand the concept of iteration.			
Keywords				looping, repetition, iteration, count with			
Starter/Introduction activity							
Time 10 minutes	Start by going through the unit 4 overview, the keywords and learning outcomes for the unit.						
Main							
Time 30 minutes	Introduce looping, also known as repetition and iteration, then explain the blocks we use for looping in Ardublockly. **Activity 1** Complete activity 1 to summarise the purpose of the loop blocks in Ardublockly. Teacher answers 1. The repeat times block is used to repeat a fixed number of times. 2. The count with block uses a variable to repeat within a range of changeable steps. 3. The repeat while/until block is used for repeating until a condition is met. Before moving on go through the correct answers with the class. Move onto programming the Maker to count from 1 to 10. Emphasise how time-consuming this is without using a loop. Opportunity for the teacher to demonstrate the programming here. **Count from 1 to 10 step-by-step guide** Students should follow the step-by-step guide to program the Maker to count from 1 to 10. Encourage strong students to add more blocks to the program to count to 20. Assist students with programming where required.						

	Teacher Answer  Check the students' progress with the program. Once complete, emphasise again how inefficient this was to program then move to activity 2. **Activity 2** Complete activity 2 to consider how long programming without looping could take for a program counting to 5000. Consider the benefits of looping (less programming blocks) which can be programmed quicker (more efficient). Teacher Answers How long will it take to create a program to count to 5000 while only using the display number block? D) 4+ hours What type of programming could we use to create a faster count program? Any of the following: looping, loops or repetition Before the end of the session, go through the correct answers with the class.
Plenary	
Time 5 minutes	Summarise lesson, recapping the Learning objective and the key vocabulary used.

Assessment focus	Students should understand the purpose of repetition (iteration/looping) and the types of blocks we use in Ardublockly to program repetition. They should also understand the inefficiency of some programs that do not use repetition.

Grade	6	Subject	DT	Lesson number	2	Week number	8
Unit		Date		Time		Page number	
4		WC: 03/03/19		45 minutes		102-105	
Equipment required:				Learning objectives			
student book computer Ardublockly software Maker				4.2 Practise using loop blocks to make programs more efficient.			
Keywords				looping, repetition, iteration, do until			
Starter/Introduction activity							
Time 5 minutes	Remind students about the counting program and how time-consuming and inefficient it was to create. Then move onto programming the Maker to count from 1 to 10 using a loop. Opportunity for the teacher to demonstrate programming again here.						
Main							

Time 35 minutes	**Count from 1 to 10 using a loop step-by-step guide** Students should follow the step-by-step guide to program the Maker to count from 1 to 10 using a loop. Assist students with programming where required. Challenge the students to change the program to count to 20. They can plan the changes to the program in the space provided in the textbook. Finally challenge the students to change the program to count down from 10 to 1. Again, they can plan the changes to the program in the space provided in the textbook. Teacher Answers Count to 10  Count to 20  Countdown from 10 to 1  Before moving on, go through the correct answers with the class. Remind students to save the program so they can use it again later. Move onto activity 4 to consider the function of another program with a loop.

<table>
<tr><td></td><td>Activity 4
This activity is about analysing the blocks in a program to identify its function. This should allow the teacher to check the students' understanding of loop blocks.

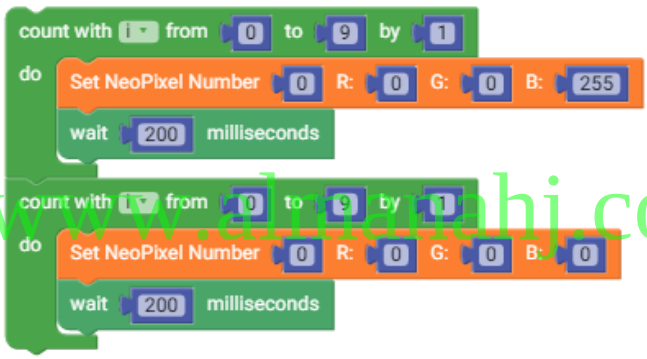
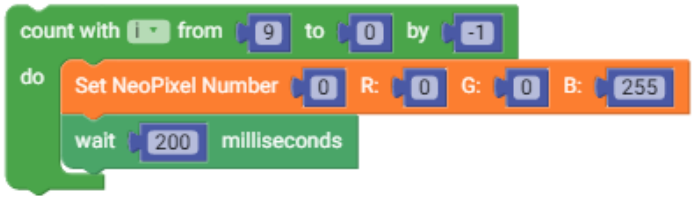
Teacher Answer
What does the program above do? Tick the correct answer [√]
<table><tr><td>Displays 200 on the Maker LED grid</td><td>Displays the number 10 on the Maker LED grid</td><td>Displays a count from 1 to 10 on the Maker LED grid</td></tr></table>
Before the end of the session, go through the correct answers with the class.

</td></tr>
<tr><td colspan="2">Plenary</td></tr>
<tr><td>Time
5 minutes</td><td>Summarise lesson, recapping the Learning objective and the key vocabulary used.</td></tr>
<tr><td>Assessment focus</td><td>Students should use a loop block to program the Maker to output a count from 1 to 10, 1 to 20 and 10 to 1. They should also demonstrate an understanding of the programming by identifying the purpose of another example program using a loop.</td></tr>
</table>

Grade	6	Subject	DT	Lesson number	3	Week number	8
Unit		Date		Time		Page number	
4		WC: 03/03/19		45 minutes		106-109	
Equipment required:				Learning objectives			
student book computer Ardublockly Software Maker				4.2 Practise using loop blocks to make programs more efficient.			
Keywords				NeoPixels			
Starter/Introduction activity							
Time 5 minutes	Start the lesson by introducing NeoPixels and explain how they are numbered anti-clockwise and that each NeoPixel can be programmed individually using its number. Move onto programming the NeoPixels.						
Main							
Time 35 minutes	**Lighting the NeoPixels step-by-step guide** Students should follow the step-by-step guide to light the NeoPixels. Like in the first counting program, this program emphasises its inefficiency. Assist students with programming where required. Challenge students to change the program to show the UAE colours (Red, Green and White). They can plan the changes to the program in the space provided in the textbook. Teacher Answers below:						

	<table><tr><td>Light the NeoPixels</td><td>Red, Green and White Allow any similar solution:</td></tr><tr><td>  </td><td>  </td></tr></table> Before the end of the session go through the correct answers with the class.
Plenary	
Time 5 minutes	Summarise lesson, recapping the Learning objective and the key vocabulary used.
Assessment focus	Students should understand the NeoPixels and use the NeoPixel block to light all 10 NeoPixels. Then they should change the program to output the colours red, green and white.

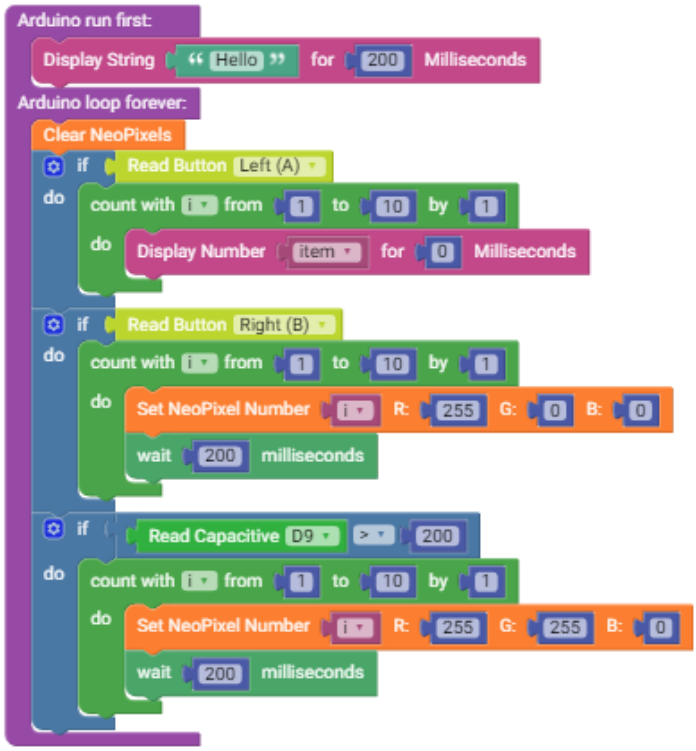
Grade	6	Subject	DT	Lesson number	1	Week number	9
Unit		Date		Time		Page number	
4		WC: 10/03/19		45 minutes		109-114	
Equipment required:				Learning objectives			
student book computer Ardublockly Software Maker				4.2 Practise using loop blocks to make programs more efficient.			
Keywords				NeoPixels, RGB values, looping			
Starter/Introduction activity							
Time 5 minutes	Remind the students about NeoPixels then introduce the NeoPixel RGB block and explain how RGB values are used to set the colours. Then move onto activity 5 to practise using the NeoPixel RGB block.						
Main							
Time 35 minutes	**Activity 5** Complete activity 5 by programming the NeoPixels using the NeoPixel RGB blocks shown in the book and answering the questions. Challenge the students to identify the RGB values for yellow. Teacher Answers 1. What colour does a NeoPixel output by setting the R: G: B: values to:  Red 2. What colour does a NeoPixel output by setting the R: G: B: values to:  Green 3. What colour does a NeoPixel output by setting the R: G: B: values to:  Blue 4. Try setting any of the R: G: B: values to either **0** or **255**. Then identify the R: G: B: values needed to output yellow. R: 255 G: 255 B: 0 Before moving on, go through the correct answers with the class. Move onto lighting the NeoPixels using a loop.							

	Light the NeoPixels using a loop step-by-step guide Students should follow the step-by-step guide to light the NeoPixels using a loop. Assist students with programming where required. Challenge students to change the program to turn the NeoPixels off. They can plan the changes to the program in the space provided in the textbook. Finally, challenge students to change the program to light the NeoPixels clockwise. They can plan the changes to the program in the space provided in the textbook. Teacher Answers below: Turn NeoPixels off  Light NeoPixels clockwise  Before the end of the session, go through the correct answers with the class.
Plenary	
Time 5 Minutes	Summarise lesson, recapping the Learning objective and the key vocabulary used.
Assessment focus	Students should use the RGB NeoPixel block to program the NeoPixels using a loop then change the program to turn the NeoPixels off and light them clockwise.

Grade	6	Subject	DT	Lesson number	2	Week number	9
Unit		Date		Time		Page number	
4		WC: 10/03/19		45 minutes		115-123	

Equipment required:	Learning objectives
student book computer Ardublockly Software Maker	4.3 Use sequence, selection and repetition techniques in programs. (G6.3.4.6.2) 4.4 Test different events included in a program. (G6.3.6.2.1) 4.5 Insert meaningful comments to explain the program. (G6.3.6.2.1
Keywords	NeoPixels, RGB values, looping

Starter/Introduction activity	
Time 5 minutes	Start by reminding students about sequence selection and repetition. Then introduce the program to demonstrate these programming structures and its requirements. The program will use Sequence to: • output "Hello" when the program starts. The program will use selection and repetition to: • output a count to 10 on the LED grid using button A as input. • light NeoPixels red while using button B as input. • light NeoPixels yellow using Pin Pad (D9) as input.
Main	
Time 35 minutes	**Sequence, Selection and Repetition step-by-step guide** Students should follow the step-by-step guide to create a program that uses sequence, selection and repetition. This is an opportunity for students to demonstrate their programming skills. Assist students with programming where required. Challenge the students to plan and add extra blocks to light the NeoPixels yellow when pin pad D9 is touched. They can plan the changes to the program in the space provided in the textbook. Teacher Answer below:



Check student progress and then move onto activity 6.

Activity 6

Complete activity 6 on testing the events in the program by ticking either yes or no for each. Students should explain what went wrong or how they can improve the program for events where they answered no.

Adding meaningful comments step-by-step guide

Students should then follow the step-by-step guide to add meaningful comments to the sequence, selection and repetition program. Remind students to save the file so they can use it again later.

End the session by recapping what we have learned so far using the Unit 4 Summary.

End of unit quiz

Prompt students to complete the end of unit 4 quiz.

Teacher Answers

1. NeoPixels are programmed using RGB values.
(True)
2. Using loops (repetition) can make a program more efficient.
(True)
3. Which two blocks have you used to output on the Maker using NeoPixels?
(Set NeoPixel, Set NeoPixel RGB)
4. Which block have you used to program loops (repetition)?
(Count with)

	5. Commenting on code or blocks is bad practice. (false)
Plenary	
Time 5 minutes	Summarise lesson, recapping the Learning objective and the key vocabulary used.
Assessment focus	Students should use their skills to create a program that uses sequence, selection and repetition. They should test and add comments to the program. They should demonstrate their knowledge by completing the end of unit quiz.

<table>
<tr><td>Grade</td><td>6</td><td>Subject</td><td>DT</td><td>Lesson number</td><td>3</td><td>Week number</td><td>9</td></tr>
<tr><td colspan="2">Unit</td><td colspan="2">Date</td><td colspan="2">Time</td><td colspan="2">Page number</td></tr>
<tr><td colspan="2">5</td><td colspan="2">WC: 10/03/19</td><td colspan="2">45 minutes</td><td colspan="2">126-133</td></tr>
<tr><td colspan="4">Equipment required</td><td colspan="4">Learning objectives</td></tr>
<tr><td colspan="4">student book
computer
Ardublockly software
Maker</td><td colspan="4">5.1 Understand the buzzer peripheral and use it within programs.
5.2 List some connections between elements of mathematics and computer science. (G6.2.4.1.1)</td></tr>
<tr><td colspan="4">Keywords</td><td colspan="4">buzzer, mathematics, Computer Science, elements</td></tr>
<tr><td colspan="8">Starter/Introduction activity</td></tr>
<tr><td>Time
5 minutes</td><td colspan="7">Start by going through the Unit 5 overview, the keywords and learning outcomes for the unit. Introduce the Buzzer feature and the blocks used to program it.</td></tr>
<tr><td colspan="8">Main</td></tr>
<tr><td>Time
35 minutes</td><td colspan="7">Move on and explain the links between maths and computer science then complete Activity 1.

Activity 1
Complete Activity 1 by matching computer science elements and mathematics elements. This will allow students to make links between mathematics and the computer science elements we have used this term.
Teacher Answers
<table>
<tr><th>Computer science elements</th><th></th><th>Mathematics elements</th></tr>
<tr><td>Numeric calculations
(algebra)</td><td rowspan="4"></td><td>Algebra</td></tr>
<tr><td>Conditional statements
(decision maths (logic))</td><td>Numbers</td></tr>
<tr><td>File storage (uses binary 1 and 0)
(numbers)</td><td>Coordinates, shapes</td></tr>
<tr><td>Computer graphical output
(Coordinates, shapes)</td><td>Decision maths (logic)</td></tr>
</table>

Move on and show the video of the maker piano and then challenge the students to make their own piano by following the step-by-step guide</td></tr>
</table>

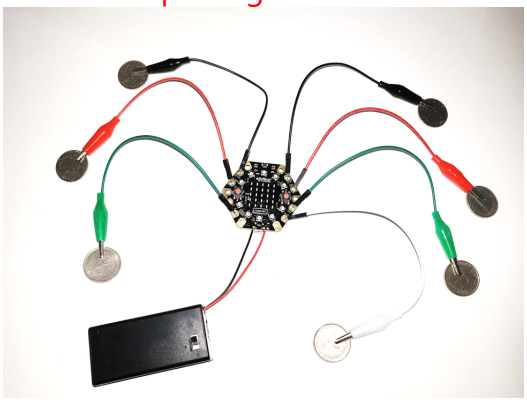
and using the schematic. This is an opportunity for students to use the crocodile clips and pin pads for input along with a schematic before the final project.

Maker Piano step-by-step guide

Students should then follow the step-by-step guide to program the maker piano. Then use the schematic to connect the crocodile clips and coins or other conductive materials to use as the keyboard.

Teacher Answers below:

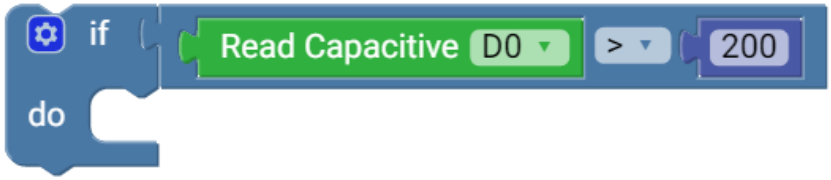
Maker setup using coins:



When students have finished programming allow some time to play with their Maker piano. Remind students to save the file so they can use it again later.

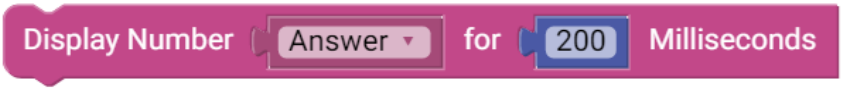
Plenary	
Time 5 minutes	Summarise lesson, recapping the learning objective and the key vocabulary used.
Assessment focus	Students should understand the links between Mathematics and Computer Science. They should be able to program the Maker using read capacitive and use crocodile clips and conductive material to for the musical instrument using the schematic.

Grade	6	Subject	DT	Lesson number	1	Week number	11
Unit		Date		Time		Page number	
5		WC: 24/03/19		45 minutes		134-140	
Equipment required				Learning objectives			
student book computer				5.3 Demonstrate an understanding of the final project and requirements.			
Keywords				project, project brief, planning			
Starter/Introduction activity							
Time 5 minutes	Start the lesson by introducing the Maker calculator project, including the stages, project requirements tasks and the requirement to complete all projects tasks by working independently.						
Main							
Time 35 minutes	Give students two minutes to discuss the project in pairs or groups then move onto Activity 2. **Activity 2** Complete Activity 2 by writing down notes and ideas about the project in the discussion box. Teacher Answers There are no teacher answers for Activity 2. It is an opportunity to make sure students understand the project before they begin assessed independent tasks. Move onto Activity 3 which is the first independent task. **Activity 3** Students must then answer the project brief questions independently. Teacher Answers 1. The aim of the project is to program the Maker to behave as a calculator. (True) 2. What will we use as the inputs for the calculator program? (Pin pads) 3. What variable data type will we use for calculation results? (Number) 4. What will these blocks be used for in the project program?						



(Input)

5. What will these blocks be used for in the project program?



(Output)

Move onto Activity 4 to complete the planning for the project independently.

Activity 4

Complete Activity 4 using the descriptions to match the inputs and processing for the project calculator program.

Teacher answers

Description	Input		Processing
Input pin pad (D3) add 1 to Answer	Read Capacitive D3 (Answer +1)		Answer + 1
Input (D10) subtract 1 from Answer	Read Capacitive D10		Display Number Answer; Play Tone: Frequency 100
Input (D6) will output Answer and play the buzzer	Read Capacitive D6 (Display number answer, play tone)		Answer - 1
Input (D2) will add 5 to Answer	Read Capacitive D2 (Answer +5)		Answer × 2
Input (D9) will subtract 5 from Answer	Read Capacitive D9 (Answer -5)		Answer - 5
Input (D0) will multiply Answer by 2	Read Capacitive D0 (Answer x2)		Answer + 5
Input (D12) will reset the program	Read Capacitive D12		set Answer to 0

	Teacher should mark the project questions and planning activity using the teacher answers and the evaluation rubric. This can be done during or after the lesson.
Plenary	
Time 5 minutes	Summarise lesson, recapping the learning objective and the key vocabulary used.
Assessment focus	Students should demonstrate their understanding of the project by answering the project questions and having completed the planning of the project by matching inputs to processing for the project program.

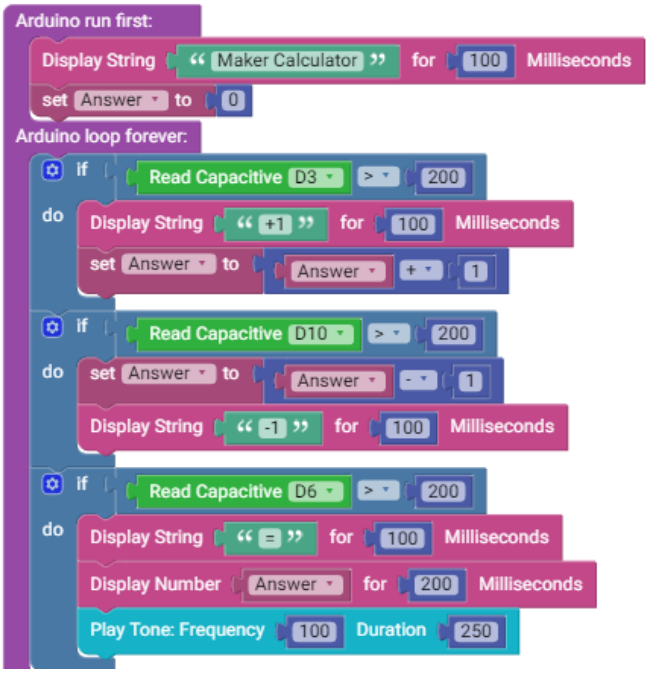
Grade	6	Subject	DT	Lesson number	2	Week number	11
Unit		Date		Time		Page number	
5		WC: 24/03/19		45 minutes		140-145	

Equipment required	Learning objectives
student book computer Ardublockly software Maker	5.4 Apply your skills to use variables, conditional statements, iteration and mathematical operators by in the final project.
Keywords	programming

Starter/Introduction activity

Time 5 minutes	Start the lesson by reminding students about the Maker calculator project and the requirement to complete all projects tasks by working independently. Explain that students will now use the planning from Activity 4 and the step-by-step guide to create the project program in Ardublockly.

Main

Time 35 minutes	**Programming the calculator step-by-step** Students should now follow the programming the calculator step-by-step instructions along with the planning for the program (activity) and the schematic to create the calculator program in Ardublockly and download it to the Maker. Teacher Answer 

When students have finished programming, they should screenshot and print a copy of the blocks used for the program. This evidence of work should be placed in the student work box provided in the student book.

Teacher should mark the program blocks against the requirements using the teacher evaluation rubric. This can be done during or after the lesson.

Plenary	
Time 5 minutes	Summarise lesson, recapping the learning objective and the key vocabulary used.
Assessment focus	Students should demonstrate their programming skills to program the Maker calculator in Ardublocky and then use crocodile clips and conductive material to create the interface using the schematic.

Grade	6	Subject	DT	Lesson number	3	Week number	11
Unit		Date		Time		Page number	
5		WC: 24/03/19		45 minutes		146-150	

Equipment required	Learning objectives
student book computer Ardublockly software Maker	5.4 Apply your skills to use variables, conditional statements, iteration and mathematical operators by in the final project.
Keywords	Programming

Starter/Introduction activity	
Time 5 minutes	Start the lesson by reminding students about the Maker calculator project and the requirement to complete all projects tasks by working independently. Ensure students have completed and downloaded their program to the Maker. Some students may need additional time. Explain that students should now move onto Activity 5 to test the project program against the basic requirements.
Main	
Time 35 minutes	**Activity 5** Complete Activity 5 by testing the program and answering the questions about the requirements for the program using yes or no responses. You can allow students to make changes to improve the program if required before completing the test table. Any changes made should be explained in the box below the testing table. **Activity 6** Complete Activity 6 to reflect on their performance in the project by choosing the appropriate answer for each section. Students then need to choose an appropriate area and explain how they could improve future performance. Teacher should mark the testing and self-reflection using the teacher evaluation rubric. This can be done during or after the lesson. Final marks should then be submitted to the learning management system.

Plenary	
Time 5 minutes	Summarise lesson, recapping the learning objective and the key vocabulary used.
Assessment focus	Students should have tested the project program against the requirements and evaluated their own performance to identify areas where they can improve performance in future.