This case study has been provided courtesy of the Manchester Robot Orchestra Project and was prepared while the three schools recorded here were involved in the ‘Tinker Tailor Robot Pi’ project 2014-2016. Please acknowledge the schools and the Manchester Robot Orchestra Project if you use this material.

Website: http://www.robotorchestra.co.uk/
Case Study L: Manchester Robot Orchestra Challenge

Themes: Enablers for EHoM - curriculum alignment through computational thinking and coding, robots, music

The Manchester Robot Orchestra Project is led by Professor Danielle George MBE at the University of Manchester. Participating schools were tasked with creating a robotic instrument which would play alongside members of the Halle Orchestra. TTRP schools that participated were Christ the King Primary School, Sacred Heart Primary School and Seymour Park Primary School.

The Robot Orchestra project provided an opportunity for pupils to tackle a creative engineering challenge which drew upon computing skills and EHoM. In creating and programming their robotic instruments, pupils used a range of computational thinking concepts identified by Barefoot Computing.

When designing their instruments, pupils decomposed the project during the process of creating the instruments and with the instrument itself. The robotic drummer engineered by Sacred Heart School could be decomposed into the mechanical mechanism for the arms, the drum blocks and the robot body. Pupils wrote algorithms specifying the movement of the servo motors used to generate sound. In the case of Christ the King Primary School, the algorithm described the movement of beaters to play the xylophone keys, including the angle they must move through the time pattern of when the notes were struck. Since patterns features heavily in music, the recognition and use of patterns was key to efficient coding. After designing their instruments, pupils created and coded their robots. They regularly tested and debugged code, again employing computational thinking skills. For example, when they decomposed code into sections, running a section at a time to pinpoint bugs, they employed a logical mindset to ‘think through’ the action of each block of code.