



PROGRESS OUTCOME 4

# Keeping a watch on your fitness

## Context

The kura holds an annual wearable arts competition as part of its arts and cultural curriculum. Students must work in teams of two or more and complete their entries within one term. Their outcomes are judged by year groups before being displayed at the wearable arts evening. Local businesses and charitable groups sponsor prizes.

One category requires students from two or more different specialist subjects to collaborate on the design and development of an outcome. Jade and Aniwaha have worked together on an entry in this category.



## Insight 1: Design and construction decisions

My friend, Aniwaha, is very skilled at fabric construction, and I'm good at building and programming circuits. We decided to together make a 'health watch' that would remind its wearer to complete activities for improving their health and well-being.

We came up with the idea of a wristband with LEDs. The LEDs would display a sequence that would prompt the user to exercise and that they could change to show that they had completed the exercise.

As the electronics expert, I had to understand the components and their functionality to ensure that they worked well in the finished outcome. I knew that the components had to be as compact as possible, so that our wristband would be lightweight and comfortable for the wearer.

We decided to sew an electronics board and battery holder into a wristband. We selected ultra-bright LEDs that could be chained together.

We sketched out our initial design ideas (including possible symbols for the user interface) and got feedback from potential end users, which helped us develop specific criteria.



## Insight 2: Installing and testing components

I investigated how to sew the components on and connect them using conductive thread, while avoiding any short circuits. Building the circuit proved to be the biggest challenge – securing the components using the thread was a much more complex task than I had expected, but working with Aniwha meant we could problem-solve together and find ways to make everything work.

Once the components were sewn on and connected, we tested the LEDs to ensure they were visible on the fabric we'd chosen. The LEDs allowed for multiple colours, so we plugged the electronics board into my computer and used an open source microcontroller to modify the code to select the most appropriate colours.



## Insight 3: Meeting end-user requirements

We then trialled the wristband with end users. This raised a concern with the functionality and design of the user interface, so we adjusted the symbols on the wristband to make sense to the wearer – so that, for example, they didn't put it on the wrong way round.

Finally, we tested the connectivity of the circuits under different physical situations. We used a range of students completing different fitness activities: skipping, a beep test, gymnastics, and cheerleading. The wristband fitted our chosen testers well and stood up to the activities.