**Heart rate monitor plan**

**Introduction**

In this activity, students learn how to measure their heart rate and create a prototype of a heart rate monitor.

**Time:** 55 minutes+

**Learning objectives**

* To understand the importance of activity to help keep the heart healthy
* To measure the effect of different activities on heart rates
* To create, test and evaluate a prototype heart rate monitor using the micro:bit

**Materials needed:** lesson slides, rough paper, large sheets of paper, MakeCode editor, micro:bits, battery packs, Heart rate monitor hex files

**Activity and heart disease (5 minutes)**

* Give groups of students large sheets of paper and ask them to share their understanding on why regular exercise is important to prevent heart disease **(slide 2).**
* Discuss their ideas as a class.

**Measuring heart rates (10 minutes)**

* Ask students to consider the impact on their heart rate of different activities **(slide 3).**
* Give out scrap paper and as a class try different forms of activity and record their heart rates in a simple table **(slide 4).**
* Discuss the results and themes as a class (i.e. which activity got their heart rates up the most, which helped to calm the heart rate down, which could easily be incorporated into daily routine, what else could they try etc.).

**Designing a heart rate monitor (15 minutes+)**

* Share the prototype with students and ask them to consider how it could be helpful and how they think it is programmed to work **(slide 5).**
* Explain you would like them to design their own heart rate monitor using the micro:bit and give out large sheets of paper for them to use to create their paper design, which could include a drawing and an algorithm to explain how it works (see **slide 6** for an example algorithm).
* Depending on your students you may need to go through some of the concepts used (e.g. iteration, selection and variables) so they can write their algorithm.

**Coding a heart rate monitor (15 minutes+)**

* Invite students to write their program using the MakeCode editor and their paper design, offering support where needed **(slide 7).**
* Example code is given below and on **slide 8.**
* Encourage students to work through any problems logically, help each other and regularly test and debug their code.
* Once they have a working program, students can download it to their micro:bit to test out their heart rate monitor and debug it as necessary.

**Reviewing learning (10 minutes)**

* Invite students to swop heart rate monitors and test them out.
* Review successes and common issues as a class, encouraging problem solving skills (slide 9).
* Ask students to give simple evaluations of their work and approach to creating their heart rate monitor.