Gladiators Inventor Workshop #1
The micro:bit and sports technology

Estimated duration: 1hour 10mins

Lesson Overview
In this lesson, pupils will explore the functions of the BBC micro:bit and understand how its features can be used to create sports and wellbeing gadgets for The Gladiators to use to help improve their performance. They will investigate existing sports technology used to create sports and wellbeing gadgets which the Gladiators can use to help improve their performance. Such as pedometers and heart rate monitors, and learn how similar devices can be created using the micro:bit. The lesson will emphasise how technology can be applied to improve fitness, performance, and wellbeing.

Learning Objectives:
Pupils will be able to:
- Understand the basic functions of the BBC micro:bit.
- Explore how sports and wellbeing technology works and its applications.
- Learn how to mimic the functionality of sports gadgets using the micro:bit.
- Develop an awareness of how technology can be used to enhance physical fitness and wellbeing.

Curriculum Links:

England: Design and Technology (KS2)

Pupils should be taught to use research and develop design criteria to inform the design of innovative, functional products that are fit for purpose.

Scotland: Technologies (Second Level)

I can extend knowledge and understanding of engineering disciplines to create solutions (TCH 2-12a).

I can use a range of graphic techniques, manually and digitally, to communicate ideas (TCH 2-11a).

Wales: Curriculum for Wales (Progression Step 3)

I can creatively respond to the needs and wants of the user, based on the context and on the information collected.

Northern Ireland: The World Around Us (KS2)

Pupils will be able to understand how knowledge in science supports technological inventions.

Materials Needed
- Computers or tablets with internet access (optional)
- Images of sports and wellbeing gadgets for demonstration (included at the end of this document)

Gladiators are you ready? Teacher are you ready?

Lesson Outline
Introduction (5 mins)

Start the lesson by watching the short introduction video to the Gladiators micro:bit challenge, found on the BBC Teach micro:bit website;
https://www.bbc.co.uk/teach/microbit/gladiators/zc6b7v4

This video introduces the design challenge and gives some examples to springboard the pupils' imagination.

Main activity

Part 1: Sports Technology (5 mins)

Continue the lesson with a discussion about technology in sports and wellbeing. Ask the children if they can name any gadgets that they know of that help people stay fit and healthy (e.g. pedometers, heart rate monitors, smartwatches).
Present examples of existing sports and wellbeing gadgets, for example:

- **Pedometer:** Tracks steps taken during the day.
- **Heart Rate Monitor:** Measures heart rate during exercise.
- **Fitness Tracker:** Monitors various fitness activities, sleep, and overall wellbeing.
- **Smartwatch:** Combines features like pedometer, heart rate monitor, and more.

Can the children name any other examples of sports technology?

Part 2: Introducing the BBC micro:bit (10mins)

N.B. Depending on the children's experiences with the micro:bit, the following section can be used as way of introducing it to the class for the first-time, or as a quick recap for those that have used it in the past but could do with a quick reminder. Alternatively, if your children are very familiar with the micro:bit, you may choose to leave this part of the lesson out and move onto the research activity.

Introduce the BBC micro:bit and explain that it is a small, programmable device with a range of features that can be used to create similar gadgets.

Exploring the micro:bit's Features

Showcase the micro:bit's basic functions: LED display, accelerometer, compass, buttons, and Bluetooth. A diagram of the micro:bit is available at the end of this document. Full explanations of the micro:bit functions, as well as child-friendly explainer videos, can be found on the micro:bit website: **https://microbit.org/get-started/features/overview/**

Explain that the micro:bit is a pocket-sized programmable computer that can be used to create fun and interactive projects - like games, music, or simple gadgets. It has a number of really interesting features such as:

1. **LED Display:** The micro:bit has a small screen made of 25 tiny lights (LEDs) that can show pictures, numbers, and words.
2. **Buttons:** There are two buttons (A and B) and a touch-sensitive logo on the front that you can press to control games, start timers, or send messages.
3. **Accelerometer:** This is like a movement sensor inside the micro:bit that can tell when you shake it, tilt it, or move it in different directions.
4. **Compass**: The micro:bit has a tiny compass that knows which way is north, so it can tell you the direction you're facing.
5. **Bluetooth radio:** The micro:bit can talk wirelessly to other devices, like your tablet or another micro:bit, to share information or play games together.
6. **Pins:** On the bottom, there are connectors called pins that you can use to attach other electronics; like lights, speakers, or sensors.
7. **Temperature Sensor**: The micro:bit can measure how hot or cold the object it's placed on is, just like a thermometer.
8. **Light Sensor:** The micro:bit can also sense how bright or dark it is by measuring the light around it using the LED display.

Part 3: How could the micro:bit be used in sports and wellbeing technology? (10 mins)

Lead a discussion with the children on how they think the different features of the micro:bit could be used to develop a useful tool for the Gladiators to improve their performance, fitness and/or wellbeing. Some simple examples are below:

LED Display *Example - Reaction Time Training:*
In sports that require quick reflexes, the LED display can be used to create a reaction timer. The micro:bit could randomly light up one or more LEDs, and the user would need to press a button as quickly as possible, with the time taken displayed on the LEDs.

Accelerometer *Example - Pedometer:*
In sports that require quick reflexes, the LED display can be used to create a reaction timer. The micro:bit could randomly light up one or more LEDs, and the user would need to press a button as quickly as possible, with the time taken displayed on the LEDs.

Radio *Example - Exercise bike speed contest:*
When a micro:bit receives a message, it can react by showing a message, making a sound and more. By attaching a micro:bit to the systems of two exercise bikes and linking them by radio, two Gladiators can compete in who is pedalling faster.

Ask the pupils what other ways they think the features of the micro:bit could be used to develop a sports technology gadget to help the Gladiators. Write down the children's ideas, discussing the merit and practicalities of each suggestion.

Part 4: Pupil Activities: Researching Sports and Fitness Technology for The Gladiators (15 mins)

N.B. If time is an issue for the pupils to carry out their own research, you can lead a discussion with the children instead, using images of the suggestions below (a selection of images are at the end of this document). Alternatively, you can task the pupils to analyse specific products and report back for a class discussion.

Divide the children into small groups. Each group will use tablets, laptops, or books/brochures to research different types of sports technology, such as wearable tech, smart gym equipment, timers, hydration monitors etc. Provide a few starting points for their research, such as:

- **Heart Rate Monitors:** Devices that measure your heart rate to ensure you're exercising within a healthy range.
- **Smart gym equipment:** These machines track reps, sets, and power output, while also offering real-time feedback during training sessions.
- **Smartwatches:** Multi-functional devices that can track fitness data, show notifications, and even monitor health metrics.
- **Timing Gates:** Used in sprint training. These systems measure the exact time it takes for athletes to run between two points, commonly used in speed and agility drills.

Encourage each group to focus on one type of sports technology and consider answers to the following questions:

- **What does the device do?**
- **How does it help athletes improve or help people stay healthy?**
- **What features make it useful for sports or fitness?**

As the children are researching, ask each group to think about how the micro:bit could be used to mimic or enhance the sports technology they researched. Prompt them with questions like:

- How could the micro:bit's LED display show important information, like a step count or heart rate?
- Could the accelerometer be used to track movement, similar to a fitness tracker?
- How could the micro:bit be used by a Gladiator during training?
- Could the micro:bit help the Gladiators improve specific skills like speed, strength, or balance?

Part 5: Presentation and Discussion (20 mins)

Each group will present their findings and ideas to the class. They should explain:

- **The fitness or wellbeing tech they researched.**
- **Their idea for a micro:bit-powered gadget that could help a Gladiator.**

After each presentation, lead a short discussion on how feasible their ideas are and what challenges they might face in creating such a gadget.

Plenary (5 mins)

Recap the different types of wearable technology discussed and how the micro:bit can be a powerful tool for creating similar gadgets.

Encourage the children to continue thinking about how technology can be used to solve real-world problems, especially in sports and fitness.

Assessment

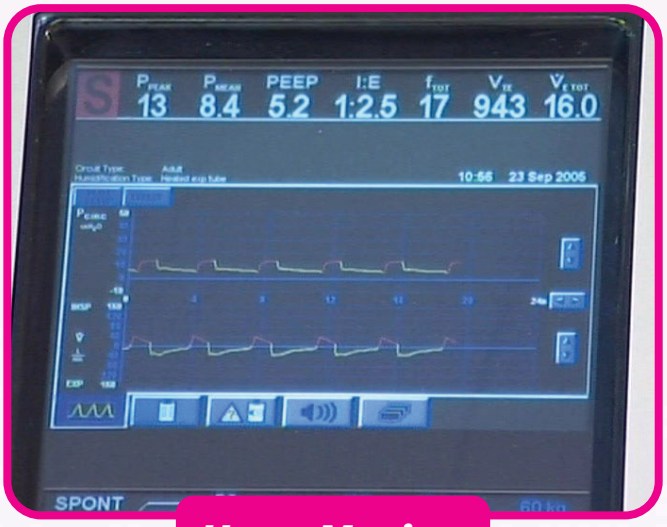
Observe the children's participation in discussions and activities.

Review the research activity for their understanding of the micro:bit's functions and how they can be applied in sports technology.

Assess the children's ability to connect the micro:bit's features with real-world sports and wellbeing applications.

Notes:

Check out the other Gladiators Inventor Workshops for more Design & Technology activities!



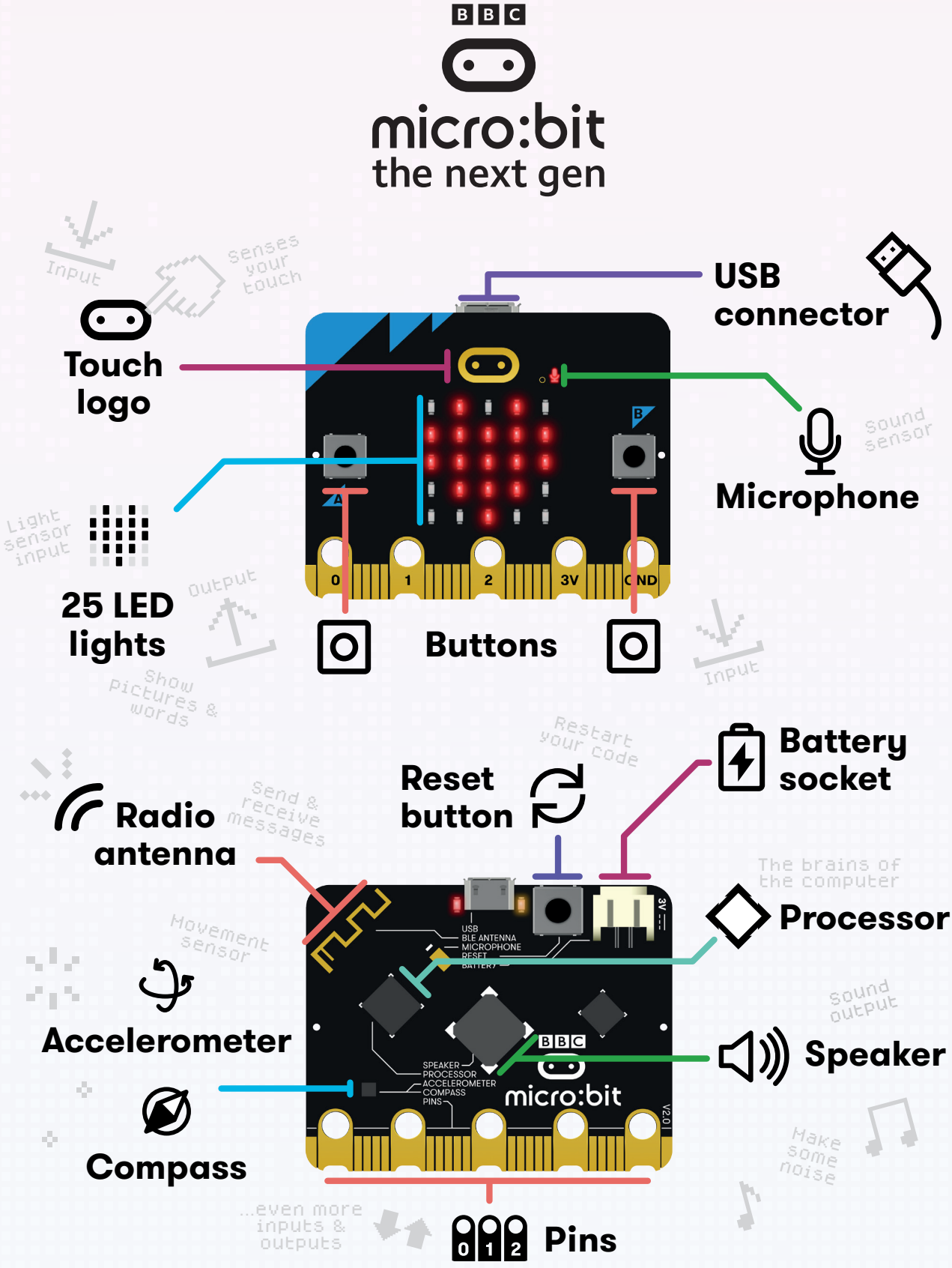
Heart Monitor

Timing Gate

Smart watch

Smart Gym Equipment

micro:bit
the next gen



micro:bit NOMINET

For further information and teaching resources visit bbc.co.uk/microbit