

micro:bit Step Tracker

Build a gadget that counts your steps and celebrates when you reach a goal - using the virtual micro:bit in your web browser.

Name: _____ **Patrol:** _____ **Date:** _____

What you need: a laptop with internet, and a pencil. No account, no download, no real micro:bit.

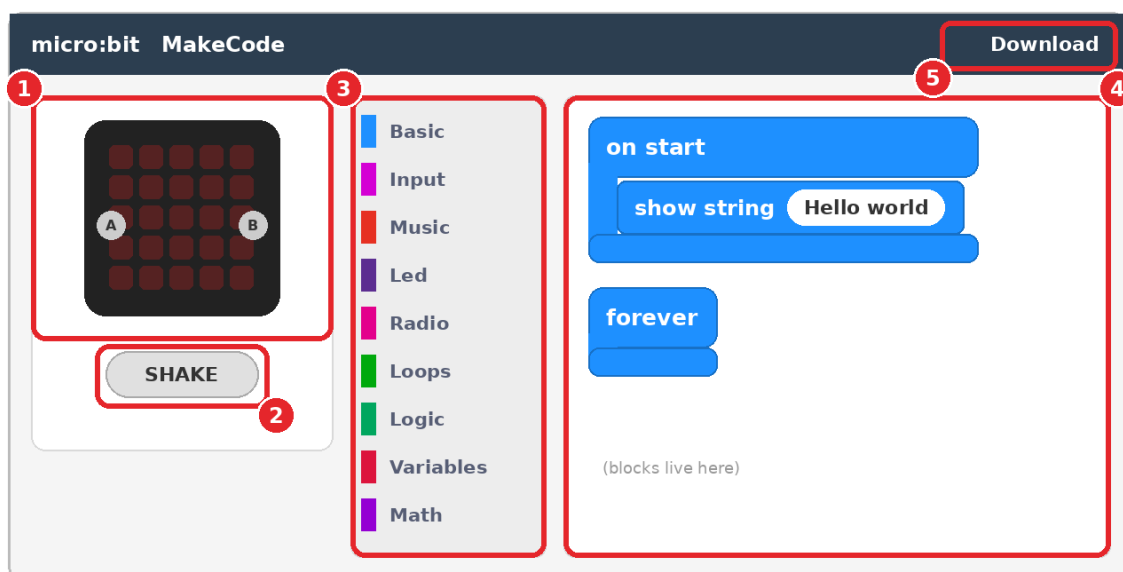
Time: about 60-75 minutes.

The plan

A step tracker has a sensor that notices when you move. The micro:bit has one built in, called an **accelerometer**. Each time it feels a shake, your program will add 1 to a number called **steps** and show it on the 25 red lights. When you hit your goal, it flashes a picture you have designed yourself.

Part 0 - Open the editor

- 1 Open a web browser and go to **makecode.microbit.org**.
- 2 Click **New Project**, type the name **Step Tracker**, and click **Create**.
- 3 Look at the picture below. Find each of the five parts on your own screen.



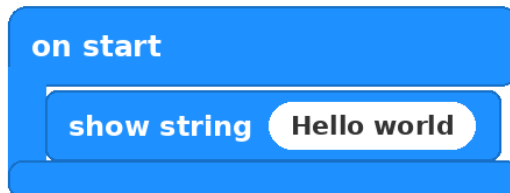
Drawing of the MakeCode editor. Your screen may look slightly different, and the top bar will have other buttons.

- 1 **The virtual micro:bit** (simulator). It runs your program as soon as you change it.
- 2 **SHAKE button**. Click it to pretend to shake the micro:bit. You can also move your mouse quickly across the micro:bit picture.
- 3 **Toolbox**. Click a colour to open its drawer of blocks.
- 4 **Workspace**. Drag blocks here and click them together like jigsaw pieces.
- 5 **Download**. Saves a file that would run on a real micro:bit. You will not need it today, but this is how a real gadget gets its program.

Part 1 - Say hello (warm-up, 5 min)

Before building the tracker, check you know how to use blocks.

- 1 Click the blue **Basic** drawer. Drag **show string** into the **on start** block so it clicks into place.
- 2 Click on the white box that says *Hello!* and type your own message, for example your name.
- 3 Watch the virtual micro:bit. The message scrolls across the lights.
- 4 Click the **restart** button under the simulator to watch it again.



Your blocks should look something like this.

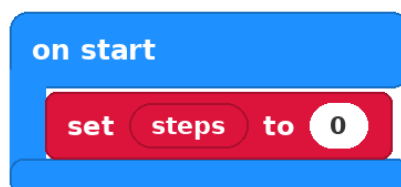
Question: The **on start** block runs once when the micro:bit switches on. Why might a step tracker need something to happen on start?

Part 2 - Count steps (20 min)

Step A. Make a variable

A **variable** is a labelled box that remembers a number. Ours will be called **steps**.

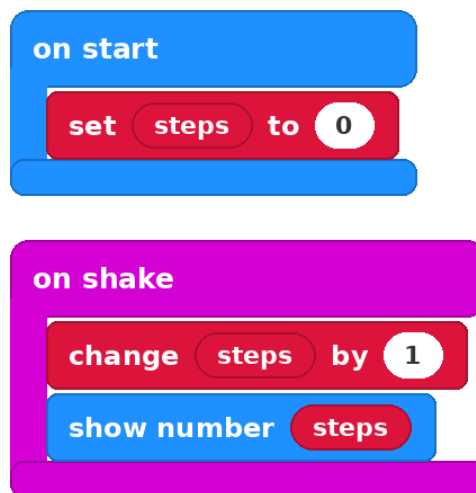
- 1 Click the red **Variables** drawer.
- 2 Click **Make a Variable...**, type **steps**, and click **OK**.
- 3 Remove the show string block from Part 1 (drag it back to the toolbox).
- 4 Drag **set [steps] to 0** into **on start**. If the drop-down shows another name, change it to **steps**.



Your first block should look like this.

Step B. Count each shake

- 1 Click the **Input** drawer. Drag the **on shake** block into an empty part of the workspace.
- 2 From **Variables**, drag **change [steps] by 1** inside **on shake**. Check the drop-down says **steps**.
- 3 From **Basic**, drag **show number** in underneath.
- 4 From **Variables**, drag the round red **steps** block onto the **0** in **show number**. It drops in like a plug.
- 5 Click the **SHAKE** button on the virtual micro:bit. Do it several times.



Everything from Part 2 together.

Test 1. Click SHAKE 5 times. What does the display show? _____

Test 2. Click **restart** (under the simulator), then shake twice. What number do you see?

Why do you think the number went back to the start?

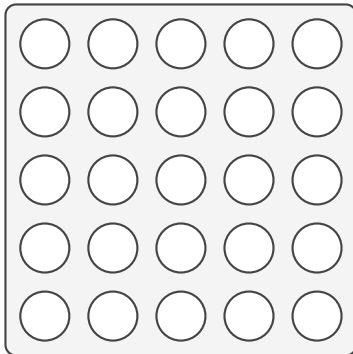
Stuck? Nothing happens when you shake: check that **change** and **show number** are *inside* the on shake block (its C shape wraps round them). The number is only shown on the simulator if the program has no red error marks.

Part 3 - Celebrate a milestone (20 min)

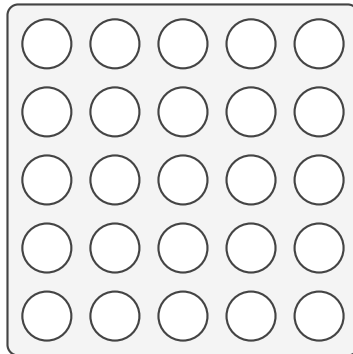
A good tracker rewards you. Your gadget will show a picture when you reach **10** steps. (In a real tracker this might be 10,000, but 10 is quicker to test.)

Step A. Design your icon

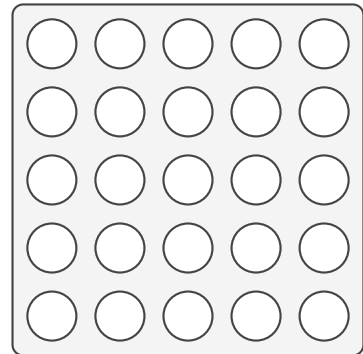
Use the grids below. Colour in the squares you want lit. Make a picture that means something to Scouts or to your goal: a boot, a star, a tent, a fleur-de-lis, a flame, a smiley.



Design 1



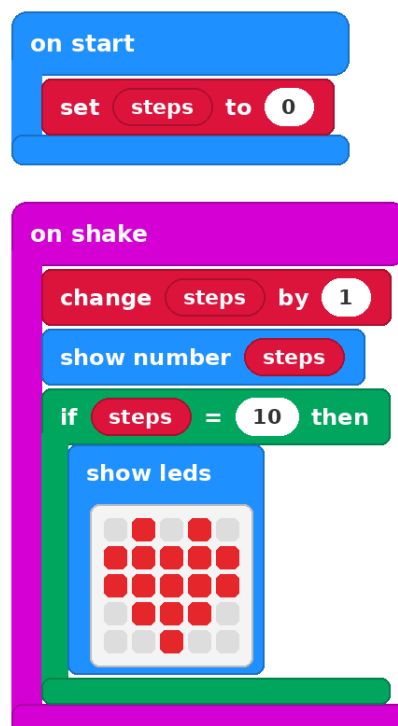
Design 2



Design 3

Step B. Add the if block

- 1 Click the green **Logic** drawer. Drag the **if true then** block in underneath **show number**, still inside **on shake**.
- 2 Back in **Logic**, find the comparison block **0 = 0** and drop it onto the word **true**.
- 3 From **Variables**, drag the round **steps** block into the left slot of the comparison.
- 4 Click the right slot and type **10**. This reads: *if steps = 10 then...*
- 5 From **Basic**, drag **show leds** inside the **if**. Click the little squares to switch lights on or off so they match your design.
- 6 Click **restart**, then click SHAKE ten times. Your icon should appear on the tenth shake.



The finished program, shown with a heart icon. Yours will have your own design.

Think about it: The number 10 shows first, then your icon. Why does the display need a moment before the icon shows? What would happen if you kept on shaking to 11?

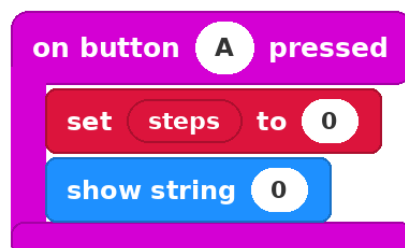
Part 4 - Turn it into a gadget (15 min)

A program on its own is not a gadget. A real step tracker needs to be worn or carried. On a real micro:bit you would add a battery pack and fix it to a strap. Plan yours on paper.

Where will it be used? Which Scouting activity: a hike, a wide game, a camp?	
How will it be worn or carried? Wrist, pocket, boot lace, rucksack strap?	
What materials would you use? Think: strap, card, battery pack, velcro, tape, waterproof bag.	
Draw it in the box below, and label the parts.	

Extension challenges (if you finish early)

- 1 Reset button.** Add an **on button A pressed** block (Input) that sets **steps** to 0 and shows a 0. Test it: shake a few times, then click A on the virtual micro:bit.
- 2 Second milestone.** Add a second **if** for 20 steps with a different icon.
- 3 Show progress.** Add **on button B pressed** to show the number of steps on request.



Reset button, using the blocks from the first extension challenge.

Part 5 - Problems and fixes (for the presentation)

The badge asks you to explain the challenges you met and how you solved them. Fill this in as you go.

What went wrong or was tricky?	What did you try?	What fixed it?

Show a leader

☐ My program counts shakes and shows the number	Leader initials: _____
☐ My icon appears at 10 steps	Leader initials: _____
☐ I have planned how it would be worn in a Scouting activity	Leader initials: _____
☐ I can explain a problem I met and how I fixed it	Leader initials: _____

Saving your work

- 1 At the bottom of the editor, click the project name box and check it says **Step Tracker**. Add your name.
- 2 Click the **Download** button. A file ending in **.hex** is saved. That is the program a real micro:bit would run.
- 3 Give your leader the file or take a screenshot of your blocks so it can be shown or loaded later.