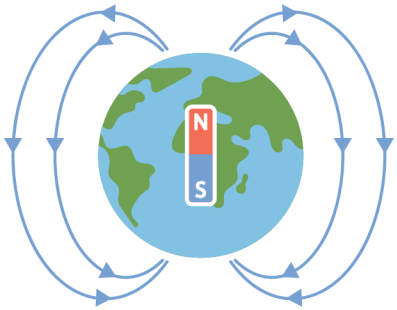
Investigating the world around us

The Earth is a giant magnet!

The Earth has a magnetic field, just like a bar magnet, with a north and south pole. This invisible field stretches all around our planet and helps compasses work by pointing us toward magnetic north.



What's a magnetometer?

A magnetometer is a tool that measures magnetic fields. Scientists use them to explore the Earth, find metal underground, and even detect submarines in the ocean!

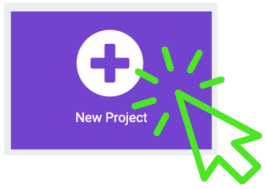
Your micro:bit has a built-in magnetometer!

Use your micro:bit to detect magnetic fields in your environment. Try scanning metal gates, benches, rocks with iron in them, or even the ground! You might be surprised where magnetic fields show up!

Connect your micro:bit to your computer and let's get coding!

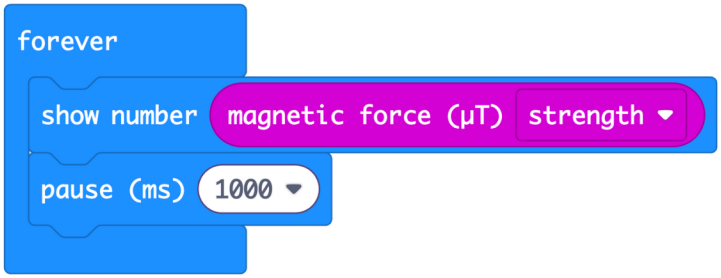
https://makecode.microbit.org/

Click on 'New Project' and give your project a name.



micro:bit magnetometer / compass sensor.

Here is the code for this project.



This program scrolls a number across the LED display screen that represents the overall magnetic field strength detected by the magnetometer.

Investigating the world around us

Compass

In this project we are using the micro:bit's built in magnetometer to turn it into a compass that helps you find north.

Connect your micro:bit to your computer and let's get coding!

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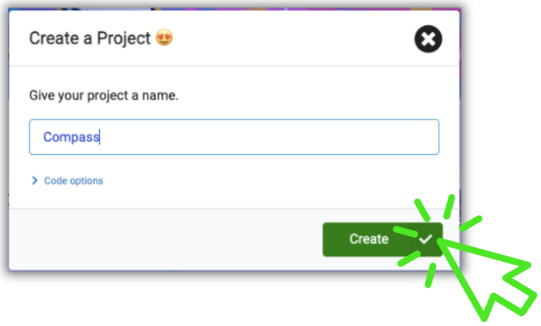
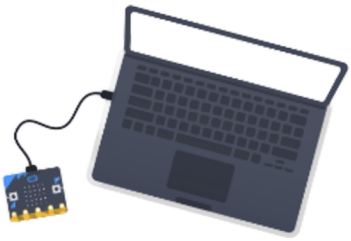
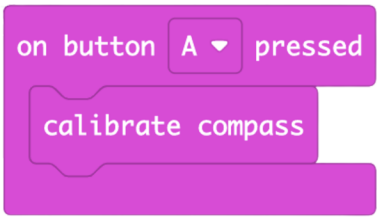
Click on 'New Project and give your project a name.





Here is the code for this project.



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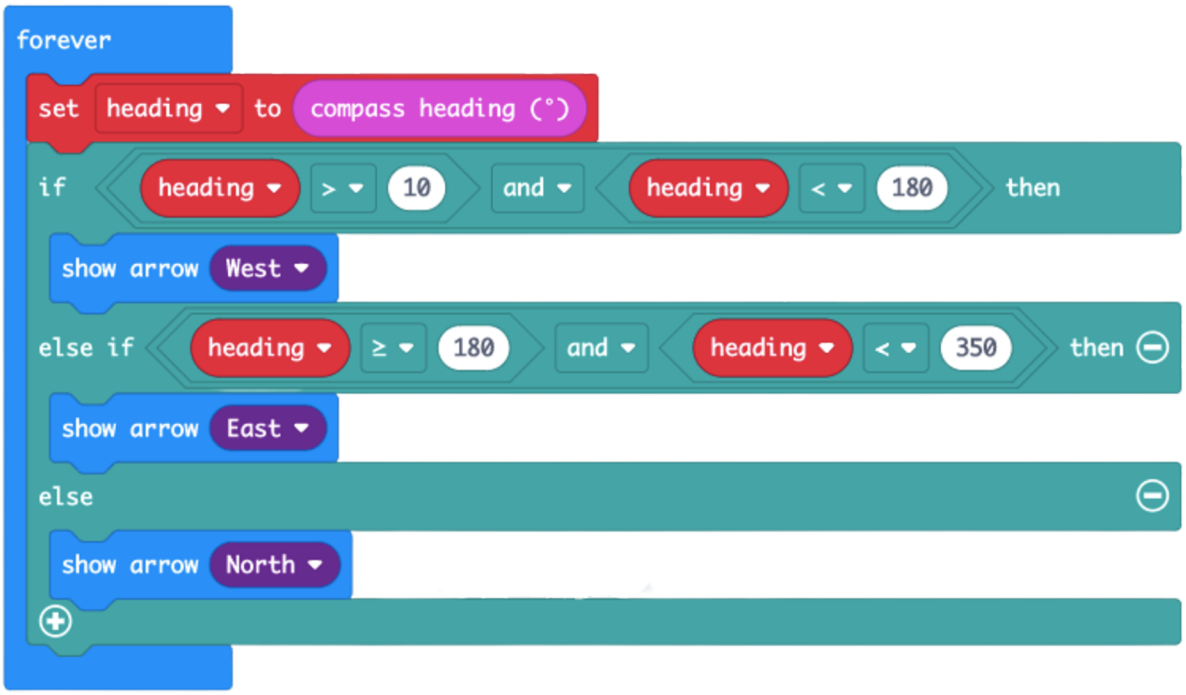
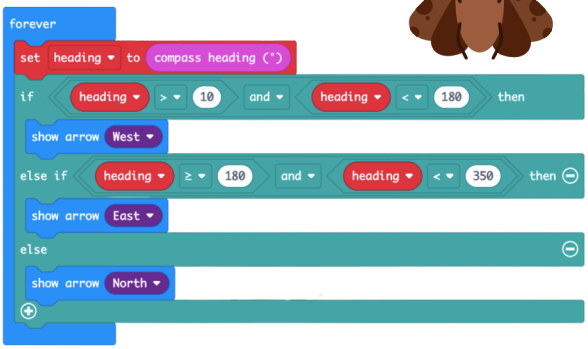


Investigating the world around us

How to use your micro:bit compass.

Calibrate your compass by pressing the A button. A mini game will appear on the screen where you tilt the micro:bit to light up all the LED. This helps it understand its position. Once calibrated, attach a battery pack and take your micro:bit outdoors for a walk! Be sure to stay away from large metal objects, computers or household appliances, as these can interfere with the compass sensor.

This digital compass works differently from a traditional one. Instead of pointing north continuously, it tells you which direction to turn to face north - like a guide giving you clues as you move.



0 degrees is north.

If the heading is between 10 and 180 degrees, you are facing east, so the micro:bit shows a west arrow ( ) to tell you to turn left toward north.

If the heading is between 180 and 350 degrees, you are facing west, so it shows an east arrow ( ) to guide you right toward north.

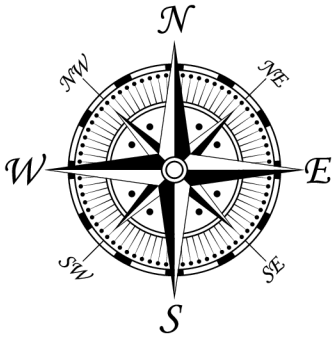
If the heading is between 350 and 10 degrees, you are facing north.

Hold your micro:bit flat and level.

If the arrow points left or right, turn in that direction until it points straight ahead - that means you're facing north!

How it works:

- Facing east? Arrow points left (turn left).
- Facing west? Arrow points right (turn right).
- Facing north (350–10°)? Arrow points forward - you've got it!

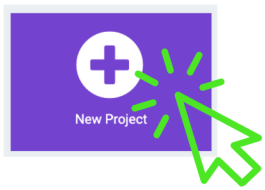


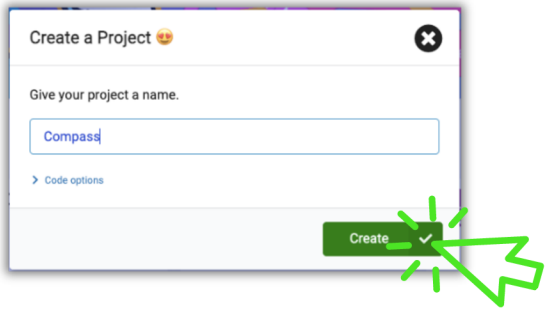
Try this:

Can you confuse the compass with a magnet?

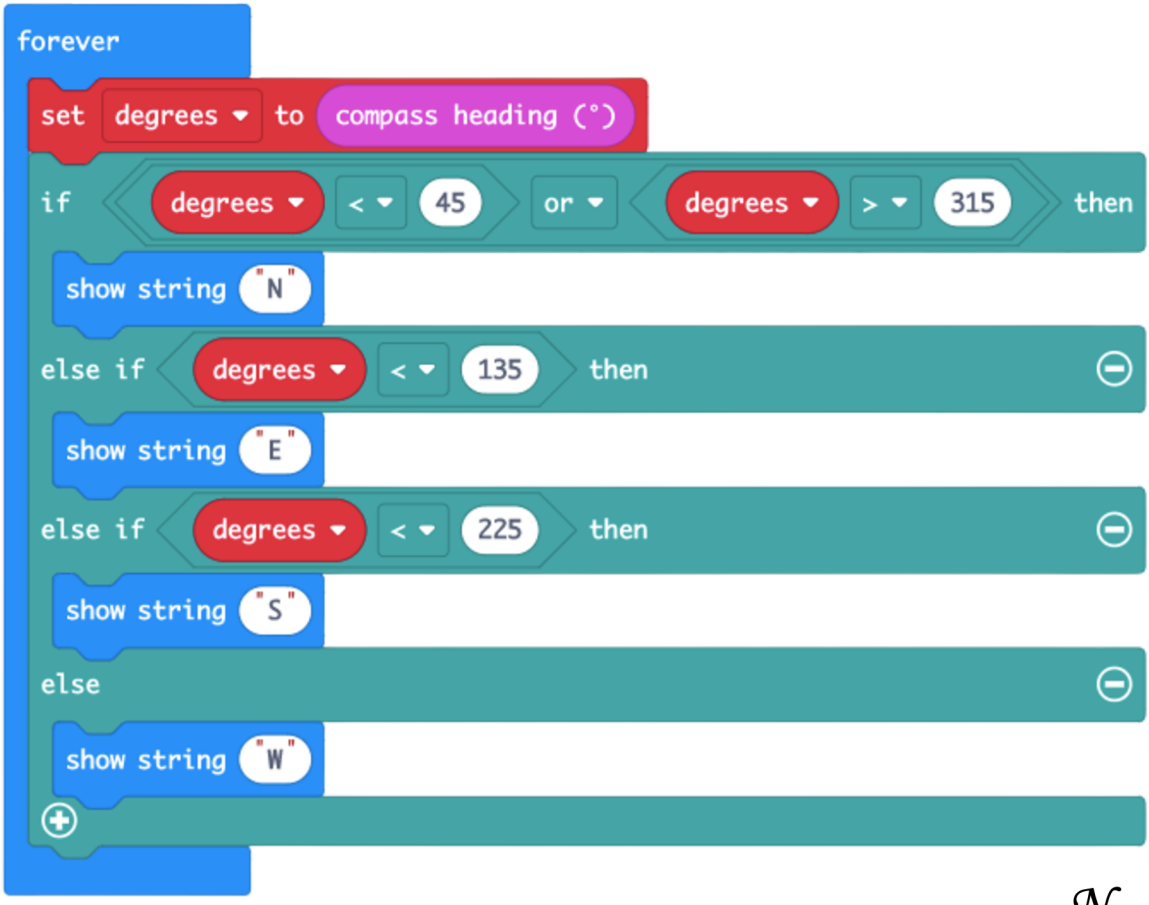
Investigating the world around us

Compass 2



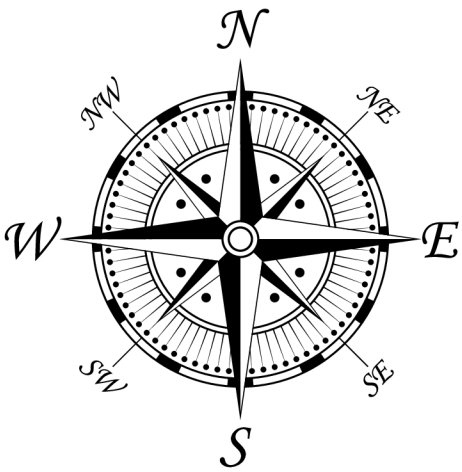


Here is the code for this project.



Challenge 1

Can you program your micro:bit so that it shows 8 compass points? e.g. N, NE, E, SE, S, SW, W, W and NW.?



Challenge 2

Design an application that uses a micro:bit compass.
I'd love to see what you come up with!

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Compass

A compass measures direction in degrees, from 0° to 360°.

0° (or 360°) = North
90° = East
180° = South
270° = West

Use your micro:bit to find the heading. The number tells you which direction you're facing!