Balance Bot

Challenge students to program their rover to always try and stabilise itself. When complete, the rover will always turn and drive upwards on any tilted surface. Once the surface the robot is driving on is flat, it should stop moving. This means the robot will balance on a seesaw. Students will need to use data from the accelerometer to control the motors based on the orientation of the rover.

Relevant Coding Skills

Iteration Algorithm Design Maths

Relevant Rover Concepts

Motors Accelerometer

Exercise Setup

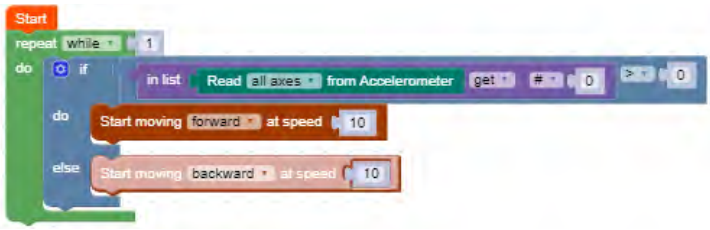
We use a large hard cover book for this challenge as a platform. Any flat surface that can be moved and tilted will work. When the object is tilted the rover should move up the surface in an attempt to stabilize. When the surface is flat the rover has found balance and will not move.

For this exercise you can also use a seesaw style balance board or a circular wobble board. We use a seesaw board build from 2 pieces of wood as pictured.

Here's Our Approach

Stage 1

Using an **IF statement** block, we can check if the x axis of the **accelerometer** is above or below zero. If its above, we can use a **motor block** to move forward, otherwise we can use the **motor block** to move backwards.



Stage 2

To make the rover move smoothly and make fine adjustments, we can use the **scale number** block to scale the X axis between -1 and 1 to -30 and 30 for the **motor block**.

Stage 3

To make the program also work for a circular board we need to also take into account the Y axis of the **accelerometer**. We can use the same **scale number** block to create a variable called rotation, which we can include in our **motor block**. Since our speed variable determines the speed the motors move forward or back, the rotation modifier needs a + or - sign. We need this sign because the robot rotates by making its tracks move in opposite directions.