The Ogden Trust STEM challenge.

Measure g (*) using a Raspberry Pi

Tick the boxes as you go.

*TEAM NAME:*_____

1. ☐ Attach the Raspberry Pi to the equipment using the cables. Plug in the Micro USB power cable last. While it's booting….
2. ☐ Think up a team name and write it above. Your Pi should now be booted.
3. ☐ Wire up your Battery and Relay as per the Ball Bearing dropper diagram and a screwdriver. Ask a helper if you are stuck.
4. ☐ Time to get the PiFace working. Open up the Python IDLE program on the Desktop. File->Open->Desktop->Gravity->gravity.py.
5. ☐ Read through the code to see how it works. Run it and drop some ball bearings. (You can simulate having a pressure plate by pressing Switch S1 on the PiFace). See diagram for Switch S1.
6. ☐ Make a pressure plate switch using aluminium foil, cardboard and sellotape.
7. ☐ Attach the pressure plate to the PiFace using two wires as per the laminated diagram.
8. ☐ You need to enter a height for your ball bearing above your pressure plate in the Python program. Measure this using the tape measure. Height = _____ metres.
9. ☐ Test the finished program by running it a few times. When you are happy, record some values in this table.

Distance ball bearing falls (m)	Ball Bearing diameter [3.15 / 6.3 / 10mm](mm)	Length of time to fall (s)	Acceleration due to Gravity (ms^{-2})

10. ☐ Calculate the mean Acceleration due to Gravity and write your answer below. [hint: look under Start menu->Accessories on the Pi] Ask if you are unsure how to calculate this.

Our team measurement of acceleration due to gravity is _____ ms^{-2}

Think about: How could we make the magnet stronger? What would happen if we changed the height? What would happen if we used a magnetic tennis ball? Is this experiment very accurate? Why? Is there a different way to measure the same thing?

*1: Acceleration due to Gravity.