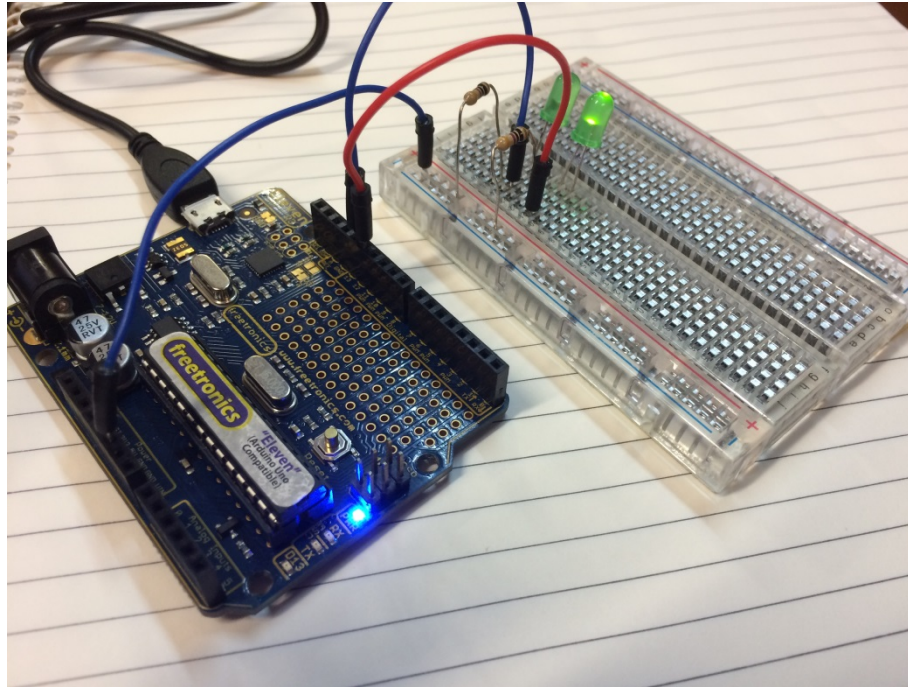


# STEM at Keysborough College



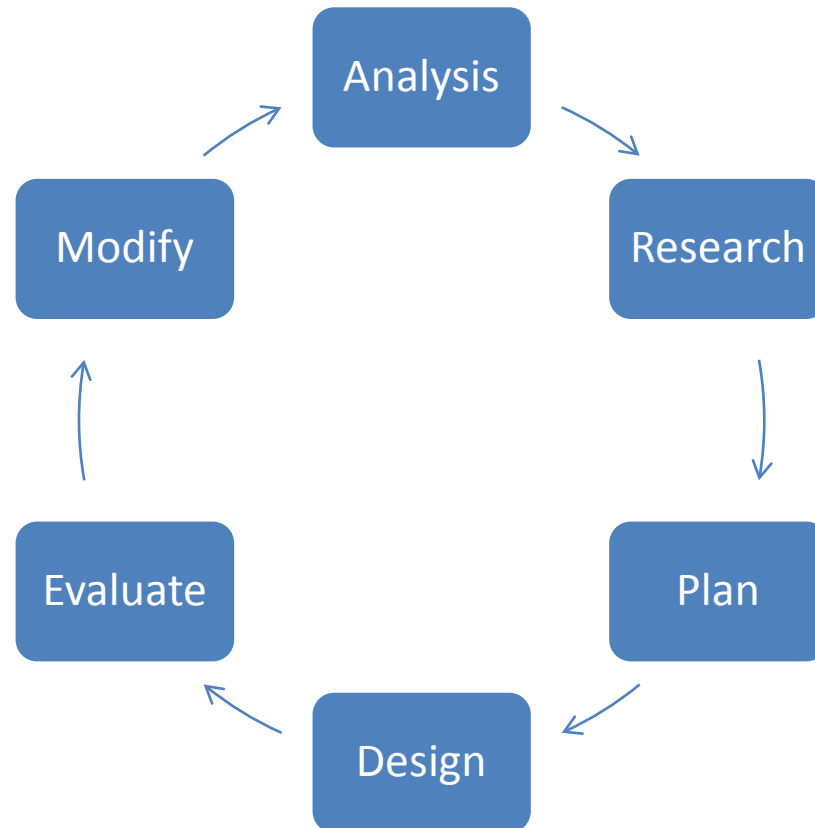
**KEYSBOROUGH  
COLLEGE**

# Context

- Select entry Year 10 science stream
  - 3x75 minute “Core Science” (Chemistry, Physics, Biology)
  - 3x75 minute “STEM Projects” (Robotics, 3D printing (OpenSCAD), Programming, Bridge building and engineering)

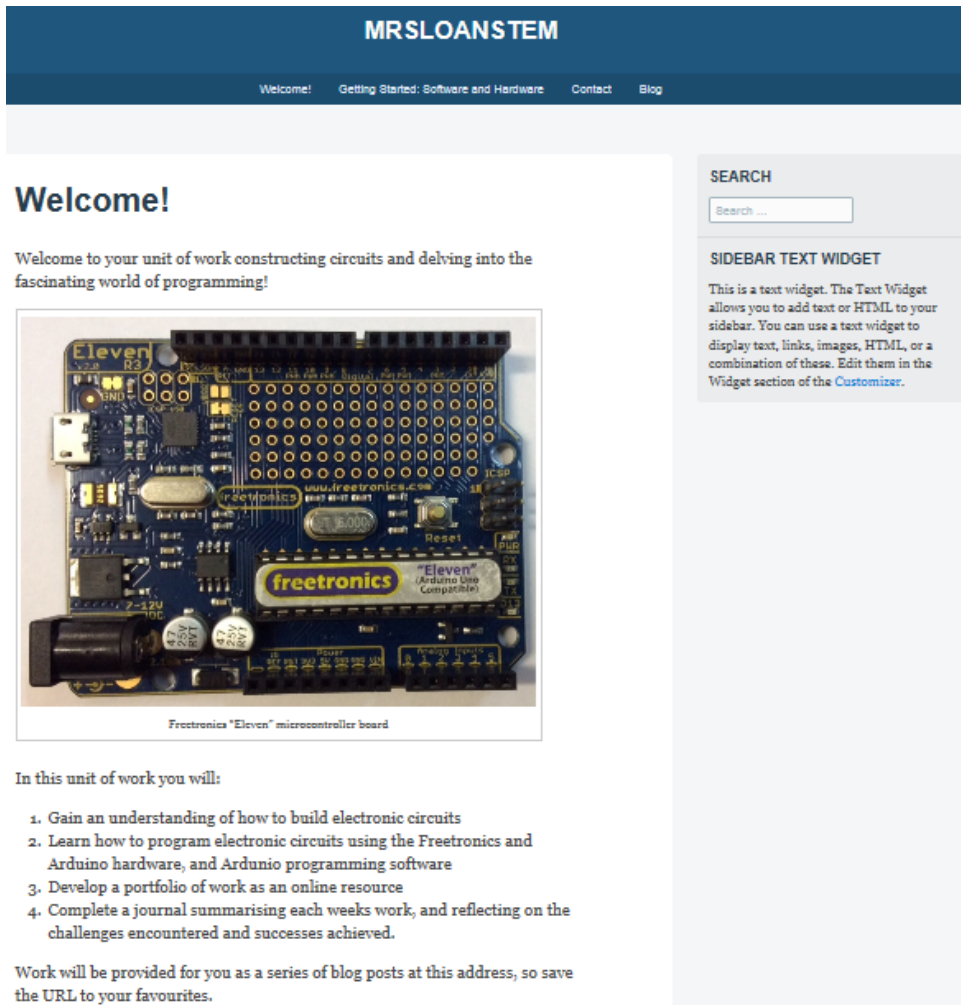
# STEM Projects

- Class work is based on a reflective design cycle



# Resources

mrsloanstem.wordpress.com

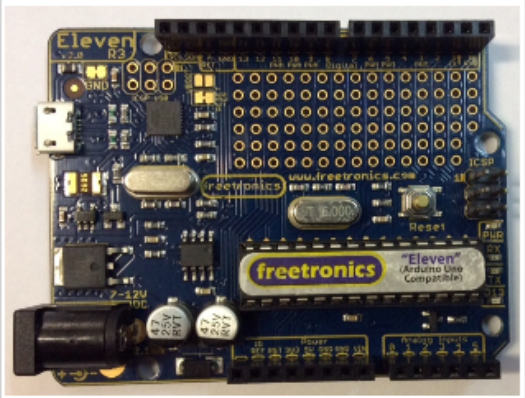


**MRSLOANSTEM**

Welcome! Getting Started: Software and Hardware Contact Blog

## Welcome!

Welcome to your unit of work constructing circuits and delving into the fascinating world of programming!



Freertronics "Eleven" microcontroller board

In this unit of work you will:

1. Gain an understanding of how to build electronic circuits
2. Learn how to program electronic circuits using the Freertronics and Arduino hardware, and Arduino programming software
3. Develop a portfolio of work as an online resource
4. Complete a journal summarising each weeks work, and reflecting on the challenges encountered and successes achieved.

Work will be provided for you as a series of blog posts at this address, so save the URL to your favourites.

## Useful websites / Resources

- Arduino reference and playground – great resource for Arduino code examples and pre-written code.
- Spark fun – General electronics information and examples of code.

# Student Work Example 1

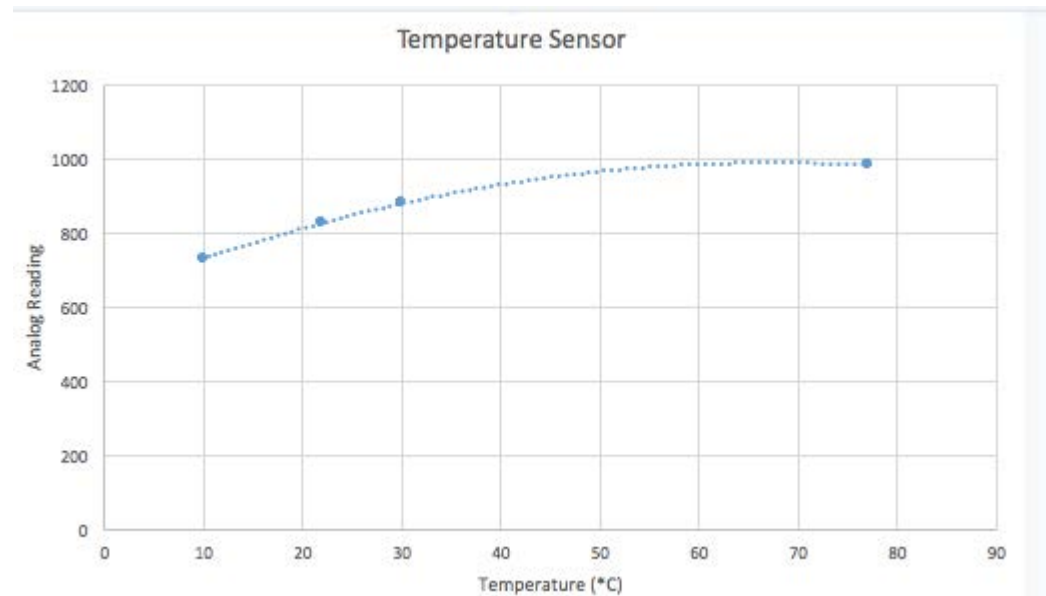
## Morse Code Machine

- Lesson 13 from handout
  - Students have previously worked on writing case switches and void functions
  - Students have completed a research project about Morse code
- Allows for a high degree of customisation – blink rate, number of LED's, letter change, word change
- Assessment – Code, Morse code competition
- Extension – Use of serial monitor to call up data from sensors

# Student Work Example 2

## Temperature Sensors

- Developed to complement mycoremediation work being completed in Core Science subject.
- Students
  - design and build a simple thermistor based temperature sensor
  - write a program based on their prior knowledge to record the analog reading
  - calibrate the sensor using various temperature water baths



## Extension work:

- Modification of code to display temperature range using case switches.
- Modification of code to give direct readout of temperature in °C using Steinhart-Hart equation or a library.
- Construction of light and moisture sensors