Microcontrollers and Prototyping Kits

DT Workshop Equipment Reference — D&T / STEM resource for school workshops | Electronics & Prototyping

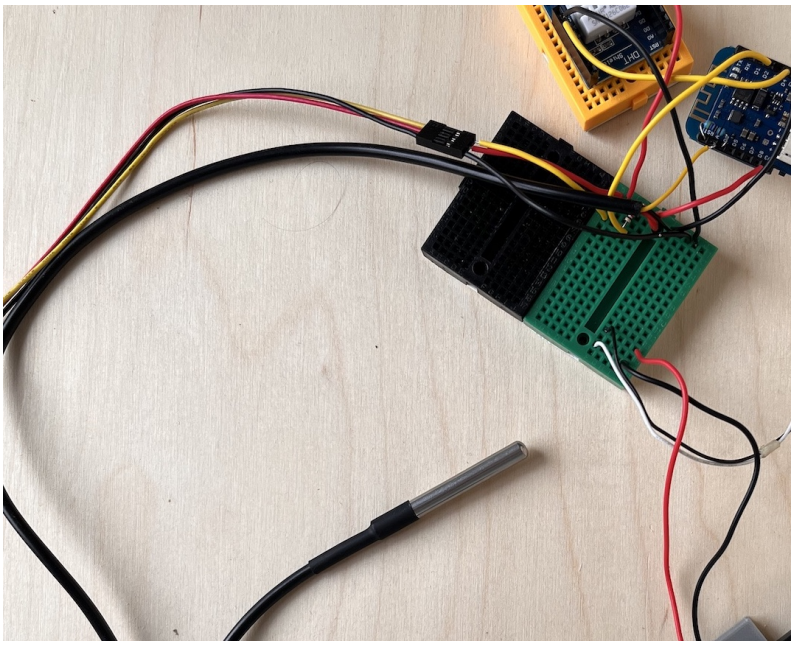

Photo: OctopusArk — CC BY-SA 4.0 — via Wikimedia Commons (Microcontroller_with_Temperature_Sensor.jpg)

Microcontrollers such as Arduino, micro:bit and ESP32 are tiny computers on a board that read sensors, drive outputs and run student-written programs. Prototyping kits bundle the board with breadboards, LEDs, resistors, sensors and wires so classes can build working electronic projects quickly.

Key Features

- Arduino Uno, micro:bit and ESP32 board options
- Breadboard for solderless circuit building
- LEDs, resistors, buttons and jumper wires included
- Sensors such as ultrasonic, light and temperature
- USB programming from laptops or tablets

Typical Uses in the Workshop

- Teach inputs, outputs and program logic with LEDs and buttons
- Build line-following robots and traffic light models
- Create environmental monitoring and data logging projects
- Prototype ideas before soldering final circuits

Safe Operation

1. Connect the board to a computer with the right software
2. Build the circuit on the breadboard from the diagram
3. Upload the program and test each input and output
4. Debug by adding serial print messages
5. Disconnect power before changing the wiring

SAFETY NOTES

- Check polarity of LEDs and batteries before powering
- Keep circuits away from liquids
- Use a current-limiting resistor for LEDs
- Turn off power when rewiring the breadboard
- Store boards in antistatic bags when unused

Maintenance & Consumables

- Check jumper wires and breadboard contacts for wear
- Store kits in labelled trays with a parts count
- Update the board software occasionally
- Replace damaged modules and sensor boards promptly
- Keep batteries charged and stored safely

Specification & Buying Notes

Buy genuine or reliable clones of the main boards plus a class set of breakout modules. A kit with breadboard, jumpers, LEDs, resistors, buttons and one or two sensors covers most curriculum projects.