

Printables: Automation Lesson Packet Overview (Pages)
Coding steps and example code
Sensor wiring diagrams
Data logging sheets
Problem-solving journal sections

Page 1: Coding Steps & Example Code

Automation Coding Steps

1. Set up your microcontroller and sensors.
 2. Gather your board (Arduino/micro:bit/Raspberry Pi), sensors (humidity, moisture, light), actuators (relay, pump, LED, fan).
 3. Wire sensors to input pins; actuators to output pins.
 4. Write code to read sensor data.
 5. Use IF statements to trigger actuators based on sensor readings.
 6. Test the code, observe responses, refine as needed.
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// Example: Automated Watering for Hydroponics

```
int moistureSensorPin = A0;
int pumpRelayPin = 8;

void setup() {
  pinMode(pumpRelayPin, OUTPUT);
  Serial.begin(9600);
}

void loop() {
  int moisture = analogRead(moistureSensorPin);
  Serial.println(moisture); // log value

  if (moisture < 600) { // threshold for dry
    digitalWrite(pumpRelayPin, HIGH); // turn pump ON
  } else {
    digitalWrite(pumpRelayPin, LOW); // turn pump OFF
  }
  delay(5000); // wait 5 seconds before next reading
}
```

Challenge:

Change the moisture threshold and see how results change. Add a delay to make the system run less frequently and conserve power.

Page 2: Sensor Wiring Diagrams

Wiring Guide

Draw or follow these diagrams to connect your sensors and actuators:

Example: Arduino Soil Moisture Sensor + Relay

Soil Moisture Sensor:

VCC -> 5V

GND -> GND

SIG -> A0

Pump Relay Module:

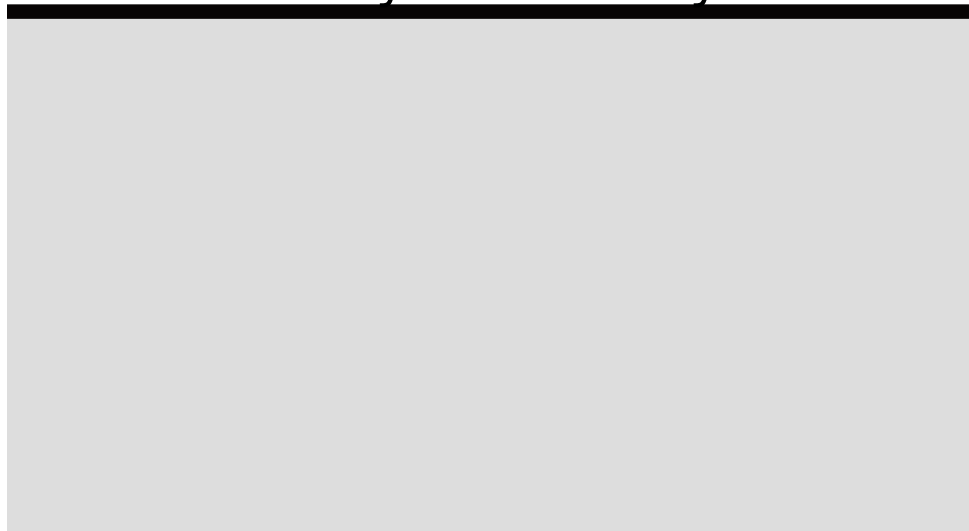
VCC -> 5V

GND -> GND

IN -> Digital Pin 8

Blank Student Diagram:

(Use this box for your own system sketch)



Suggested: Label each wire and pin, mark sensors/actuators.

Page 4: Problem-Solving Journal

Troubleshooting Reflection

Prompt 1:

What problems did you encounter during coding, wiring, or testing? (List error messages, wiring issues, sensor malfunctions...)

Prompt 2:

How did you identify the cause of each problem? (Describe steps taken—checked wires, read serial output, adjusted code, replaced sensor, etc.)

Prompt 3:

What solution(s) did you try, and what was the outcome? (Did you fix the issue? What worked/failed?)

