

Automatic Plant Watering System

Project Idea

Create a system that waters a plant when the soil gets dry using a **soil moisture sensor**, **Arduino**, and a **water pump**.

Components

- Arduino Uno
 - Soil Moisture Sensor
 - Relay Module
 - Water Pump
 - Jumper Wires
 - Power Supply
 - LED (optional for indicator)
 - Pot and plant
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STEM Breakdown

STEM Area	How it Applies in the Project
Science	Understanding plant biology and the importance of soil moisture for healthy growth.
Technology	Using the Arduino microcontroller and sensor to automate watering.
Engineering	Building the circuit, integrating electrical components, and managing water flow.
Math	Calibrating sensor values (0–1023), using thresholds (e.g., if < 300 then pump ON), and maybe even logging data over time.

Learning Outcomes

- How sensors work (input device logic)
- Basics of coding in Arduino (C++)
- How automation can solve real-world problems
- Data collection and logical decision-making

Expansion Ideas

- Add an LCD screen to show soil moisture levels
- Use Wi-Fi (ESP8266) to send data to a mobile app
- Add solar panel for energy source (eco-friendly extension)