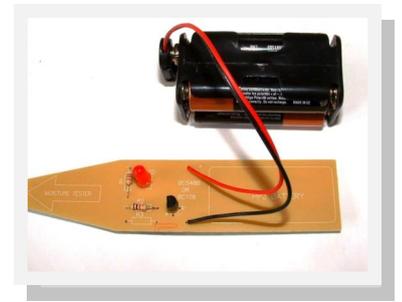


MOISTURE SENSOR TEACHER/TUTOR NOTES & WORKSHEET



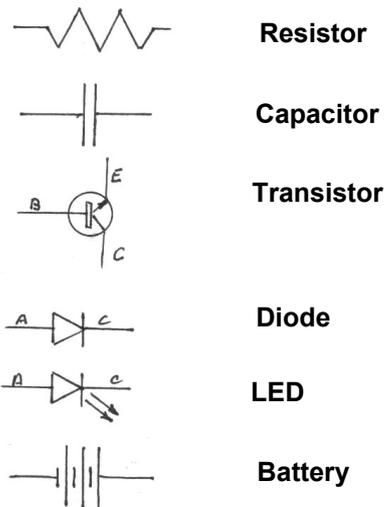
The project will take probably two sessions.

This project introduces some of the fundamental concepts of electricity –

- Electrical current, voltage and resistance
- Electrical circuits
- The function of diodes
- Transistors

It also introduces the practical use of printed circuit boards and the soldering of components to them.

The electrical circuit for the project is given in the Instructions where the components are shown by symbols. The commonly used symbols are given in the diagram.



The current in a circuit equals the voltage divided by the resistance. This means the higher the voltage the higher the current and the higher the resistance the lower the current. The resistor chart enabled the value of a resistance to be read from the colours printed on it.

The Moisture Sensor will show how our own bodies have an electrical resistance especially when the contact points to the body are dampened.

Water conducts electricity and has a low resistance so if water exists between the two contact probes a current will flow between them.

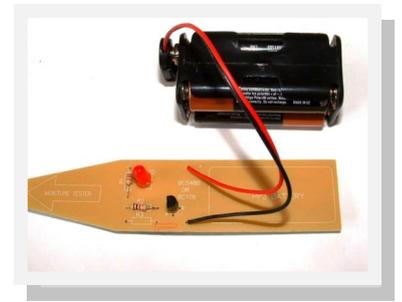
A diode is like a resistor but only works when the current flows in one direction.

A “Light emitting diode” or LED is a diode which lights up like a bulb when it is passing electricity.

A transistor is a diode with an additional connection called the “Base” which controls it. A very small voltage at the “Base” makes it pass current and act as a switch, and it is this function that is used in the project.

The circuit is arranged so that if a current passes between the two probes, the Base of the transistor will be subject to a small voltage and act as switch lighting up the LED.

MOISTURE SENSOR



Session 1

Blackboard:

Electrical Circuits

Component symbols

Printed Circuit Boards

Advantages over wired circuits.

This has the pattern of all the wires attached to the back of the board. It is made by etching away the conducting metal which is not wanted.

PCBs have the advantage that it is easy to solder the components in their correct positions and it makes a much neater arrangement than pins and Formica board.

Transistor

A Transistor is a Valve which only lets the electrical current pass in one direction and the amount of current is controlled by a voltage on the third terminal or Base.

Water analogy is a flexible pipe with your foot on the pipe. The flow is varied by varying the pressure of your foot on the pipe.

LED

An LED is a diode or valve which only lets electricity pass in one direction and lights up when it does. It must be assembled the correct way round with the shorter leg (the leg by the flattened edge of the rim) in the hole shown on the circuit diagram.

Practical :

- * Further practice soldering wires to a scrap PCB or Matrix board.
- * Examine PCB and decide where resistors go
- * Identify correct resistors with "Resistor Chart"
- * Assemble and solder resistors in position.
- * Cut off the excess Resistor wires.

Session 2

Blackboard

Revision of Session 1

Practical

- * Complete assembly and soldering. .
- * Test with a 6 volt or 9 volt battery or power source.
- * Confirm that your body transmits electricity especially when your hands are damp.
- * Competition to see who can invent a way to use the sensor in their house.

MOISTURE SENSOR



WORKSHEET

1. What is the sign for a Transistor on the circuit diagram ?
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 2. What is the sign for Resistor on the circuit diagram ?
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 3. What could you use the Moisture Sensor for in your home ?
.....
.....
 4. Give three examples of electrical equipment which use batteries
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.....
 5. What makes something “ moist” ?
.....
 6. Write a story about someone who made a moisture sensor and found an unusual application for it.
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