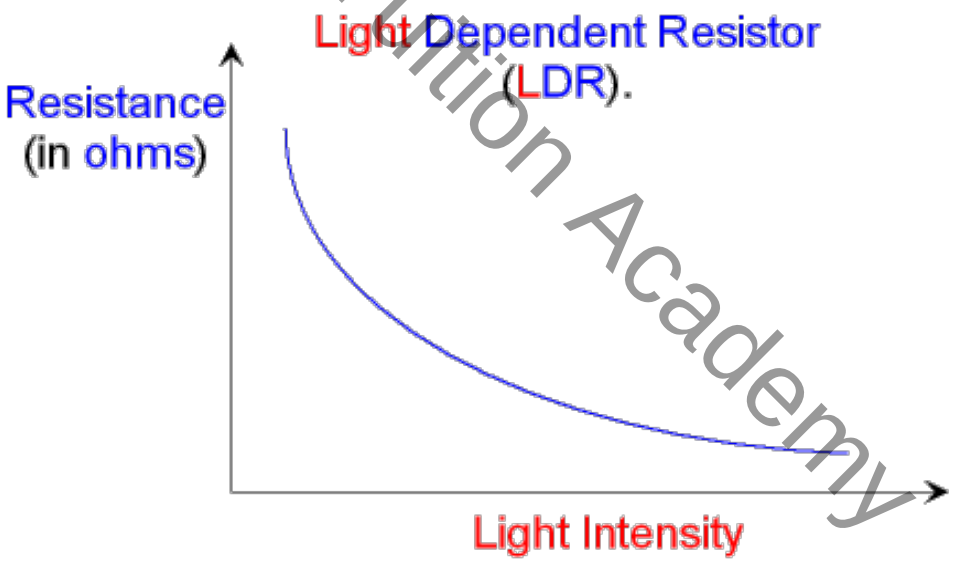
Circuit Devices

A light dependent Resistor (LDR)

- **Light dependent resistors** are often called **LDRs**. Similar to how a thermistor depends on temperature, an LDR will depend on light.

- There are several applications of LDRs:

1. **Burglar Detectors** – LDRs can be used in burglar detectors. When light falls on the sensor, the resistance will decrease. This allows a signal or security alert to be triggered. In this way, LDRs can be used as part of a security system.
2. **Street Lights** – LDRs can be used in automatic street lights. They work by using the light in the surroundings, and therefore can switch the streetlights on and off appropriately



Bright light = low resistance.	No light = high resistance.

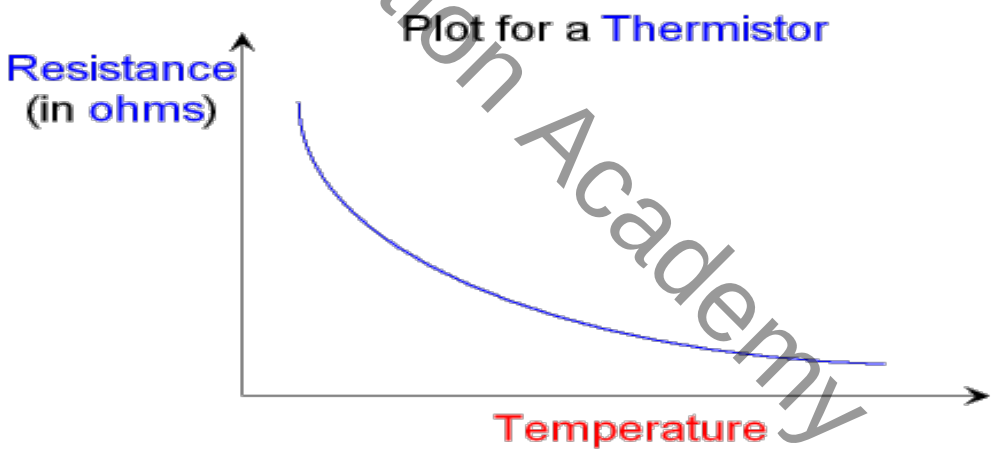
Table 2. Thermistor Resistance in High and Low Temperature.

Thermistors

- A **thermistor** is a special type of resistor. This resistor depends on the temperature of the surroundings. The higher the temperature, the lower the resistance.

- There are several applications of thermistors:

1. **Digital Thermostat** – when a thermistor is placed inside a **thermostat**, it can sense the temperature of the surroundings. In this way, it forms part of the circuit and enables efficient temperature control of our homes. For example, if it gets too hot, the thermistor will have lower resistance, allowing more current to flow to potentially cool the room.
2. **Replacement Fuse** – a fuse is used to **break** a circuit when it becomes dangerous, thus preventing an accident. Instead of using a fuse, we can use a thermistor. If too much electricity flows in a circuit, the circuit and thermistor will heat up. This increases the resistance of the thermistor, which increases the flow of current and therefore prevents the circuit from becoming dangerous.



High temperature = low resistance.	Low temperature = high resistance.

Table 1. Thermistor Resistance in High and Low Temperature.

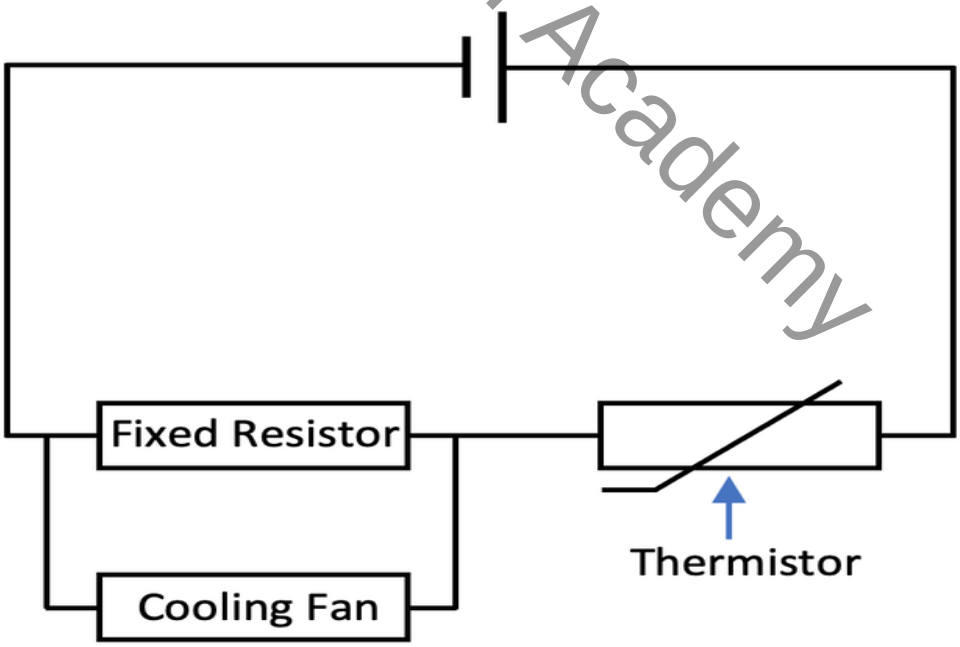
LDR and Thermistor in sensing circuit

- Sensing circuit can be used to turn on or increase the power to component depending on the condition

Thermistor in sensing Circuit

- Circuit below is the sensing circuit used to operate the fan in a room
- The fixed resistor and fan are connected in parallel to each other, and this means that they will always have the same potential difference across them.
- The potential difference of power supply is shared out between the thermistor and fan according to their resistance
- Components with a greater resistance receive a greater proportion of the source potential difference.
- In hotter conditions, the resistance of the thermistor is low, which means that the thermistor takes a small proportion of the source potential difference.

Potential difference across fixed resistance and fan Rise= fan go faster



Light Dependent Resistant in sensing circuit

- in below circuit, the LDR is connected in parallel with the filament bulb; this means that the LDR and the bulb will always have the same potential difference across them.
- In dark, Potential difference across bulb and LDR is high
- Greater the potential difference across component = more energy it gets