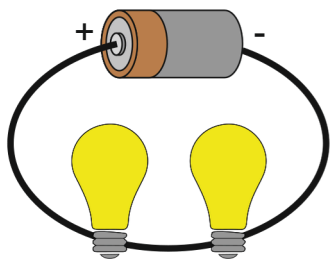




### SERIES CIRCUIT

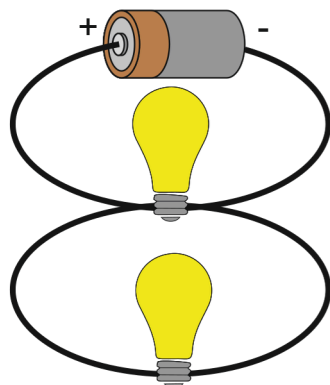


#### Battery voltage

In a series circuit the battery voltage should be equivalent to and not greater than the **SUM** of the bulb voltages, providing all the bulbs are of the same voltage.  
E.g. Two 1.5V bulbs would need a 3V battery.

**NOTE** You cannot isolate a bulb in this type of circuit i.e. If one bulb blows, all the lights will go out (think Christmas lights....). This circuit is only useful for connecting a very small number of bulbs.

### PARALLEL CIRCUIT



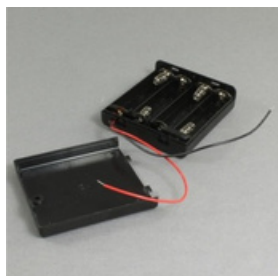
#### Battery voltage

In a parallel circuit the battery voltage should be equivalent to and never greater than the **voltage of an individual bulb** providing all bulbs are of the same voltage.

E.g. Any number of 1.5V bulbs can be connected in parallel, requiring only a 1.5V battery (useful for connecting a large number of bulbs in one circuit).

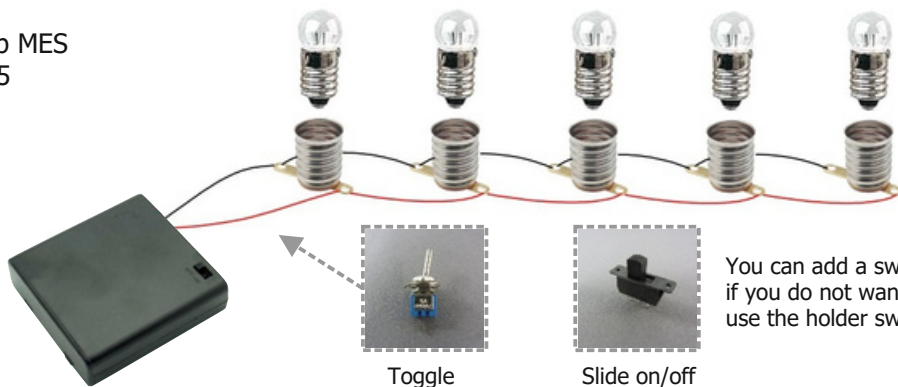
**NOTE** A higher voltage battery could potentially damage the bulbs. A lower battery voltage (than total bulb voltage) can be used - but may cause a slightly dimmer glow.

### CONNECTING MES BULBS



Example: Bulb MES  
100MA 6V Pk5

Recommended: In a parallel circuit 4 AA batteries will power the whole circuit. This holder comes with a switch.



You can add a switch if you do not want to use the holder switch

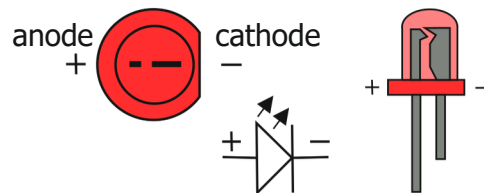
### LED - LIGHT EMITTING DIODE

Advantages over incandescent light sources:

**Efficiency:** they emit more light per watt than with incandescent bulbs.

**Longer lifetime:** they tend to slowly dim over time, rather than the abrupt failure of incandescent bulbs.

**Size:** can be very small (smaller than 2mm).



### BASIC DEFINITIONS



**Voltage:** the force that pushes an electrical current.(E.M.F.Electro-motiveforce)

**Current:** the flow of electrons around a closed circuit

**Resistance:** the property of a material to restrict the flow of an electrical current

UNITS= volts= V

UNITS= amps= I

UNITS= Ohms =  $\Omega/R$