

How to use ancient crafts and modern techniques

In conjunction with *Miniature Time Traveller Magazine* and miniaturist *Jill Fraser*

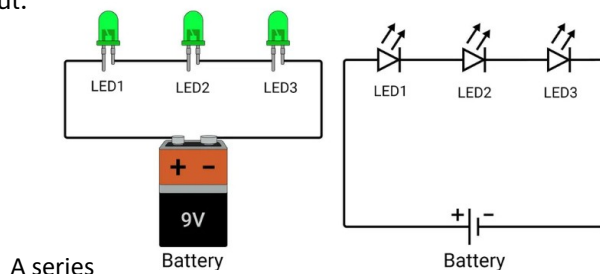
How to use LED lighting in your miniature creations.

To be read in conjunction with the YouTube video posted by Miniature Time Traveller on 14/8/25.



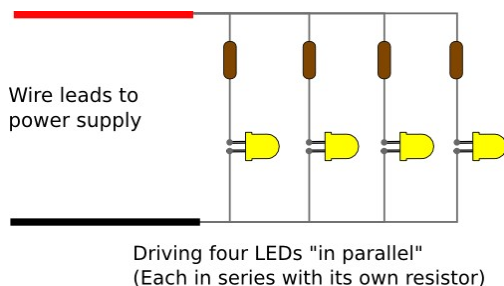
A plan.

- Familiarise yourself with the different coloured LED lights and how much voltage they draw. Each colour is slightly different. See table below.
- Have a look in an electronics store for different power sources. There are different size battery packs to choose from.
- Draw up a simple plan of your room box or dollhouse and mark where you want your lights to go.
- Count how many lights you want. Decide on what colour. Warm white or yellow work well. Try and stay clear of cold white.
- If you are wiring LEDs in a series (like a daisy chain), try to match the total voltage required to a similar power source (e.g. 3 white LED's with a 9V battery). This is because in a series the LED's share the power output.



Color of LED	Voltage Drop (Volt)
Red	1.63 ~ 2.03
Yellow	2.10 ~ 2.18
Orange	2.03 ~ 2.10
Blue	2.48 ~ 3.7
Green	1.9 ~ 4.0
Violet	2.76 ~ 4.0
UV	3.1 ~ 4.4
White	3.2 to 3.6

If wiring in parallel, you will likely need to use resistors, as each LED receives the full power output. The size of the resistor will depend on the power supply. It simply limits the current flowing to an LED.



Note: the easiest way to determine the resistors required to ask the shop where you purchase them. Or, if you want to work it out yourself, use this formula:

$V / I = R$ where:

R is the resistance in ohms (Ω).

V is the voltage across the resistor in volts (V).

I is the current flowing through the resistor in amperes (A).

This is the work of photographer, miniaturist, artist and writer, Jill E Fraser, Martinborough, New Zealand.

Jill Fraser reserves the right under the New Zealand Copyright Act 1994 to be identified as the creator of this work. Her contact is jill@miniaturetimetraveller.com Her projects are all original, and feature in *Miniature Time Traveller* magazine and on her YouTube channel.

If you are getting good help from your electronic store you may not need the information below.

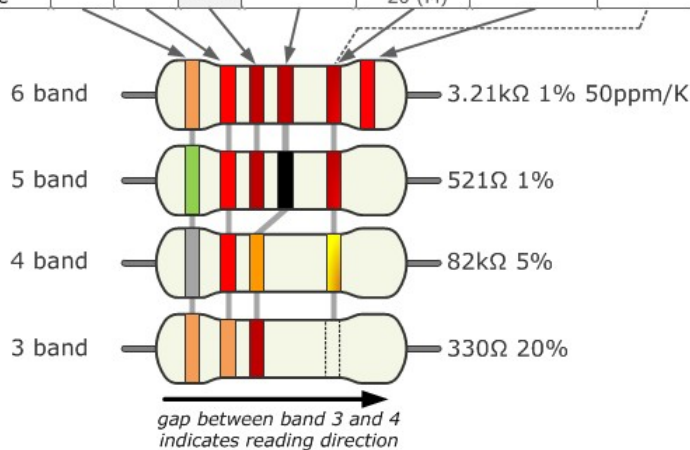
But if you ever need to work out the capacity of a resistor the chart below will be helpful. Don't let the complexity of it put you off. One you work out one example, the coding becomes quite easy to understand.

Resistor Colour Code Chart

This chart shows how to determine the resistance and tolerance for resistors. The table can also be used to specify the colour of the bands when the values are known. An [automatic resistor calculator](#) can be used to quickly find the resistor values. You will locate these easily on a Google search.

www.resistorguide.com

	Color	Significant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
Bad	black	0	0	0	x 1		250 (U)	
Beer	brown	1	1	1	x 10	1 (F)	100 (S)	1
Rots	red	2	2	2	x 100	2 (G)	50 (R)	0.1
Our	orange	3	3	3	x 1K		15 (P)	0.01
Young	yellow	4	4	4	x 10K		25 (Q)	0.001
Guts	green	5	5	5	x 100K	0.5 (D)	20 (Z)	
But	blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
Vodka	violet	7	7	7	x 10M	0.1 (B)	5 (M)	
Goes	grey	8	8	8	x 100M	0.05 (A)	1(K)	
Well	white	9	9	9	x 1G			
Get	gold				x 0.1	5 (J)		
Some	silver				x 0.01	10 (K)		
Now!	none					20 (M)		



Or, if you prefer, email Roger and he will work it out for you!