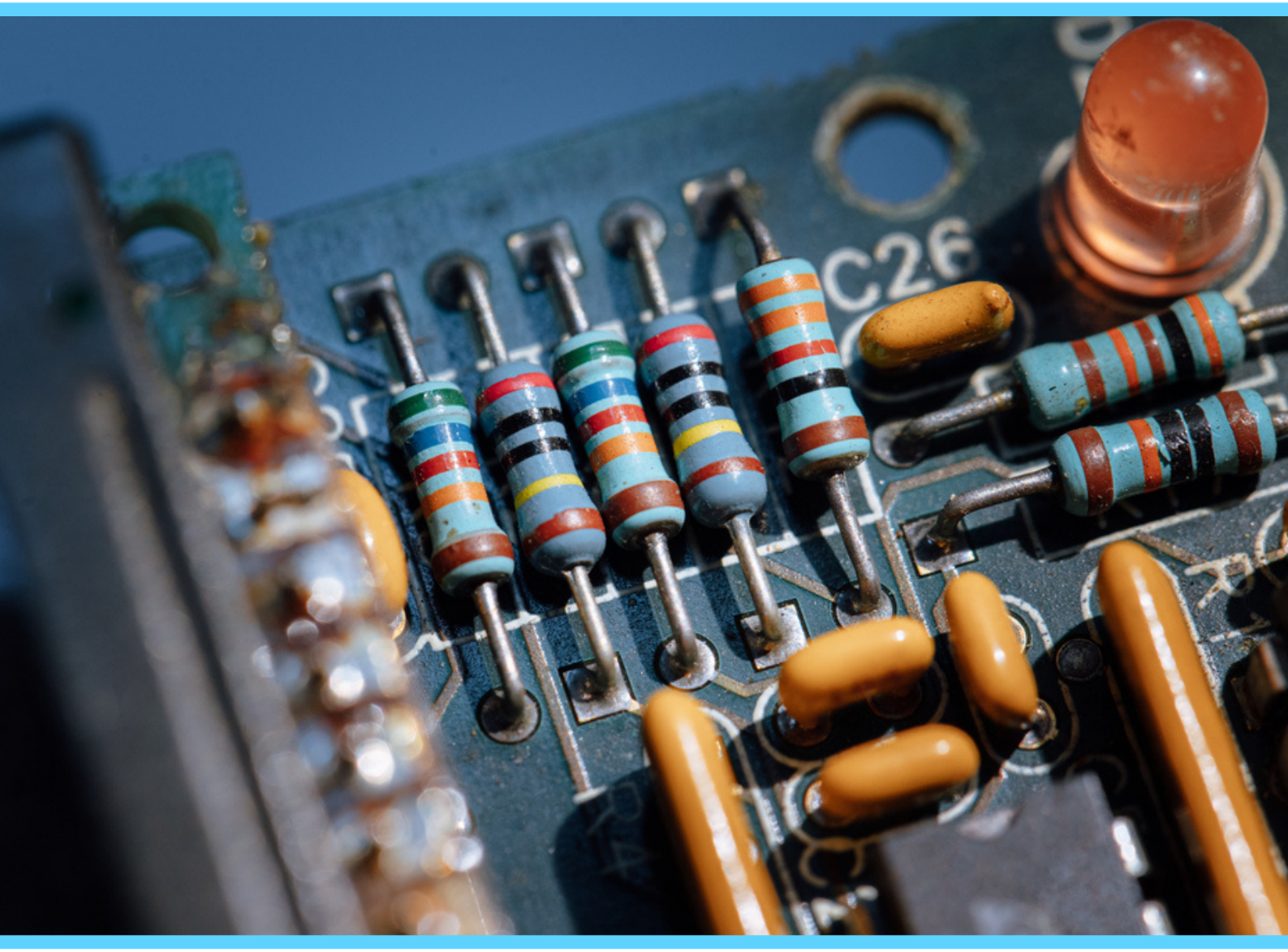

Resistor Colour Codes

Most resistors used in school will be 4 or 5 colour banded resistors.

The colours will represent the value of the resistor (using significant figures and a multiplier).

For 3/4/5 band resistors the last band in the series tells you the tolerance of the resistor.
Tolerance is the accuracy of the resistor: a resistor of 10Ω (Ohm) with a tolerance of 2% will be accurate to 10Ω with a 2% variation around that.)

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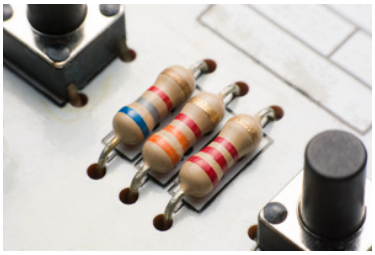
Which end do you start reading the banding from?



Ideally, it will be the one closest to one end of the resistor, and you read Left to Right. There are checks you can do to ensure you are reading it correctly (especially if it's hard to tell which band is nearer to the end of the resistor):

• On a 3 or 4 band resistor there will be a large gap between the tolerance band and the rest. The tolerance band will be furthest to the right.

• The most common tolerances used in schools are gold and silver. Gold and silver are ONLY used for tolerance, so keep this band on the right and read from the left.

• Check the resistance using the Ω setting on a multimeter.

Band identity

Number of Bands	Band 1	Band 2	Band 3	Band 4	Band 5	Band 6
4 Band	1st Significant Number	2nd Significant Number	Multiplier	Tolerance		
5 Band	1st Significant Number	2nd Significant Number	3rd Significant Number	Multiplier	Tolerance	
6 Band	1st Significant Number	2nd Significant Number	3rd Significant Number	Multiplier	Tolerance	Temperature Coefficient

Colours for band 1,2 (and 3 for a 5 or 6 band resistor):

Colour of Band	Number
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

Colours for multiplier (band 3, or 4):

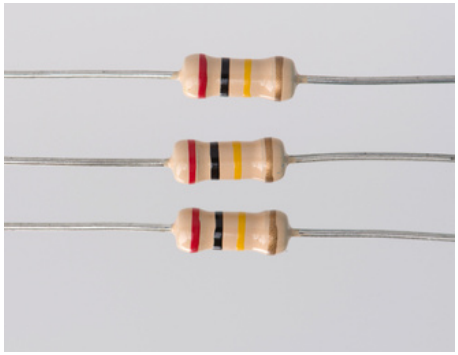
Colour of Multiplier	Multiply by	Alternate units	
Black	X1	X 1	X One
Brown	X10	X (1x101)	X Ten
Red	X100	X (1x102)	X One Hundred
Orange	X1000	X (1x103)	X One Thousand
Yellow	X10,000	X (1x104)	X Ten Thousand
Green	X100,000	X (1x 105)	X One Hundred Thousand
Blue	X1 000,000	X (1x 106)	X One Million
Violet	X10 000 000	X (1x 107)	X Ten Million
Grey	X100 000 000	X (1x 108)	X One Hundred Million
White	X100 000 000 0	X (1x109)	X One Billion

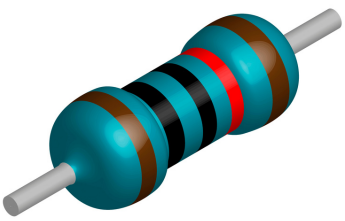
Colours for tolerance (band 4 or 5)

Colour of Band	Number +/-%
Black	1
Brown	2
Red	3
Orange	4
Yellow	0.5
Green	0.25
Blue	0.1
Violet	0.05
Grey	5
White	10

So, for the 4-band resistor in the photo Red, Black, Yellow, Gold.
There are 2 numbers, 1 multiplier, and a tolerance value.

This translates to:
2 (red), 0 (black) x10 000 (yellow) with a tolerance of 5% (gold),
so this is a 200,000 Ω resistor (2 x10^5Ω) with 5% tolerance.





The 5-band resistor is:
Brown, Black, Black, Red, Brown.

3 numbers, 1 multiplier and a tolerance value:
1 (brown), 0 (black), 0 (black) x 100 (red) = 10,000Ω
(1x10^4Ω) with a tolerance of 1% (brown).

Temperature coefficient. These are only found on 6 band resistors.

This is a measure of how much the resistance changes as its temperature changes: For example a coefficient of 5ppm/ºC means that the resistance will not change more than 0.000005ohms per degree Celsius temperature change (within the working range of –55ºC - +145ºC))

Colours for temperature coefficient (band 6):

Colour of Band	Ppm/ºC
Brown	100
Red	50
Orange	15
Yellow	25
Blue	10
Violet	5

See our School Science Guide for Technicians for more information

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