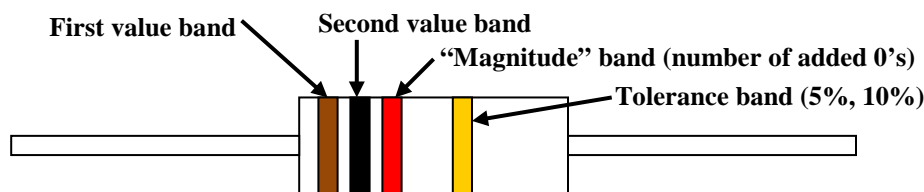


Appendix B: Color Code for Composite Carbon Resistors

The following is a list of resistor color codes for the carbon resistors commonly used in electronic circuits.

0 – Black	5 – Green
1 – Brown	6 – Blue
2 – Red	7 – Violet/Purple
3 – Orange	8 – Gray
4 – Yellow	9 – White

The color code is used as follows (see figure below).



¼ Watt Resistor

The first and second resistor bands give the numerical portion of the value of the resistor. The third band denotes how many zeroes are required to complete the resistor value. The fourth band (near the other end, but a little further towards the center than the first color band) gives the resistor tolerance, that is, how accurately the denoted value indicates the real resistor value. If there is no tolerance band (i.e., band omitted completely), the tolerance is $\pm 20\%$. If the band is silver, the tolerance is $\pm 10\%$, while a gold band denotes a $\pm 5\%$ resistor. Note that for values under 10 Ω , the third band will be gold (= "divide previous numbers by 10") or silver (= "divide previous numbers by 100"). The term for resistance is the Ohm, represented by the Greek letter capital omega (Ω). Carbon resistors are made in various power ratings, including 0.1, ¼, ½, and 1-Watt values. We will use ¼ Watt, 5% resistors in most of our experiments.

- Examples:
1. 100 Ω – brown-black-brown. Translation: the first two numbers are 1-0. The third band adds one (1) additional 0, so the value is 1-0-0 or 100 Ω .
 2. 1200 Ω – brown-red-red. Translation: 1-2 is brown-red. The second red band denotes two zeroes, so the resistor value is 1-2-0-0 Ω , or 1200 Ω .
 3. 1 Ω – brown-black-gold. Translation: the first two numbers are 1-0 (=10). The third band means " $\div 10$," so the value is 10/10, or 1 Ω .
 4. 970 K Ω – white-purple-yellow. White is nine, purple or violet is 7, and the yellow stands for four zeroes: 9-7-0-0-0-0; 970,000 Ω or 970 K Ω .
 5. As a further example, two of the resistors in our parts kits are 1000 Ω (1 K Ω) and 10 K Ω . Thus the 1 K Ω (or, more commonly, "1K") resistors are coded brown-black-red, and the "10K" resistors are coded brown-black-orange.