

## RESISTANCE

Resistance is the opposition to the flow of electrons (current).

### Electrical Resistance in Humans

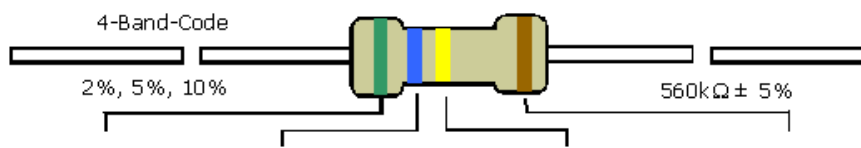
Hand to hand - dry skin 100 000 - 5 000 000 Ohms

Hand to hand - wet skin 1000 Ohms

Internal - hand to Foot 500 Ohms

Ohm  $\Omega$

### Resistor Color Code




COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1Ω	
Brown	1	1	1	10Ω	± 1% (F)
Red	2	2	2	100Ω	± 2% (G)
Orange	3	3	3	1KΩ	
Yellow	4	4	4	10KΩ	
Green	5	5	5	100KΩ	±0.5% (D)
Blue	6	6	6	1MΩ	±0.25% (C)
Violet	7	7	7	10MΩ	±0.10% (B)
Grey	8	8	8		±0.05%
White	9	9	9		
Gold				0.1	± 5% (J)
Silver				0.01	± 10% (K)



Electronix Express / RSR  
<http://www.elexp.com>

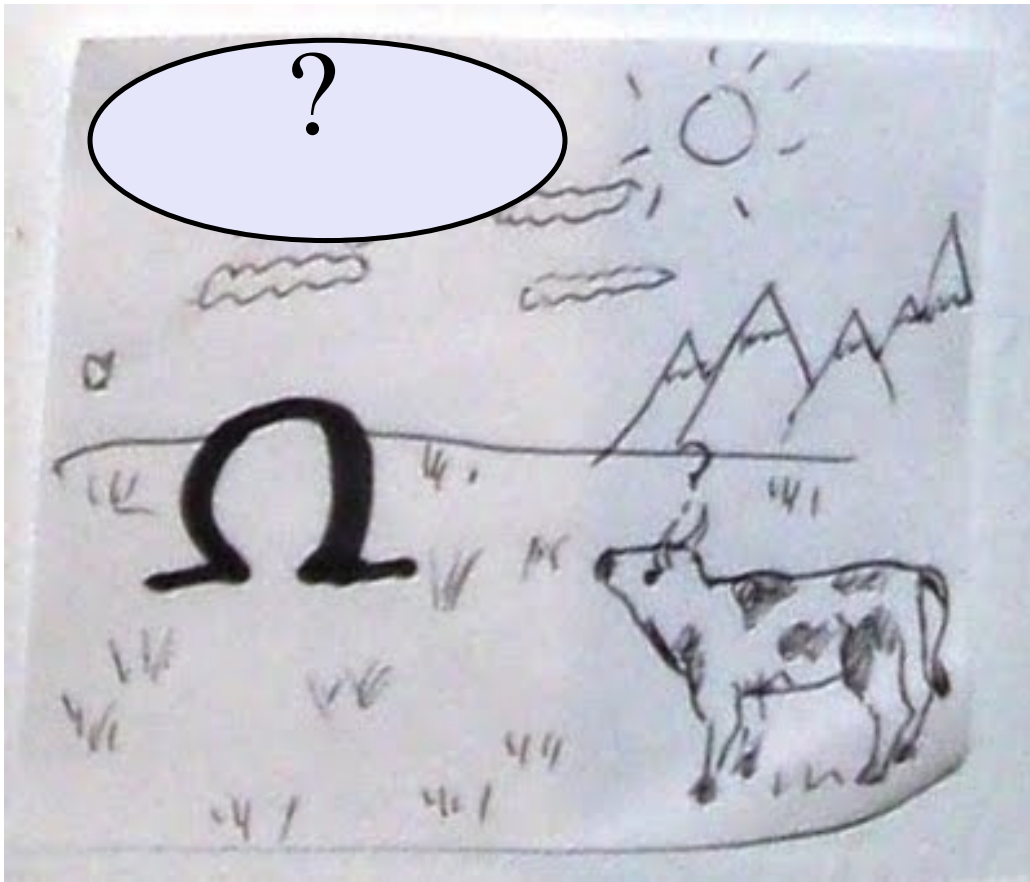
1-800-972-2225  
In NJ 732-381-8020

## Factors that Affect Resistance

- (1) Length  $L$
  - (2) Cross-sectional Area  $A$
  - (3) resistivity - depends of type of material  $\rho$
  - (4) temperature
- 

Resistance

A piece of copper wire has a resistance of  $2.0 \times 10^{-3} \Omega$ . What is the resistance of another piece of copper wire with the same cross-sectional area but twice the length?



With 1.0m length and radius of 3.0mm, a piece of wire has  $9.0 \times 10^{-4} \Omega$  of resistance. If the wire is stretched until its radius is 1.0mm, what will be the resistance of a 1.0m long piece?

Wire A has length 2.0m, a diameter of 2.0mm and resistance of  $0.004 \Omega$ . What is the resistance of Wire B if it is made of the same material but is 0.5m long and has a diameter of 1mm?

A current flows through a copper wire that is 1.8m long and 1.2mm in diameter. Find the resistance between the end of the wire if the resistivity of copper is  $1.72 \times 10^{-8} \Omega \cdot \text{m}$ .



[http://www.furryelephant.com/player.php?  
subject=physics&jumpTo=ee/7Ms4](http://www.furryelephant.com/player.php?subject=physics&jumpTo=ee/7Ms4)



Ohm



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