



- **Resistor:** device (material object with two terminals)
- **Resistance:** attribute of device
- **Resistivity:** attribute of conducting material

A voltage V provided by some source is applied to the terminals of a resistor and a current I is observed flowing through the resistor.

- Resistance: $R = \frac{V}{I}$ [$1\Omega=1V/A$] (1 Ohm)

The current density \vec{J} in a resistor depends on the local electric field \vec{E} and on the resistivity ρ of the resistor material.

- Resistivity: $\rho = \frac{E}{J}$ $\left[\frac{1V/m}{1A/m^2} = 1\Omega m \right]$
- Conductivity: $\sigma = \frac{1}{\rho}$ [$1(\Omega m)^{-1}$]
- Vector relations: $\vec{E} = \rho \vec{J}$, $\vec{J} = \sigma \vec{E}$