Source: [KBhPHYS201IntroToElectrostaticsLN] [KBhPHYS201CircuitsIndex]

1 | Resistance

So, let's figure out resistance.

We know that… $V = \frac{J}{C}$, per [KBhPHYS201Voltage], and we also know that resistance would equal a unit $\frac{Vs}{c}$ given that $I = \frac{C}{s} = \frac{\Delta V}{Resistance}$ (see [KBhPHYS201Current] Current). Plugging in the definition of voltage, we get that resistance is measured in $\frac{Js}{C^2}$. We call this unit Ohms, or Ω.

Definition 1 · **Resistance** Ω A value measured in $\frac{Js}{C^2}$ that measures the resistance to current

Calculating resistance

- So, let's think. With a wire of length L and with a wire of area A, if we increase L, the resistance in the wire would increase; if we increase area A, the resistance in the the wire would decrease.
- $Resistance = \frac{L}{A} * ResistivityOfMaterial$ with units $\frac{m}{m^2}(\Omega \times m)$.

and, indeed, resistivity of materials are measured in $\Omega \times m$, which also makes sense intuitively.

Heat of resistance

[KBe20phys250srcHeatFromResistors].png