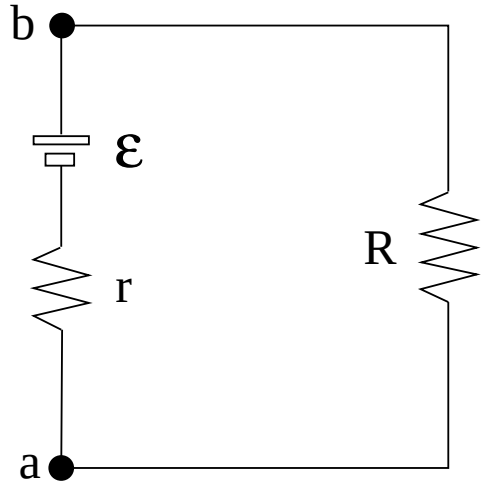
Power in Resistor Circuit

Battery in use

- Terminal voltage: $V_{ab} = \mathcal{E} - Ir = IR$
- Power output of battery: $P = V_{ab}I = \mathcal{E}I - I^2r$
  - Power generated in battery: $\mathcal{E}I$
  - Power dissipated in battery: I^2r
- Power dissipated in resistor: $P = I^2R$



Battery being charged:

- Terminal voltage: $V_{ab} = \mathcal{E} + Ir$
- Power supplied by charging device: $P = V_{ab}I$
- Power input into battery: $P = \mathcal{E}I + I^2r$
  - Power stored in battery: $\mathcal{E}I$
  - Power dissipated in battery: I^2r