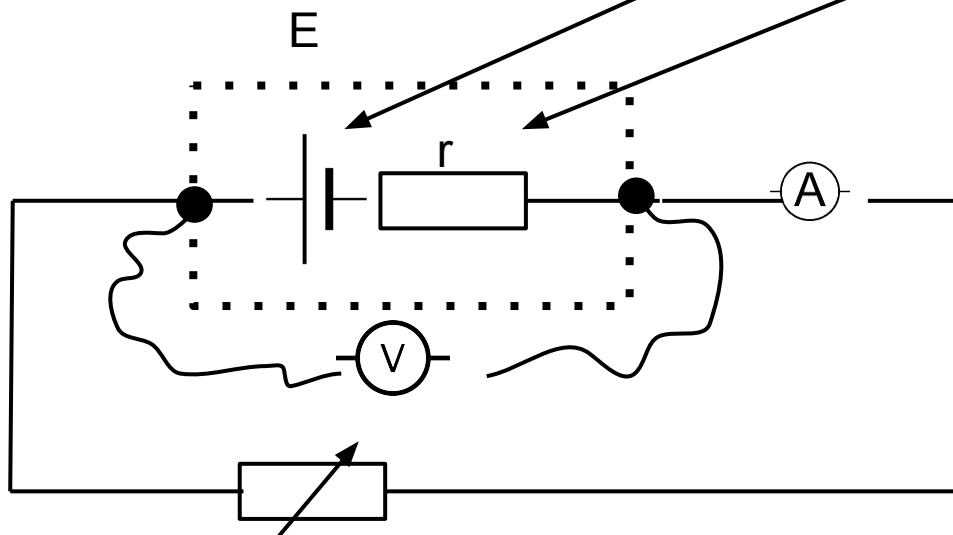# Internal Resistance of a Cell

An electric cell is considered to be a source of EMF and a resistor in series with it.

E

r

(A)

(V)

When no current is taken from the cell the voltmeter across the terminals measures the EMF of the cell.

tpd = EMF - lost volts

V = E - Ir

As current is drawn from the cell the potential difference available at the terminals (tpd), measured by the voltmeter, decreases.
We say volts are LOST in the internal resistance of the cell.
The more current taken from the cell the more volts are lost.

tpd / V

EMF value

gradient = internal resistance

Short circuit current value

Current / A

E

r

(A)
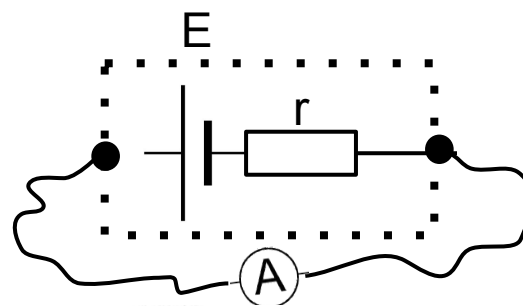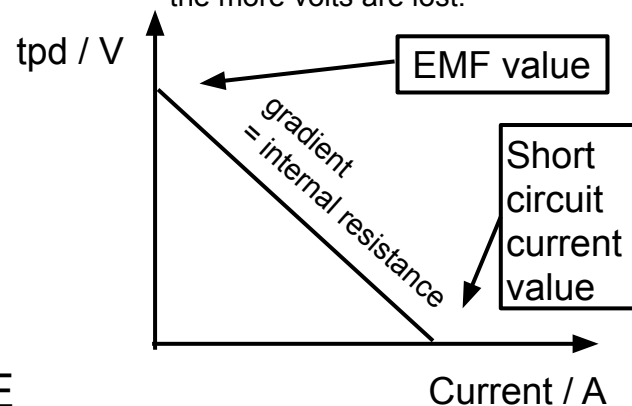
Short circuit the terminals by wire and the current is called the short circuit current

$$I_{short\ circuit} = \frac{EMF}{internal\ resistance}$$