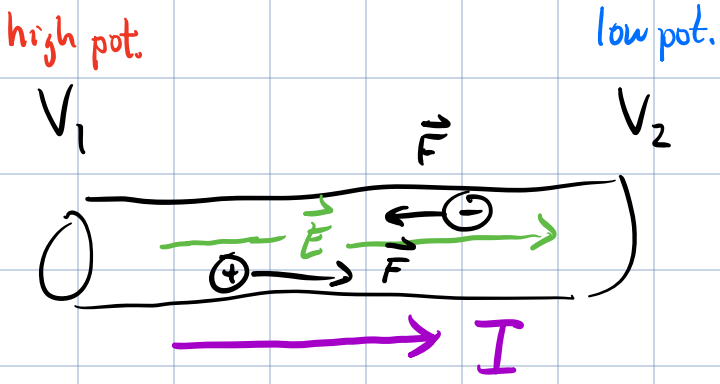
PHYS 231 - Intro to Electronics.

Jake Bobowski
SCI 266
jake.bobowski@ubc.ca

Consider a conductor w/ a pot. diff. across it



Recall that $\vec{E}$ point from high to low pot.

Cross conductor from left to right.

$$V_2 - V_1 < 0 \quad \text{(negative)}.$$

Get a negative change in voltage when cross

a resistor/conductor in the dir'n of current I.

$$V_2 - V_1 = \Delta V = -IR$$ ← resistance.

Cross conductor from right to left

$$V_1 - V_2 > 0 \text{ (positive)}.$$

- Get a pos. change in voltage when cross a resistor/conductor in the opp. dir'n of the current.

$$V_1 - V_2 = \Delta V = +IR$$

Relationship between electric field $\vec{E}$ & voltage differences.

$$\Delta V = -\int \vec{E} \cdot d\vec{\ell}$$

mult. by pt. charge q:

$$\underbrace{q\Delta V}_{\Delta U} = -\int \underbrace{q\vec{E}}_{\vec{F}} \cdot d\vec{\ell}$$

$$\Delta U = -\underbrace{\int \vec{F} \cdot d\vec{\ell}}_{\text{work } W}$$

$$\underbrace{\Delta U}_{-\Delta K} = -W \quad \Rightarrow \quad \boxed{W = \Delta K}$$