

OHM'S LAW

Series Circuits:

- **Only one path** for current to flow
- **Current is the same** everywhere in the circuit
- **Applied voltage** equals the sum of the voltage drops
- **Total Resistance** equals the sum of the individual resistors
- **Total Power** equals the sum of the powers of the individual resistors
- $E_{\text{total}} = ER_1 + ER_2 + ER_3\dots$
- $I_{\text{total}} = IR_1 = IR_2 = IR_3\dots$
- $R_{\text{total}} = R_1 + R_2 + R_3\dots$
- $P_{\text{total}} = PR_1 + PR_2 + PR_3\dots$

Parallel Circuits:

- **Multiple paths** for current to flow
- **Voltage is the same** across all branches
- **Current divides** between the circuit branches proportional to the branch resistances
- **Total resistance** is always less than the smallest resistor
- **Total Power** equals the sum of the powers of the individual resistors
- $E_{\text{total}} = ER_1 = ER_2 = ER_3\dots$
- $I_{\text{total}} = IR_1 + IR_2 + IR_3\dots$
- $R_{\text{total}} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \dots}$
- $P_{\text{total}} = PR_1 + PR_2 + PR_3\dots$