

Introduction to Physical Science

Kirchoff's Rules

Presented by Robert Wagner

Kirchoff's Rules

- Some circuits cannot be reduced as in the previous lesson
- Kirchoff's rules apply to any circuit - simple or complex
 - Related to laws of conservation of charge and conservation of energy

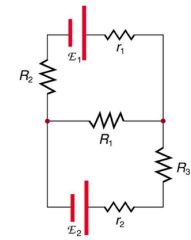


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First Rule: The Junction Rule

- The sum of all currents entering a junction must equal the sum of all currents leaving the junction
- Related to conservation of charge
 - Charge entering the junction must equal charge leaving the junction

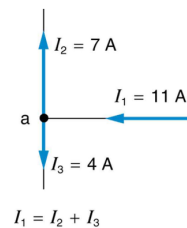


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Second Rule: The Loop Rule

- The algebraic sum of changes in potential around any closed circuit path (loop) must be zero
- Related to conservation of energy
 - Potential difference represents changes in energy - there are no other ways to transfer energy in or out of the circuit

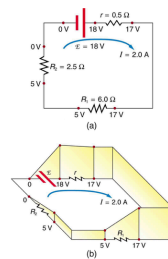


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Applying Kirchoff's Rules

- Label the direction in which the current is flowing in each branch of the circuit
 - If you choose the wrong direction, it will only change the sign
- Identify a closed loop and decide which way to go - clockwise or counterclockwise

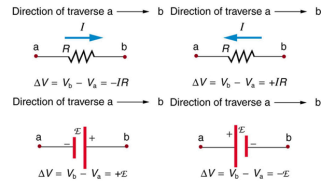


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Summary

- Kirchoff's rules allow us to solve more complex circuits
- They are related to the conservations of charge and conservation of energy
- Selecting the direction of current flow and direction around the loop do not matter