

Homework

Pg. 461 #1-4, 7, 8

Worksheet: Circuit diagram practice

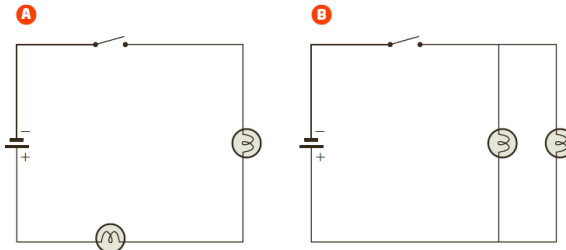
Date: _____

Measuring the Properties of Simple Circuits (11.3)

Circuit diagrams show how the various components of a circuit are connected. Recall that there are two basic types of circuit:

- A **series circuit** - There is only one path for electrons to flow. Since there is only one path, if this path is broken, the flow of electricity stops.
- A **parallel circuit** - There is more than one path for electrons to flow. Since there is more than one possible path, breaking the flow of electrons in one part of the circuit may not affect another part.

Figure 11.20 In **A**, there is only one path along which electrons can flow. This is a series circuit. In **B**, there is more than one path along which electrons can flow. This is a parallel circuit.



Classifying circuits in this way is rather simple; in reality, most circuits are actually a combination of series and parallel connections.

Measuring Current

- Current is expressed using amperes (A).
- An **ammeter** measures the current at a particular location in a circuit.
- An ammeter is always connected **in series** with a load
 - because the current has to pass through the ammeter

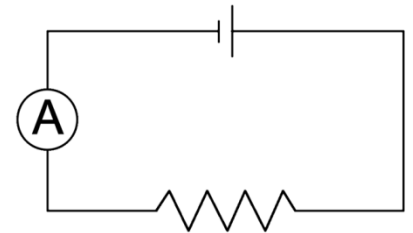


Figure 1 An ammeter is always connected in series with a load.

Measuring Potential Difference

- potential difference (or _____) is expressed in volts (V)
- measured using a **voltmeter**
- potential energy is always higher on the negative side of a load (e.g., a lightbulb), and lower on the positive side. This is what produces the difference!
- voltmeter is always connected in **parallel** with a load
 - because it is measuring the difference between two points (“across” a load)

Potential difference across a battery

- Batteries are made up of one or more cells, which are connected in series.
- Cells can be connected to produce greater potential differences.
- The total potential difference across a battery is the sum of the potential differences across each cell:

$$V_{\text{battery}} = V_{\text{cell 1}} + V_{\text{cell 2}} \dots$$

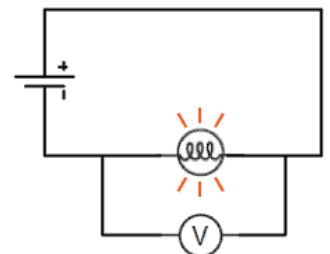


Figure 2 A voltmeter is always connected in parallel with a load

Learning Check

1. Three 1.5-V cells are connected in series to form a battery. What is the total potential difference of the battery? (*Show your work*)
2. Why must an ammeter be connected in series with a load (rather than in parallel) to correctly measure the current through the load?
3. Why must a voltmeter be connected in parallel with a load (rather than in series) to correctly measure the potential difference across the load?