

Topic 3.3 How do charges flow through the components of a circuit?

The Terminology of a Circuit, page 128

1.

Word	Everyday Meaning	Scientific Meaning (Physics)
a) cell	small room in a prison	a small, portable source that transforms chemical energy into electrical energy
b) source	a place from which something originates or is supplied	anything that supplies electrical energy
c) current	the movement of water or air in one direction	moving charges
d) load	something that is carried, or is a burden	a device that converts electrical energy into another form of energy as it hinders the flow of current
e) resistance	to oppose or strive against something	describes the amount that current is hindered by a load

2. a) cell: The everyday meaning indicates that a cell is small, which is related to the scientific meaning of a cell as a small, portable source.
- b) source: The everyday meaning indicates that a source supplies something, which is related to its scientific meaning of anything that supplies electrical energy.
- c) current: The everyday meaning indicates that current moves something in one direction. This relates to the scientific meaning of current which refers to the movement of charges (which also travel in one direction).
- d) load: The everyday meaning indicates that a load is a burden, which can slow something down or hinder its progress. This can be related to the scientific meaning of a load because a load hinders the flow of current.
- e) resistance: The everyday meaning indicates that something is being opposed. This is similar to something being hindered. This can be related to the scientific meaning of resistance because resistance describes the amount that current is hindered by a load.

The Flow of Current, page 129

1. a)

Term	Similarities	Differences
wet cell	Both are types of electrochemical cells.	The electrolyte is a liquid solution.
dry cell		The electrolyte is a moist paste.

b)

Term	Similarities	Differences
open circuit	Both are types of electrical circuits.	There is no closed path so current cannot flow.
closed circuit		There is a closed path so current can flow.

c)

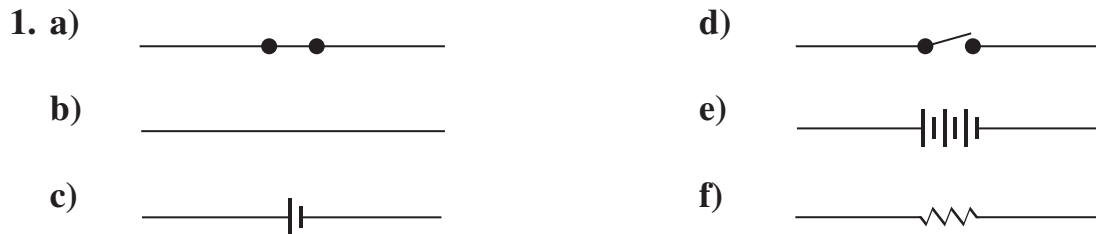
Term	Similarities	Differences
conductor	Both involve the movement of charges through a material.	Charges can flow through a conductor.
insulator		Charges cannot flow through an insulator.

Resistance Is Useful, page 130

The comic could address the following points:

- A load is a device that converts electrical energy into another type of energy. A light bulb is a type of load.
- A load resists or hinders the flow of current. The degree to which the load is hindered is called resistance.
- In a light bulb, electrons in the current move into the bulb filament from a much larger wire.
- In the filament, collisions occur between the electrons of the current and the atoms of the filament. The collisions hinder the flow of current. The electrons collide with surrounding atoms so hard that the filament gets very hot and glows.

Circuit Diagrams, page 131–132

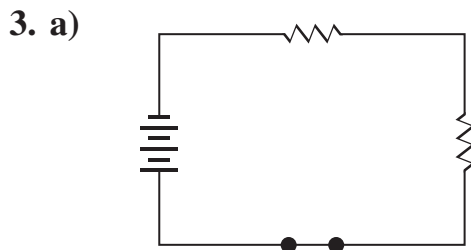


2. a) The switch is open so current cannot flow through Circuit A.

b) A

c) B

d) The source in circuit A likely has a higher electrical potential difference because it is a battery, not a cell.



b) The light bulb will go out because the broken motor will open the circuit so current can no longer flow through the circuit.

Comparing an Electrical Circuit and a Water Circuit, page 133

1. a) The cell or battery raises charges to a higher level of electrical potential energy.
- b) The switch controls whether charges are allowed to flow through the circuit.
- c) The flow of current lights a light bulb or runs another load.

3.3 Assessment, pages 134–137

- | | | | |
|------|-------|-------|-------|
| 1. A | 8. E | 15. C | 22. A |
| 2. D | 9. G | 16. C | 23. A |
| 3. F | 10. H | 17. D | 24. A |
| 4. I | 11. C | 18. B | 25. D |
| 5. J | 12. D | 19. C | 26. B |
| 6. C | 13. C | 20. A | 27. D |
| 7. B | 14. A | 21. D | 28. B |

29.

