Current and Circuits

Electric charges travel round a circuit to create a current. Current is measured in Amps (A).
The charges can be positive or negative.
Electric charges are the electrical "material" in a circuit.
For a current to flow in a circuit, the circuit must form a loop. We say it is closed.
If the circuit is **open**, the current is zero.

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1 Which of these four situations are closed circuits?

(a) The bedside lamp is off.

(b) The phone is charging.

(c) The toaster is toasting bread.

(d) A remote control has a missing battery.

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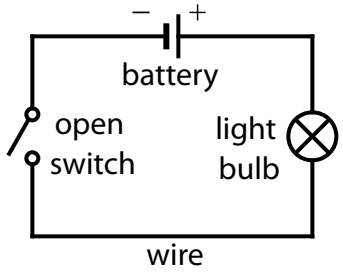
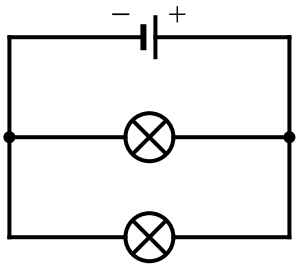
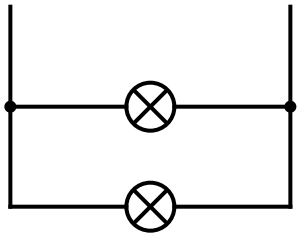
2 Which of these circuits are closed?



(a)


(b)


(c)

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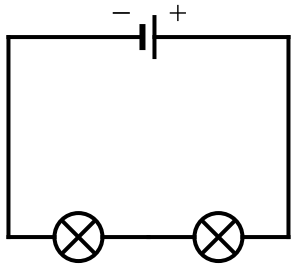
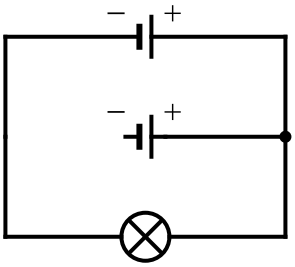
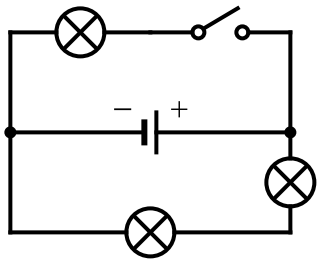
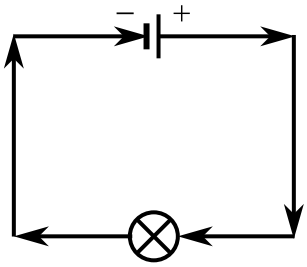
3 Draw around the closed loop in these circuits.


(a)

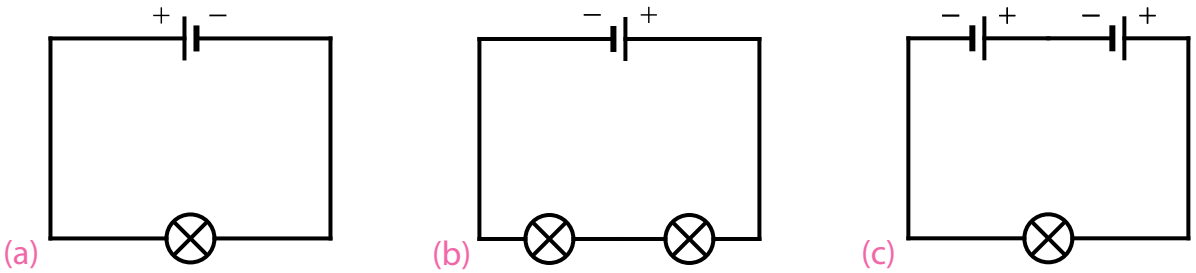

(b)


(c)

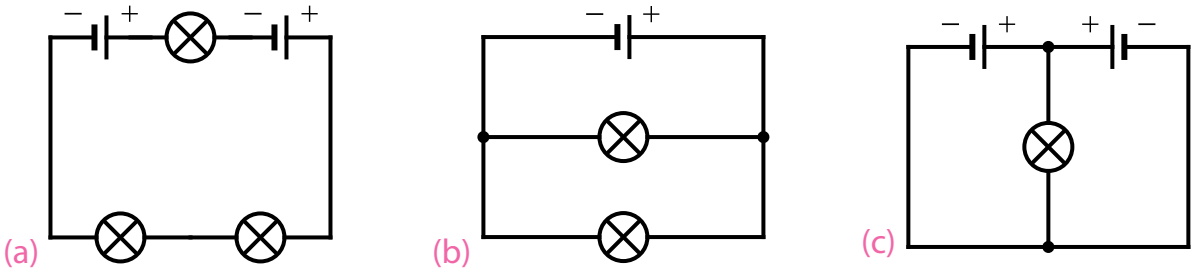
The direction of the current in circuits is the same as the direction in which positive charges would move.
Positive charges will be repelled (pushed away) from the positive $(+)$ terminal of the battery. They are attracted to (pulled towards) the negative $(-)$ terminal of the battery.



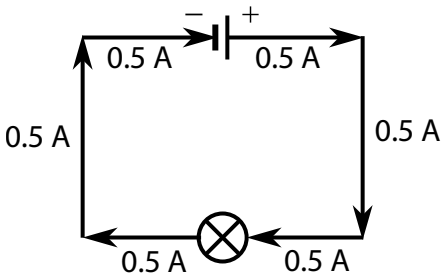
4 Draw arrows on the circuits in the direction of the current.



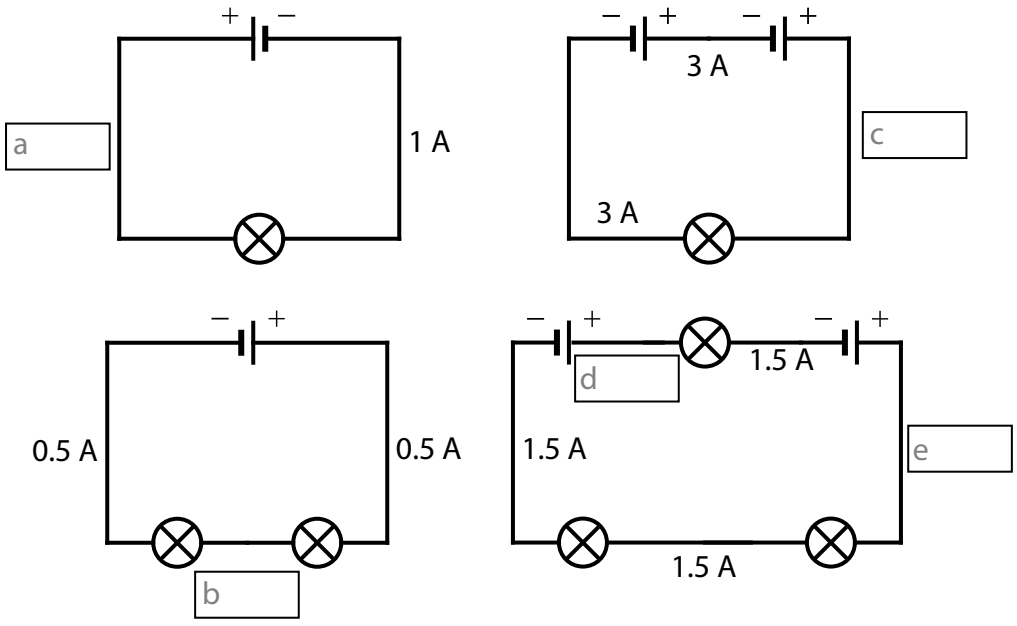
5 Draw arrows on the circuits in the direction of the current. Each line needs an arrow.



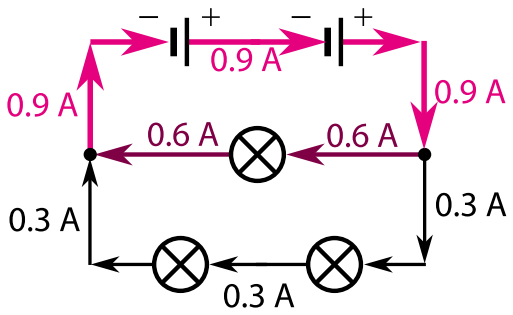
Similar to energy, current is never used up. The total amount of current in a closed circuit stays the same in all parts of the circuit at one time. This is an important rule of charge and current.



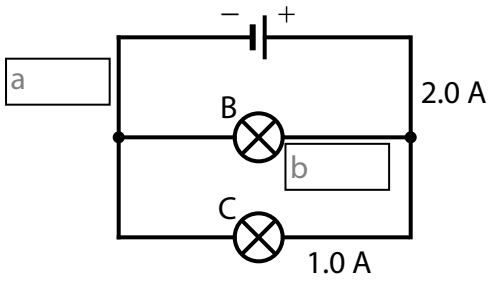
6 Write down the current in each of the boxes.

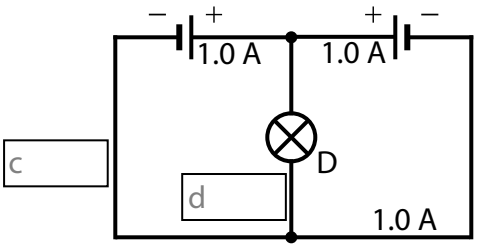


Parallel circuits have junctions. The total current flowing into a junction must be the same as the total current flowing out of the junction.

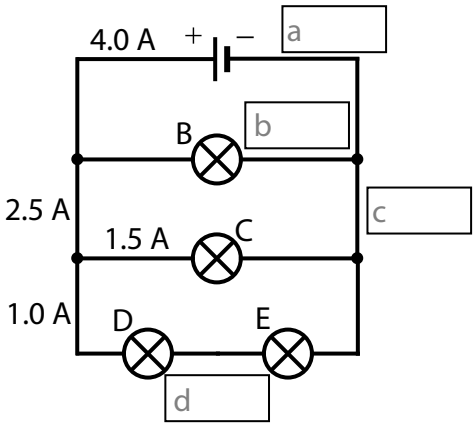


7 Write down the current in each of the boxes on the circuits from question 5.





8 Write down the current in each of the boxes.



If two light bulbs are next to each other on the same branch of the circuit, we say they are in series. The current is the same between the two.
If two light bulbs are on different branches of the circuit, we say the bulbs are in parallel. The current is shared through the two branches of the circuit.
When current moves through a light bulb, the bulb lights up. For identical light bulbs, the more current flowing through a bulb, the brighter it will be.

9 Fill in the sentences with the words **same, shared, most, brightness.**

(a) The current through two identical light bulbs in **series** will be the _____. They will have the same _____.

(b) The current through identical light bulbs in **parallel** will be _____. The bulb with the _____ current will be the brightest.

10 Go back to the circuits in questions 7 and 8. The light bulbs are identical in those circuits. Label which light bulbs will have the same brightness, which will be brightest and which will be dimmest.