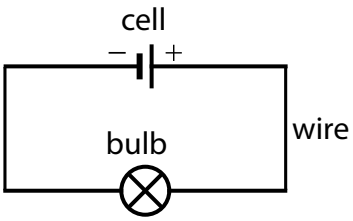
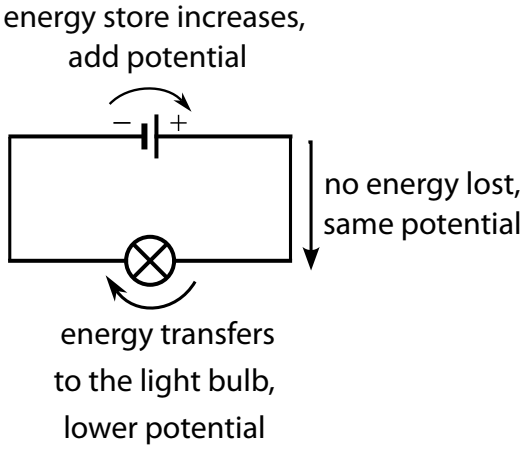
Potential and Circuits

Electric charges travel round a circuit to make a current. The charges can be positive or negative. Electric charges are the electrical "material" in a circuit.

The amount of energy transferred from the chemical energy store of a cell to a charge is called the **potential**. It is measured in volts (V).

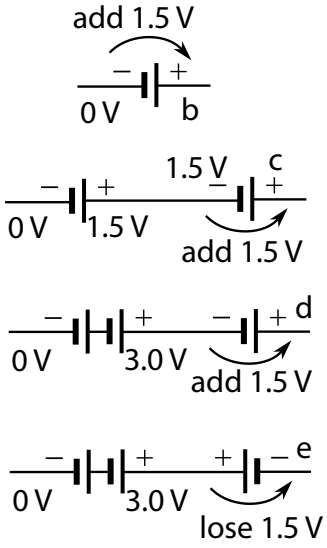
The potential will change around a circuit.





1 Complete the sentences below with the words **potential, positive, negative**.

(a) The potential at the _____ terminal of a cell, the short side, is 0 V. The _____ at the _____ terminal, the long side, is 1.5 V.



(b) What is the potential at (b)?

(c) Two cells are connected together. What is the potential at (c)?

(d) Three cells are now connected together. What is the potential at (d)?

(e) The third cell is now connected in reverse. What is the potential at (e)?

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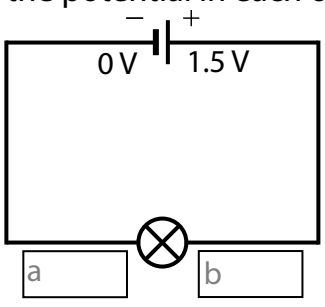
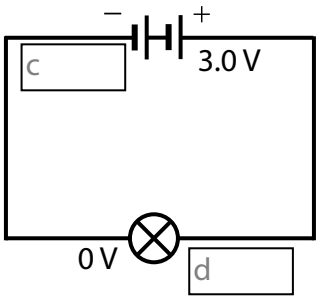
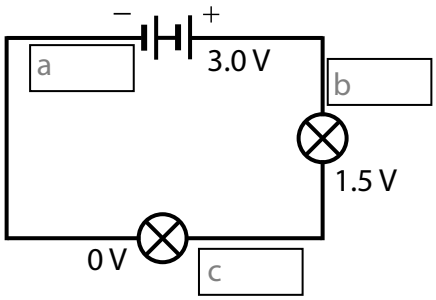
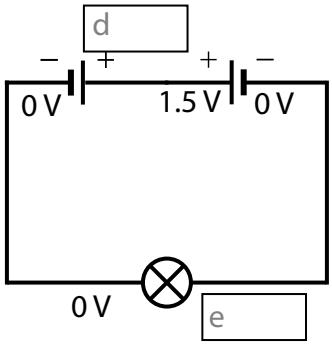
2 Write down the potential in each of the boxes.



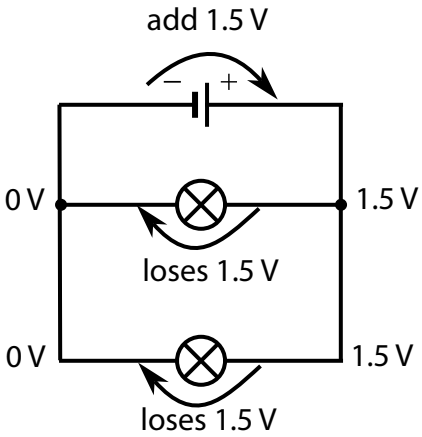


3 Write down the potential in each of the boxes.





Parallel circuits have junctions. The energy of a charge does not change when passing through a junction.



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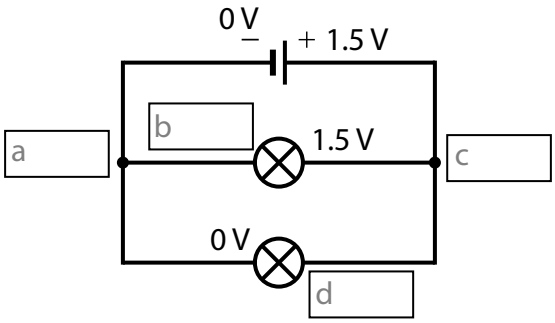
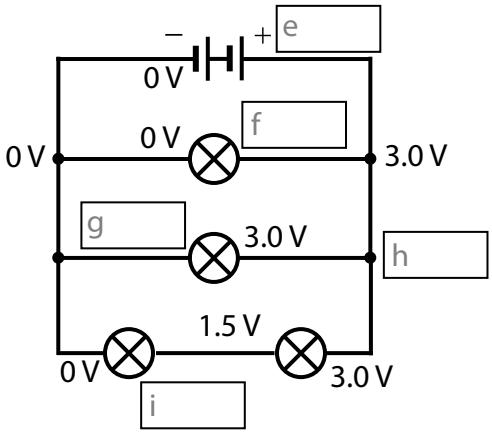
4 Write down the potential in each of the boxes.





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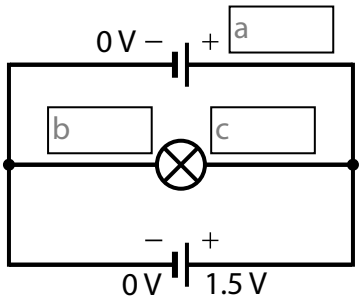
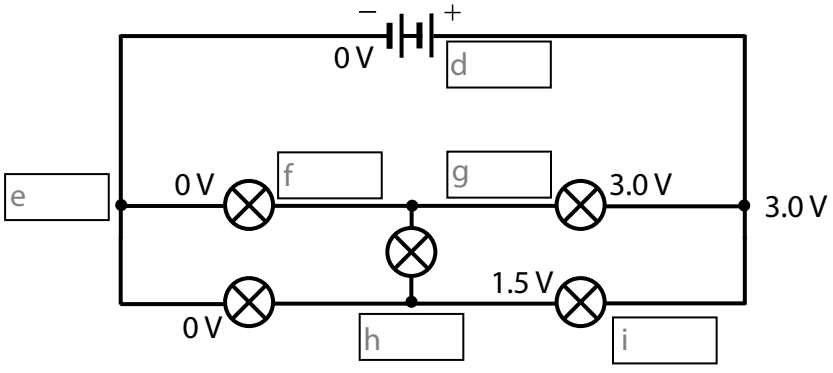
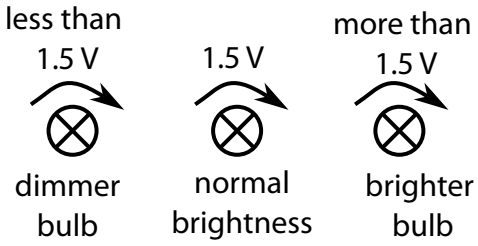
5 Write down the potential in each of the boxes.



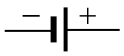


The difference in **potential** across a battery or a bulb is called the potential difference or voltage. When there is a potential difference across a bulb, the charges flow through it, lighting it up.

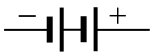


6 What is the potential difference for each combination of cells or **batteries**? Each cell has a potential difference of 1.5 V.

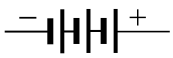
(a) 1-cell battery



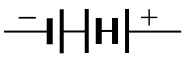
(b) 2-cell battery

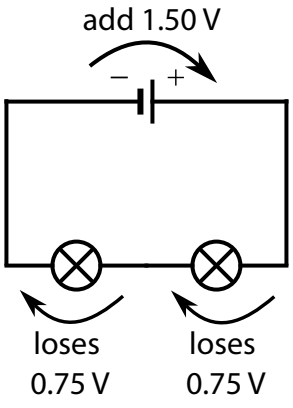


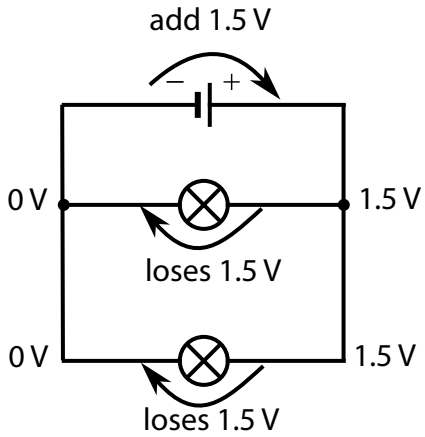
(c) 3-cell battery



(d) odd 3-cell battery







If two bulbs are next to each other on the same branch of the circuit, we say they are in series. The potential difference is shared across the two.
If two bulbs are on different branches of the circuit, we say the bulbs are in parallel. The potential difference is the same across the two branches of the circuit.

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7 In the circuits in question 4, which bulbs are in series and which bulbs are in parallel?

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8 Go back to the circuits in questions 2, 3, 4, and 5. What is the brightness of each bulb? Are they **normal**, **dimmer** or **brighter**?