Sources of electricity

The simple electric cell is used so much in everyday life to drive our portable electrical appliances.

The electric cell is a source of electrical energy.

The amount of electrical energy given by the electric cell is usually displayed as the number of volts.

In the AAA cell as shown the voltage is marked as 1.5 V

This is called the E.M.F. of the cell.

E.M.F means .....

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9V Battery

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How to measure the E.M.F. Of a Cell.

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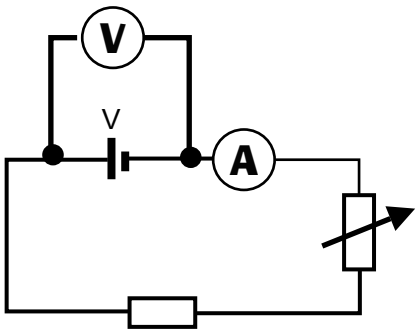
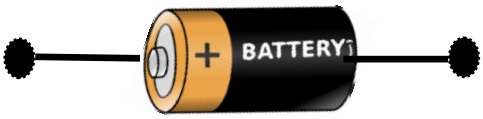
You don't get what it says on the tin!



Current taken from cell (A)	Terminal p.d.

The internal resistance of a cell.

Whenever electric current is taken from a cell the the voltage available at the terminals of the cell will be less than the E.M.F. of the cell.



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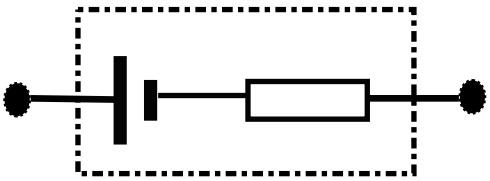

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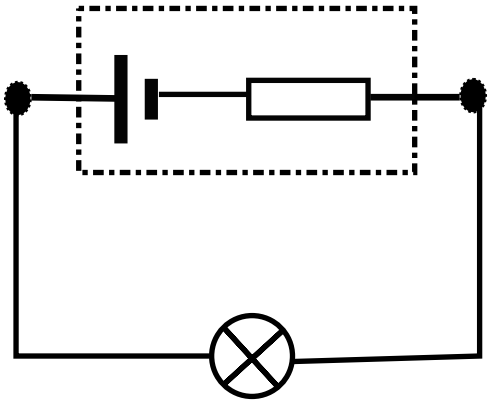


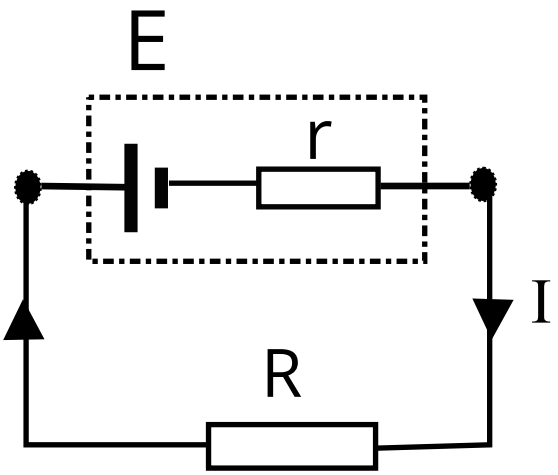
The emf of an electric cell is 1.5 V.

When the cell is connected to a lamp a current of 20 mA is taken from the cell and its terminal potential difference (tpd) becomes 1.3 V.

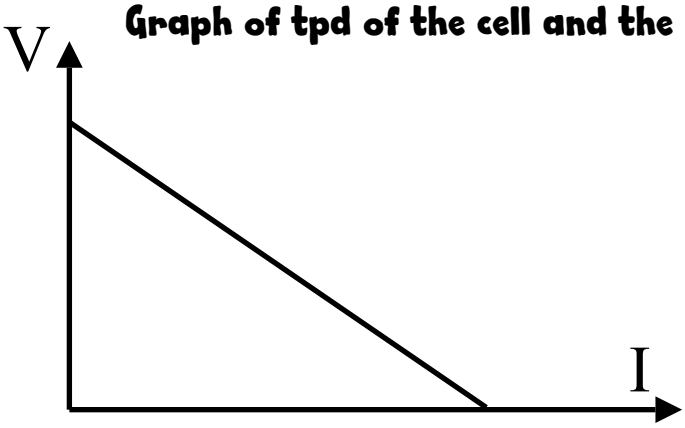
Determine the internal resistance of the cell.

The tpd of a cell.

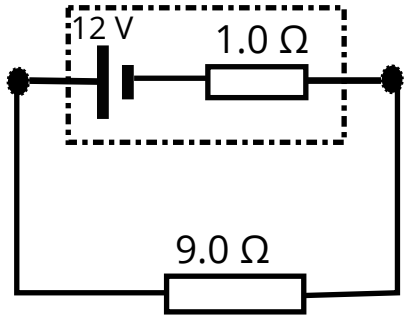
The emf of the cell equals the sum of the potential differences around the circuit.



Graph of tpd of the cell and the current drawn from it.



Examples



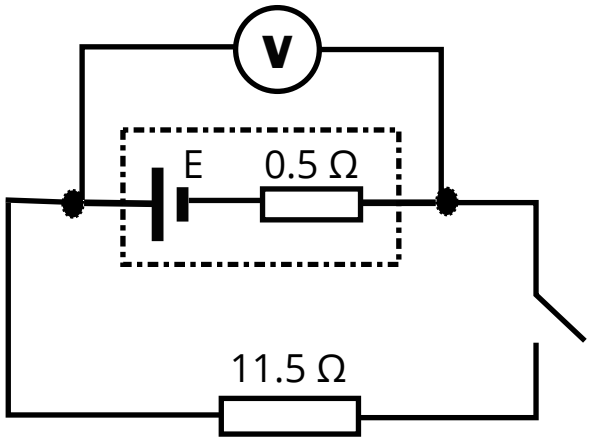
A cell has an emf of 12 V and an internal resistance of 1.0 Ω

It is connected to a load resistor of 9.0 Ω.

(1) Find the current in the circuit.

(2) the lost volts

(3) the tpd of the cell.



When the switch is closed in the circuit a current of 0.5 A flows around the circuit.

Determine

(1) The lost volts of the cell

(2) The tpd of the cell.

(3) The emf E of the cell.

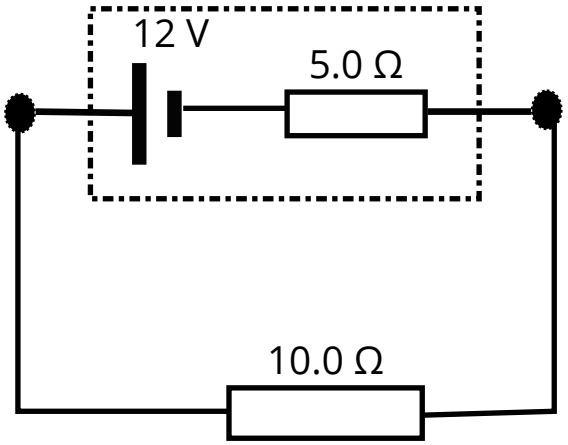
(4) The reading on the voltmeter when the switch is open

Load matching practical

In electrical circuits there is an optimum value for the load resistor that will give maximum transfer of electrical power from the emf source to the load resistor.

https://goo.gl/bj0voZ

Go to the PhET site and build the following circuit. Use the QR code or simply type the link given below it.



Instructions

1. Build the circuit set the values of the components shown by right clicking and adjusting values.
2. Place a non contact ammeter over the wire.
3. Vary the load resistor from 0 ohms to 10 ohms
4. Record values into table below and use the appropriate format to draw a graph of **load resistance against Power transferred.**

Load resistor value/ohms	Current /A	Power I^2R
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Conclusion