4 Electric circuits – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

English	中文	Write it 3 times (English)		
electric current	电流			
circuits	电路			
amperes	安培			
volts	伏特			
current	电流			
ammeter	电流表			
voltage	电压			
voltmeter	电压表			
resistance	电阻			
ohms	欧姆			
Power	功率			
watts	瓦特			
series	串联			
parallel	并联			

exercises.lol exercises.com.cn

Recall

From Part 1 you know charge can flow through a conductor. A flow of charge is an **electric current** 电流. Here we look at simple **circuits** 电路 and the key electrical quantities.

- Current is measured in **amperes** 安培 (A).
- Voltage is measured in **volts** 伏特 (V).

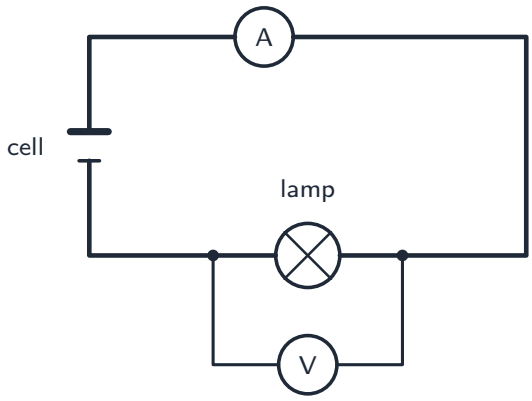
Nothing here is hard – it just adds three equations.

New ideas

Read these first, then do the Practice.

1 Current, voltage and resistance

- **current** 电流 (I) is the charge that passes each second: $I = \dfrac{Q}{t}$. Measured with an **ammeter** 电流表 (in series).
- **voltage** 电压 (V) is the energy given to each unit of charge. Measured with a **voltmeter** 电压表 (in parallel).
- **resistance** 电阻 (R) is how hard it is for current to flow: $R = \dfrac{V}{I}$ (in **ohms** 欧姆, Ω).



Worked example. A 12 V battery drives 0.50 A through a lamp: $R = V/I = 12/0.50 = 24\ \Omega$.

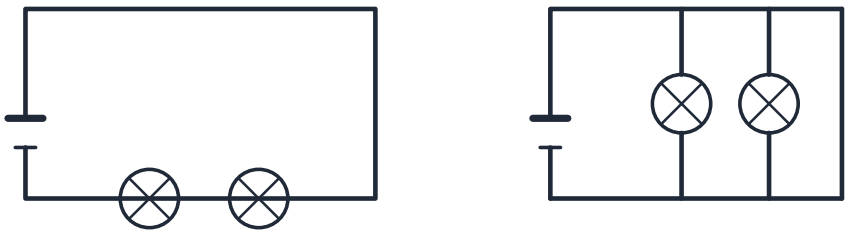
2 Electrical power

Power 功率 is the energy transferred each second (in **watts** 瓦特, W):

$$P = IV$$

■ 3 Series and parallel

- in a **series** 串联 circuit (one loop): the current is the **same** everywhere; the voltage is **shared**; resistances **add up**.
- in a **parallel** 并联 circuit (separate branches): each branch gets the **full** voltage; the current **splits**.



Home lamps are wired in **parallel**, so each gets full voltage and one can fail without the others going off.

Watch out: an **ammeter** goes *in series* (it measures the current passing through); a **voltmeter** goes *in parallel*, across the component. In a series circuit the current is the same everywhere – it only **splits** in parallel.

Practice

Try these in order.

4.1 Write the equation linking current, charge and time. [1]

4.2 A current of 3.0 A flows for 20 s. Calculate the charge that passes. [2]

4.3 A 6.0 V supply drives 0.30 A through a resistor. Calculate its resistance. [2]

4.4 A lamp runs at 12 V and 2.0 A. Calculate its power. [2]

4.5 In a series circuit, what is true about the current at every point? [1]

4.6 Why are the lamps in a house wired in parallel? [2]

4.7 Challenge. A 230 V hairdryer has a power of 1150 W. Calculate the current it draws. [2]