

## 8 The electric field – 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 field | 电场 | _____                      |

### Recall

In Part A you met the force between charges. Now the **field** that carries that force:

- A charge seems to reach across empty space to push another.
- We describe this with an "electric field" filling the space around a charge.

Each idea has a worked example before the Practice.

### New ideas

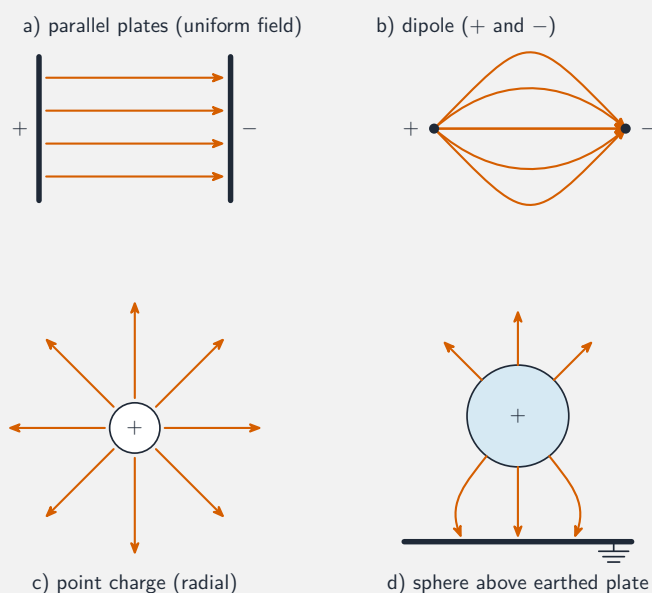
#### ■ 1 The electric field

An **electric field** 电场  $E$  is the force felt per unit of charge at a point:

$$E = \frac{F}{q}, \quad \text{so a charge in a field feels} \quad F = qE.$$

#### ■ 2 Field lines

Field lines point **away** from positive charges and **toward** negative ones. Where the lines are denser, the field is stronger.



### ■ 3 Force on a charge

*Worked example.* A field of  $2000 \text{ N/C}$  acts on a  $3.0 \times 10^{-6} \text{ C}$  charge:  $F = qE = 3.0 \times 10^{-6} \times 2000 = 6.0 \times 10^{-3} \text{ N}$ .

### ■ 4 The field of a point charge

A single point charge  $Q$  makes a field  $E = \frac{kQ}{r^2}$  —stronger close in, weaker far away (inverse-square, like the force).

**Watch out:** the field points the way a **positive** test charge would be pushed. A negative charge in the same field feels a force in the **opposite** direction to the field.

## Practice

Try these in order. The methods are all above.

**2.1** State what an electric field is, in words. [2]

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**2.2** State which way field lines point around a positive charge. [1]

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**2.3** A field of 500 N/C acts on a  $4.0 \times 10^{-6}$  C charge. Find the force. [2]

**2.4** State what a denser pattern of field lines means. [1]

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**2.5** State the direction of the force on a negative charge placed in a field. [2]

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