

8 The electric field – Part 2

Name: _____ Class: _____ Date: _____

Vocabulary

*Write each word three times.***English****Write it 3 times** (English)

electric field

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

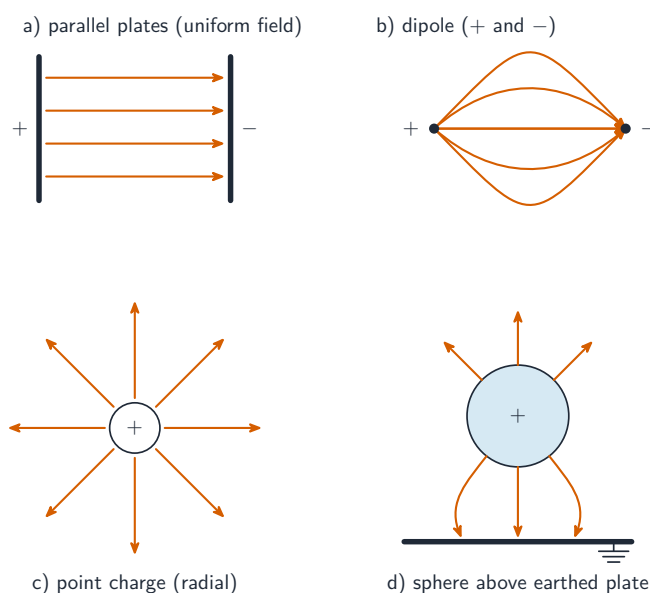
■ 1 The electric field

An **electric field** 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 N/C acts on a 3.0×10^{-6} C charge: $F = qE = 3.0 \times 10^{-6} \times 2000 = 6.0 \times 10^{-3}$ 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]

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

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

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

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