

Electric Field

Read from Lesson 4 of the Static Electricity chapter at The Physics Classroom:

<http://www.physicsclassroom.com/Class/estatics/u8l4a.html>

<http://www.physicsclassroom.com/Class/estatics/u8l4b.html>

MOP Connection: Static Electricity: sublevels 10 and 11

- The standard metric units of measurements for electric field strength are _____.
- The direction of the electric field vector is defined as _____
_____.

Use the electric field equations to answer the following questions.

- A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.050 N. The electric field strength is _____.
- A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.10 N. The electric field strength is _____.
- An object with a charge of 2.0×10^{-4} C creates an electric field. A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.050 N. The electric field strength is _____.
- An object with a charge of 2.0×10^{-4} C creates an electric field. A test charge of $+2.0 \times 10^{-6}$ C experiences a force of 0.10 N. The electric field strength is _____.
- An object with a charge of 4.0×10^{-4} C creates an electric field. A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.10 N. The electric field strength is _____.

- An object with a charge of **Q** creates an electric field. A positive test charge, **q**, is used to test the strength of the field. Use this scenario to answer the following questions:



- If the charge of the test charge **q** is doubled, then it will experience _____ (2X, 4X, 1/2, 1/4-th, the same) force; the electric field strength at this location will be _____ (2X, 4X, 1/2, 1/4-th, the same as) the original value.
 - If the charge of the object **Q** is doubled, then the test charge will experience _____ (2X, 4X, 1/2, 1/4-th, the same) force; the electric field strength at this location will be _____ (2X, 4X, 1/2, 1/4-th, the same as) the original value.
 - If the distance between the charge and the test charge is doubled, then the test charge will experience _____ (2X, 4X, 1/2, 1/4-th, the same) force; the electric field strength at this location will be _____ (2X, 4X, 1/2, 1/4-th, the same as) the original value.
- Use your understanding of electric force and electric field to fill in the following table.

	Charge creating the E field (C)	Charge used to test the E field (C)	Force experienced by test charge (N)	Electric Field Intensity (N/C)	Distance (fictional units)
a.	4.0×10^{-4} C	1.0×10^{-6} C	0.20 N		d
b.	4.0×10^{-4} C	2.0×10^{-6} C		2.0×10^5 N/C	d
c.	8.0×10^{-4} C	1.0×10^{-6} C	0.40 N		d
d.	8.0×10^{-4} C	2.0×10^{-6} C		4.0×10^5 N/C	d
e.	8.0×10^{-4} C		0.60 N		d
f.	8.0×10^{-4} C	1.0×10^{-6} C		1.0×10^5 N/C	2d
g.	8.0×10^{-4} C	2.0×10^{-6} C			2d
h.	8.0×10^{-4} C		0.10 N		2d
i.	4.0×10^{-4} C			8.0×10^5 N/C	0.5 d
j.	4.0×10^{-4} C				0.5 d