 Name: _____

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

1. The standard metric units of measurements for electric field strength are ___N/C___.
2. The direction of the electric field vector is defined as ___a direction a + charge would move.___

Use the electric field equations to answer the following questions.

3. A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.050 N. The electric field strength is ___50000 N/C___ $\frac{0.05N}{1.0E-6C}$
4. A test charge of $+1.0 \times 10^{-6}$ C experiences a force of 0.10 N. The electric field strength is ___.1/1.0E-6 = 100,000 N___
5. 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 ___50000 N/C___ $\frac{0.05N}{1.0E6}$ 50000 N/C
6. 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 ___50000 N/C___ x2 $\frac{.1}{2E-6} = 50000$
7. 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 ___100,000___
8. 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:

   a. 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.
   b. 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.
   c. 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	200000.	d
b.	4.0×10^{-4} C	2.0×10^{-6} C	0.4 N	2.0×10^{5} N/C	d
c.	8.0×10^{-4} C	1.0×10^{-6} C	0.40 N	4.0E5	d
d.	8.0×10^{-4} C	2.0×10^{-6} C	0.8 N	4.0×10^{5} N/C	d
e.	8.0×10^{-4} C	1.5E-6 C	0.60 N	4.0E5 N/C	d
f.	8.0×10^{-4} C	1.0×10^{-6} C	.04/4 = .01	1.0×10^{5} N/C	2d
g.	8.0×10^{-4} C	2.0×10^{-6} C	.8/4 = 0.2	1.0E5	2d
h.	8.0×10^{-4} C	1.0E-6 C	0.10 N	1.0E5 N/C	2d
i.	4.0×10^{-4} C			8.0×10^{5} N/C	0.5 d
j.	4.0×10^{-4} C			8.0E5 N/C	0.5 d

Created Q by 9. $F = Eq$ $\frac{F}{E} = q$ $\frac{.6}{4.0E5} = 1.5E-6$ How much force if $q = 1C$ $\frac{0.20N}{1.0E-6C}$ $F = Eq$ $\frac{F}{E} = q$ $\frac{0.1}{1.0E5} = 1.0E-6C$ $F = qE$ $E = \frac{F}{q}$