

# The Electric Field

1. Draw the electric field around the following charges:

a. Single Positive Charge

b. Single Negative Charge



c. Two Positive Charges

d. Two Negative Charges



e. Two Opposite Charges



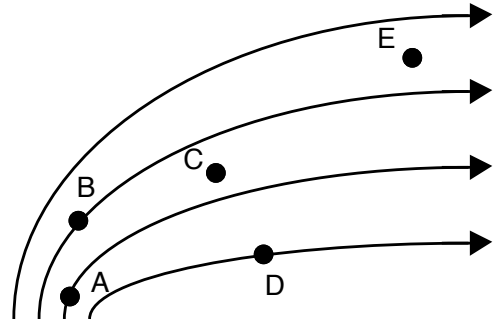
2. The diagram to the right represents a random electric field.

a. At which point would the electric field be the greatest?

b. At which point would the electric field be the least?

c. At point B, draw an arrow that would represent the force on a proton placed at B.

d. At point C, draw an arrow that would represent the force on an electron placed at C.

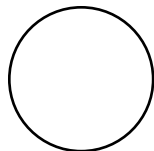


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It turns out that when you put a charge on a conductor, the charge will distribute itself on the surface of the conductor so that there is no electric field inside the conductor – even if there is a huge electric field just outside the conductor. In order to do this, charge tends to concentrate on edges and especially points.

3. What was the demo to show that charge piles up on edges and points?
4. Imagine that a sphere and a cube each have a large negative charge on them. Show how the extra electrons would be distributed on each shape.



5. Why is the van de Graaff generator a big sphere?
6. Charge will build up on the van de Graaff generator until the electric field just outside the generator is about 400,000 N/C, which is a pretty big field. What is the field inside the generator?
7. Air is actually a pretty good electrical insulator. However, if there is an electric field bigger than about 400,000 N/C, what happens to air?
8. Putting a big conductor in an electric field causes the free electrons on the conductor to move around and rearrange themselves. After they move around, what is true about the electric field inside the conductor?
9. What is meant by the term *Electric Shielding*?
10. At the Museum of Science, the person running the lightening show is in a metal cage. Why does that keep them safe?
11. If you are in an accident, and live electric wires fall on your car, what should you do?
12. Why can't an insulator shield out electric fields?