

Source: [\[KB20200824225130\]](#)

From this note, I am assuming that you have read [\[KB20200824225536\]](#) Illustrating electric fields.

Imagine if we had... Well... Lot's of vectors:

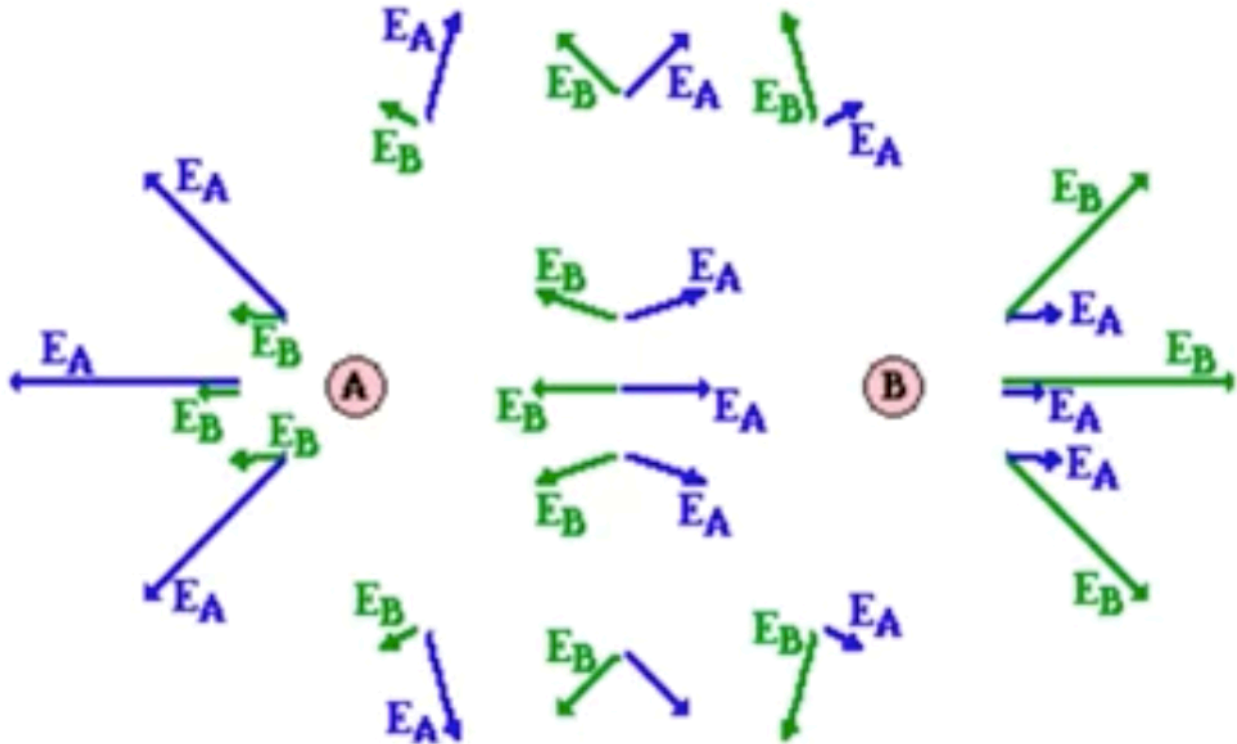


Figure 1: Screen Shot 2020-08-24 at 9.01.47 PM.png

In this diagram,  $A + B$  are both positive. The diagram, now, shows *both* electric field vectors for A and B. Take, for instance,



This tidbit:

If we connected it back to A and B, you will get:

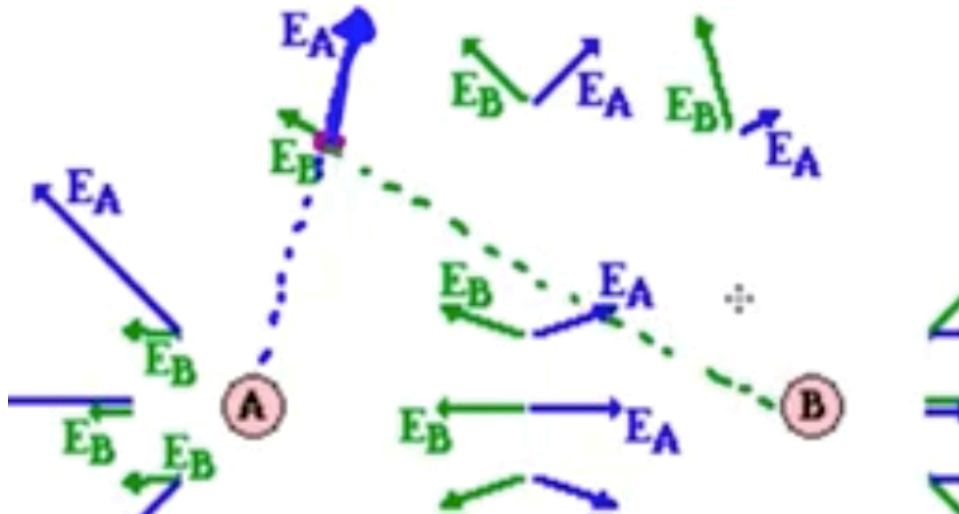


Figure 2: Screen Shot 2020-08-24 at 9.05.26 PM.png

As you could see, the force from B is smaller because the point is farther away from B. Ok, now, let's see the *net* electric field by adding all of these vectors up:

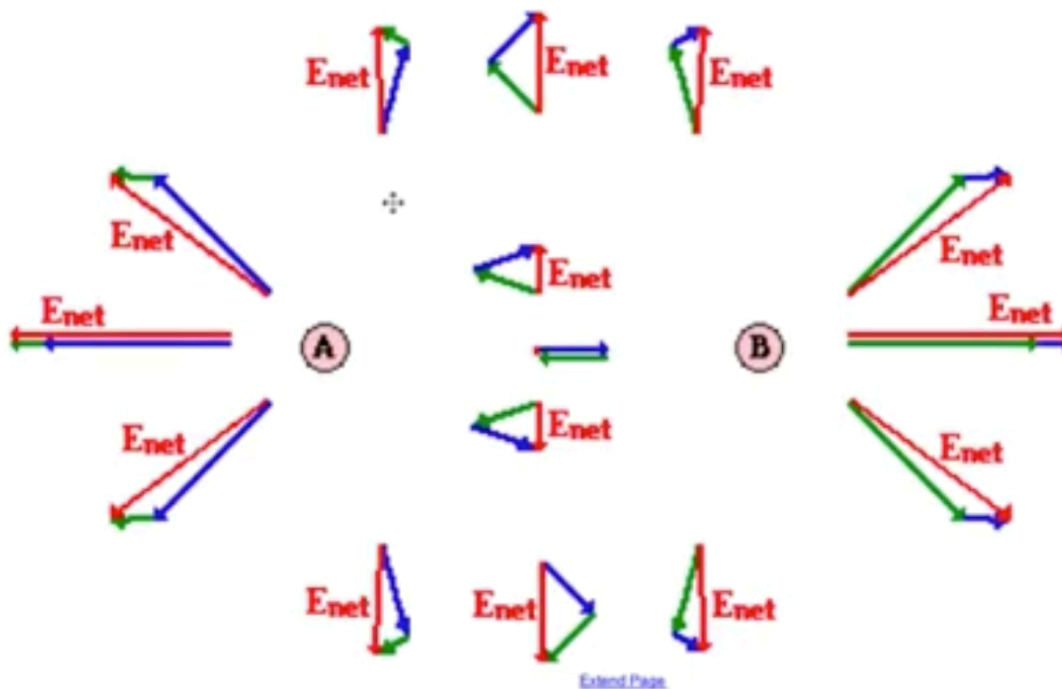


Figure 3: Screen Shot 2020-08-24 at 9.07.26 PM.png

Nice! You are, at this point, hopefully seeing something of a symmetry. Remember how we had two ways of drawing an electric field? That

- 1) You choose to draw an infinite amount of vectors, or
- 2) You draw lines from the center of each element outwards, connecting all the vectors

If we do option 2, you see this lovely image:

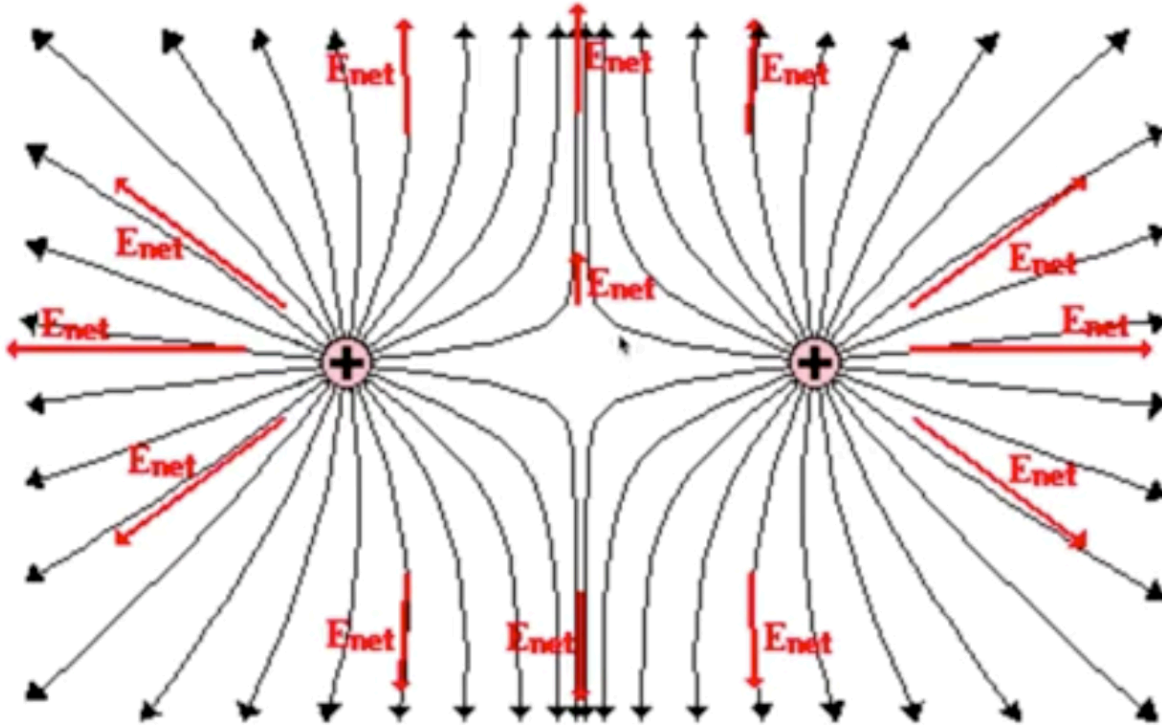


Figure 4: Screen Shot 2020-08-24 at 9.10.52 PM.png

Please, be also reminded of the fact that the world is 3D, making the diagram more like this:

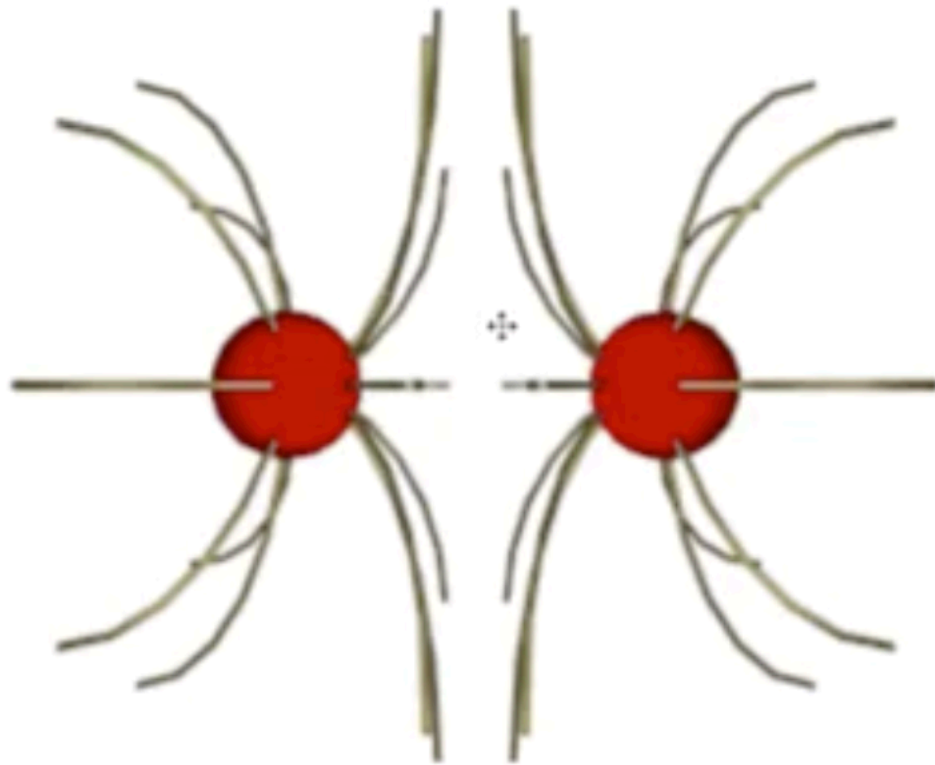


Figure 5: Screen Shot 2020-08-24 at 9.24.48 PM.png

Great. Lastly there are other possible configurations of charges apart from positive-positive, and they are as follows:

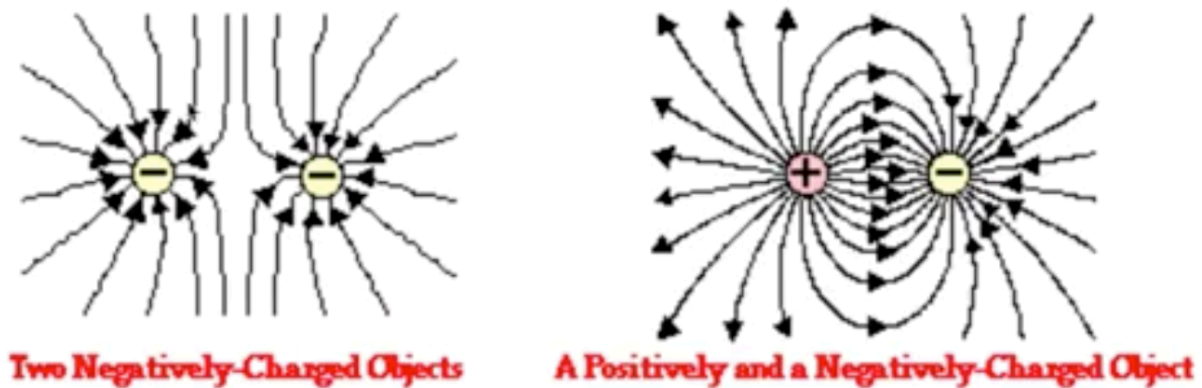


Figure 6: Screen Shot 2020-08-24 at 9.25.58 PM.png

As you could see. There is a lovely point (yes, it's actually a point, but people are lazy and don't to draw, say *infinite* field lines) in the middle of Neg-Neg and Pos-Pos electric field graphs with a lovely hole. At that hole, the field value is 0.

(Thanks Mr. Valdez!)

Here's a gallery of electric fields with unequal charges:

### Electric Field Line Patterns for Objects with Unequal Amounts of Charge

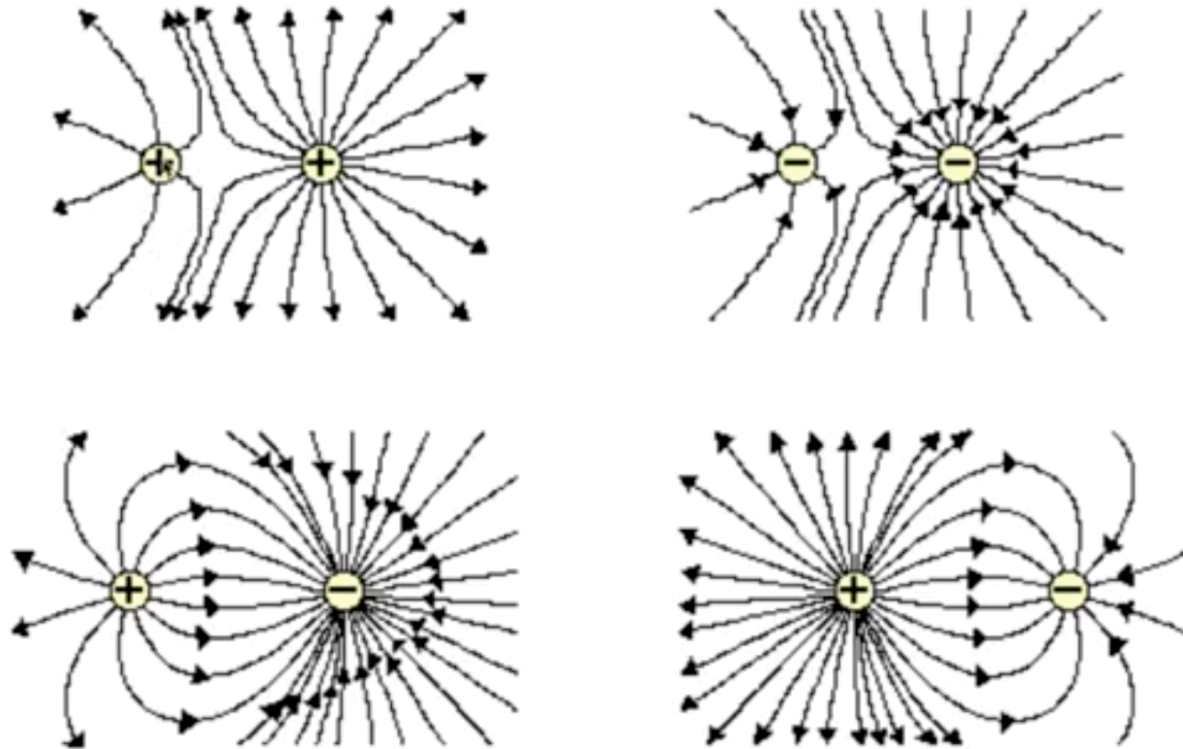


Figure 7: Screen Shot 2020-08-24 at 9.28.56 PM.png

As you could see, the higher amount of field lines, the higher is the strengths. If each charge's field "bends" towards the other, (i.e. particles that go *AAAAA I AM GOING TO OVERTAKE THE OTHER PARTICLE'S FIELD LINES*)