

Electric Field Lines

Purpose:

The purpose of this activity is to investigate the electric field lines around a configuration of two or more electric charges.

Getting Ready:

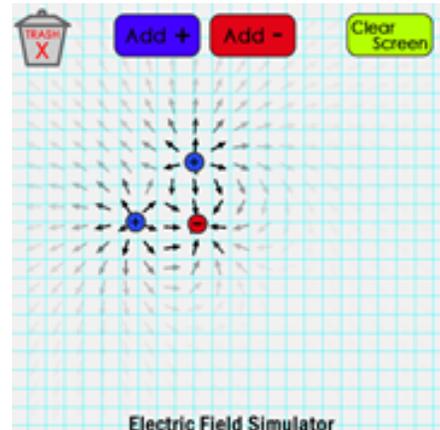
Navigate to the **Electric Field Lines** Interactive at The Physics Classroom website:

<http://www.physicsclassroom.com/Physics-Interactives/Static-Electricity/Electric-Field-Lines>

Navigational Path:

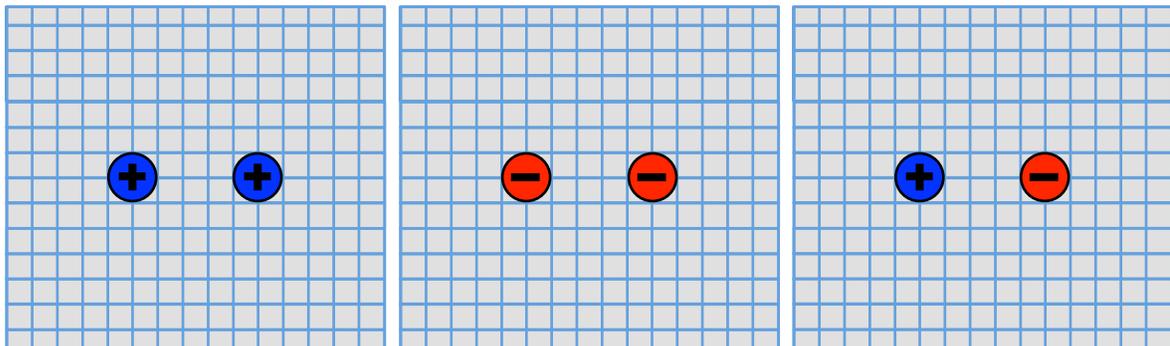
www.physicsclassroom.com ==> Physics Interactives ==>
Static Electricity ==> Electric Field Lines

Once you Launch the Interactive, resize the window as desired and then begin getting acquainted with the simulation. Add + and - charges to the work space and move them about. Drag a charge to the Trash can if no longer needed. Learn to place like charges on top of each other in order to intensify the amount of charge. Or use the Clear Screen button to remove all the charges at once. Once you understand how to use the simulation, begin completing the exercises below.



Interact • Explore • Learn

1. This simulation shows lines of force in the region of space surrounding a charge or configuration of charges. The strength of these forces is depicted by how bold or how faint the color is. State a general rule for the direction of these lines of force.
2. The lines of force shown in this simulation can be connected to form unbroken electric field lines. Create the following three configurations of two charges and observe the electric lines of force. Use these lines of force to draw unbroken electric field lines for each configuration.



3. Create the following configurations of three or more charges. Draw the electric field lines for each situation. Avoid intersecting your electric field lines. Note that **Diagram F** is similar to **Diagram E** but has five negative charges piled onto the same location.

Diagram A

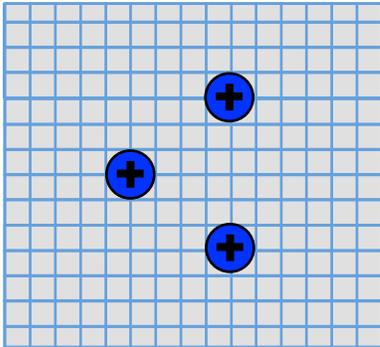


Diagram B

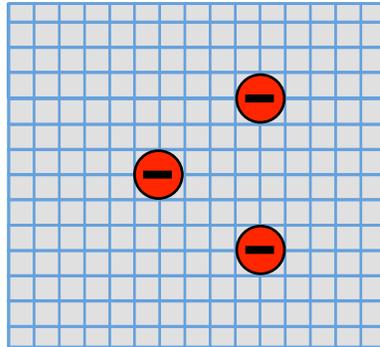


Diagram C

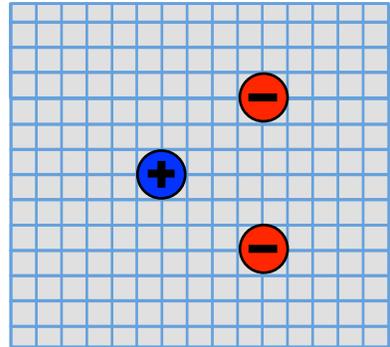


Diagram D

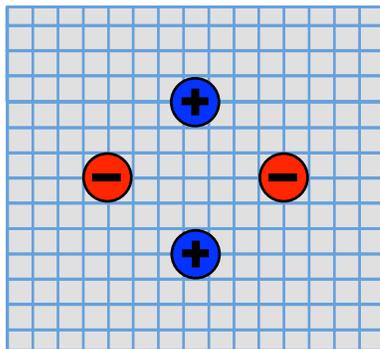


Diagram E

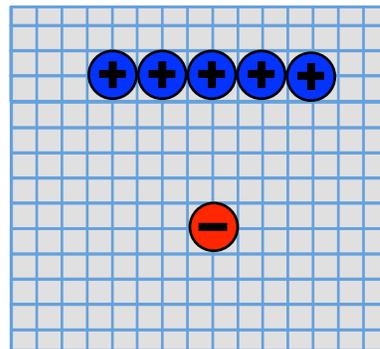
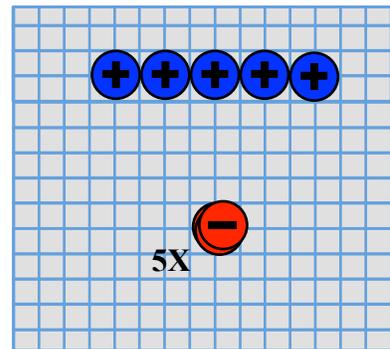


Diagram F



4. Compare **Diagram E** and **Diagram F**. How does the quantity of charge at a given location seem to affect the curvature of the electric field lines in the space surrounding it.
5. Observe the boldness and faintness of the lines of force for any of your configurations. Make a statement describing where the electric field strength is greatest.