Electric field

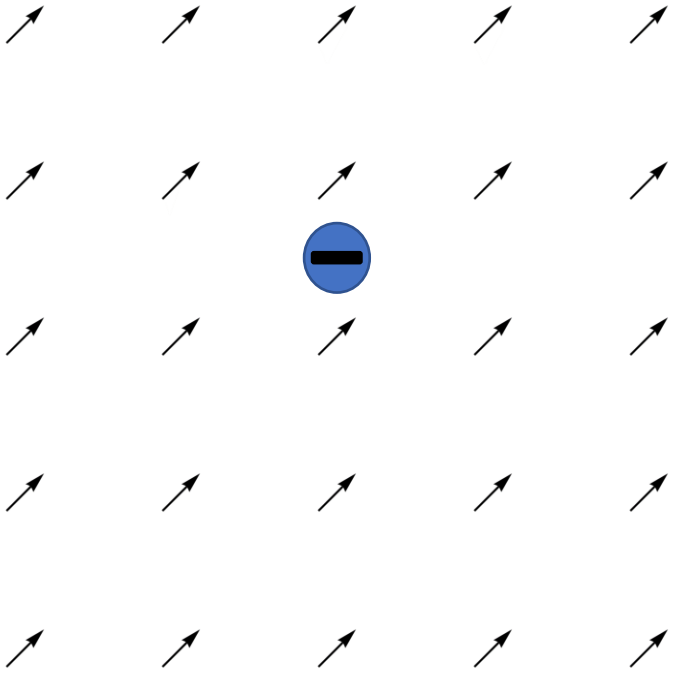
Similar to a way in which a fire changes the temperature of its surroundings, an electric charge changes the space by creating an **electric field**. The electric field tells us the force that a positive test charge would feel if it were placed in each point in space. The force at each point is defined by Coulomb's law.

The electric field is a property of the space around us that determines the force (per unit of charge) that a charged particle would feel if it was positioned there. Therefore, if we know the electric field $\vec{E}$, we can get the force $\vec{F}$ acting on a particle with charge q_1 as follows:

$$\vec{F} = q_1 \vec{E}$$

Homework 26

Problem 1. A negatively charged ball is placed in a constant electric field that is pointing at 45 ˚(as shown below). Find the force that the ball feels if it has a charge of -5C and the magnitude of the electric field is E = 2.5 N/C, and sketch the direction of force. There is no gravity or any other force acting on the ball.



Problem 2. Suppose now that a positively charged ball is placed 5m above the surface of the Earth, where it also feels the force of gravity. It has a mass of 5 Kg, and it has a positive charge of 5 C. We turn on an electric field that is pointing upwards. Find the required magnitude of the electric field such that the ball will remain in its same position.