# Physics Honors: Electric Force

# Electrostatic Force

- Electrostatic force is stronger than gravity. However, like gravity, it depends distance.

- The SI unit for charge is called the Coulomb (C)

- One Coulomb of charge is the charge that $6.24 \times 10^{18}$ electrons or protons would have

# Elementary Charge

Every single electron or proton will have the same amount of charge. This known as the Elementary Charge.

The Elementary Charge is $1.602 \times 10^{-19}$ C

Protons will have a positive charge, while electrons will have a negative charge.

# Coulomb's Law

Coulomb's Law tells us what the force exerted between two charges that are a certain distance apart from each other

F = Force (N)

K = Coulomb's Constant → 9.0 x$10^9$ $Nm^2/C^2$

$q_1$ = Charge 1(c)

$q_2$ = Charge 2(c)

r = radius (m)

$$F = k\frac{q_1 q_2}{r^2}$$

# Coulomb's Law Practice

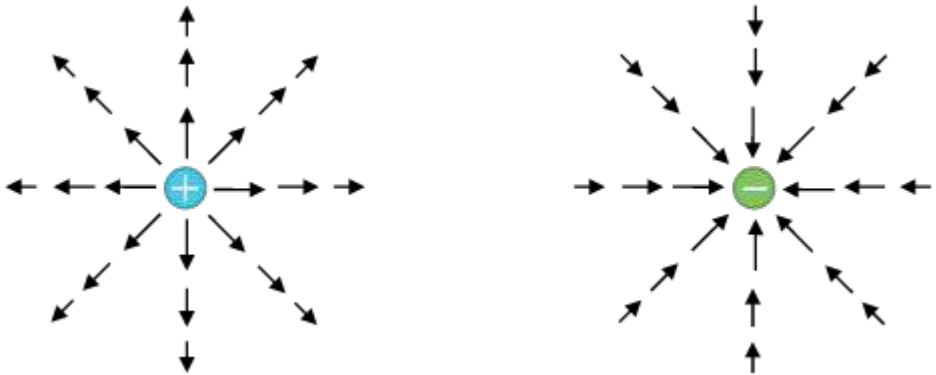
A negative charge of $-2.0 \times 10^{-4}$ C and a positive charge of $8.0 \times 10^{-4}$ C are separated by 0.3 m. What is the force between the charges?

# Coulomb's Law Practice

A negative charge of $-6.0 \times 10^{-6}$ C exerts an attractive force of 65 N on a second charge that is 0.05 m away. What is the magnitude of the second charge?

# Point Charges

Coulomb’s Law only works for point charges



# Physics Honors: Electric Fields

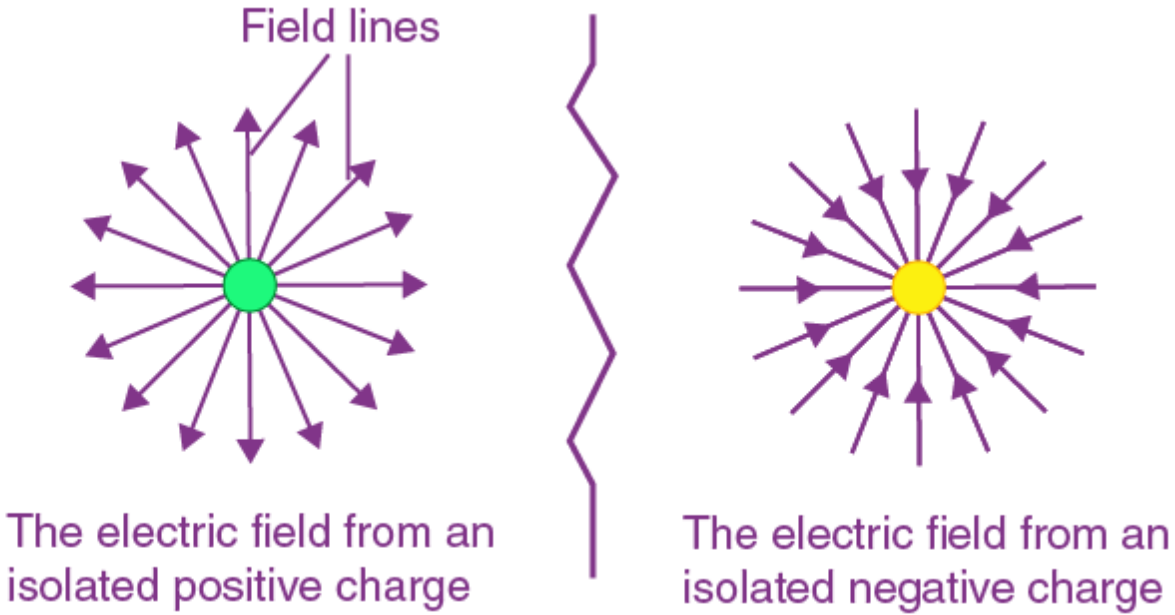
# Electric Fields

An electric field is a property of the space around a charged object that exerts forces on other charged objects.

You cannot see an electric field, but there are ways to determine if they are present.

# What is an electric field?

We can imagine what a field would act if we put a single positive “test charge” in the field.



# How do we determine the strength of an electric field?

If, and only if (iff), the charge q is a point charge or a uniformly charged sphere, you can calculate its electric field using a version of Coulomb's law.

$$E = \frac{kQ}{r^2}$$

E = Electric Field (N/C)

K = Coulomb's Constant → 9.0 x$10^9$ $Nm^2/C^2$

Q = Charge of particle in field (c )

r = radius (meters)

# Drawing Electric Field Lines