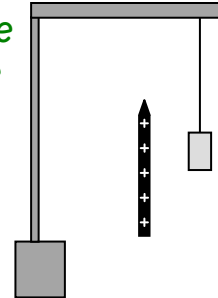


Quiz 1

1) a)² When a positively charged rod is brought near a small piece of suspended (neutral) aluminum foil, the rod **(attracts, repels)** the foil. Explain **Why**.

The uncharged aluminum foil is initially attracted to the rod since the rod induces charge separation in the foil (attracting opposite charge to the near side and repelling like charge to the far side).



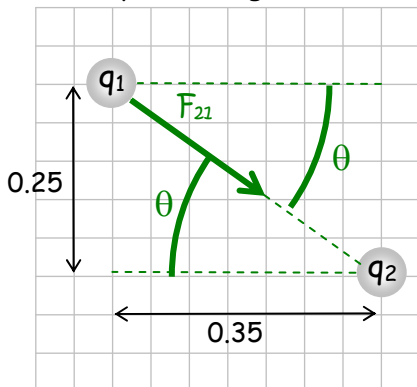
b)² After a positively charged rod touches a small piece of suspended (neutral) aluminum foil, the rod **(attracts, repels)** the foil. Explain **Why**.

After touching the rod, the foil acquires actual charge that is the same as the rod and it will then be repelled by the rod and move away from it.

2) The charges shown are $q_1 = 5 \mu\text{C}$ and $q_2 = -7 \mu\text{C}$.

a)³ Find the magnitude of the force on q_1 due to q_2 where $k = 8.99 \times 10^9 \text{ Nm}^2/\text{C}^2$.

b)³ find the direction of the force on q_1 due to q_2 . Give an angle. Sketch the angle and an arrow representing the force vector on the graph.



a) Find the distance between the charges

$$r_{12} = \sqrt{(0.25)^2 + (0.35)^2} = 0.43$$

Find the magnitude of the force from Coulomb's law

$$F_{21} = \frac{k|q_1||q_2|}{r_{12}^2} = \frac{(8.99 \times 10^9)(5 \times 10^{-6})(7 \times 10^{-6})}{(0.43)^2}$$

$$F_{21} = 1.70 \text{ N}$$

b) Find the angle of the force

$$\theta = \tan^{-1}\left(\frac{0.25}{0.35}\right) = 35.5^\circ$$

$$F_{21} = 1.70 \text{ N}, 35.5^\circ \text{ down from the horizontal in the diagram.}$$

