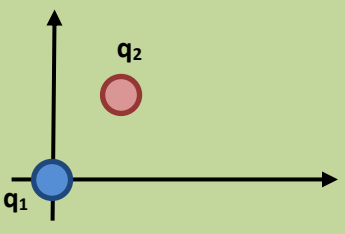
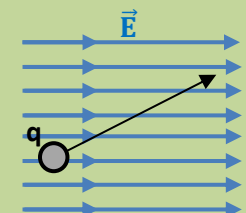


CONCEPT: WORK DUE TO ELECTRIC FORCE

- Whenever a charge moves, it changes its position → so its [**POTENTIAL** | **KINETIC**] energy changes.
 - The Electric Force and/or Field accelerates and **moves** charges.
 - Remember: whenever there's a change in energy, some _____ is done.

• Energy conservation: $-\Delta U = \Delta K$ - Work energy theorem: $W = \Delta K$ → $W = \underline{\hspace{2cm}}$ - U & V relationship: $\Delta U = q\Delta V$ → $W = \underline{\hspace{2cm}}$		
	→ $W = \underline{\hspace{2cm}}$	$W = \underline{\hspace{2cm}}$

- Work by the electric force depends ONLY on _____, NOT the “path”.
 - When charges get “very far away” (infinitely far), Electric Potential Energy → _____.

EXAMPLE: A 2nC charge is initially 5mm away from a 10nC charge. The 2nC charge is then moved 2mm closer to the 10nC charge. What is the work done by the electric force?

EXAMPLE: A 1 μ C charge is placed in a horizontal, uniform electric field of magnitude 1,000 N/C. a) What is the work done on the charge when it travels a distance of 2m at an angle of 30° below the horizontal? b) If this 3g charge initially starts from rest, how fast is this charge going after the 2m displacement?

PRACTICE: WORK DUE TO POTENTIAL DIFFERENCE

An electron moves from point A to point B. The potential difference between these two points is 100 V. What is

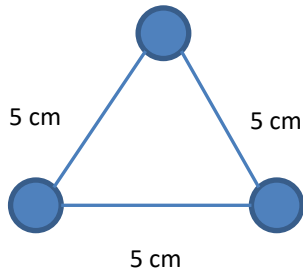
- (a) the point of higher potential?
- (b) the work done on the electron?
- (c) the final speed of the electron if its initial speed is zero?

EXAMPLE: BRINGING TWO CHARGES FROM INFINITY

How much work is done by the electric force in bringing a 5C charge from infinitely far away to the origin of a coordinate system, and then bringing a -2C charge from infinitely far away to a point $(3\text{m}, 4\text{m})$? Assume there are no other charges.

PRACTICE: WORK TO ASSEMBLE A TRIANGLE OF CHARGES

What work is needed to assemble an equilateral triangle of side length 5 cm, with a $5\ \mu\text{C}$ charge at each vertex?



EXAMPLE: SPEED OF ELECTRON IN UNIFORM ELECTRIC FIELD

An electron is initially at rest in a uniform, 500 N/C electric field. After traveling 10 cm, what is the electron's speed?