1. Draw a vector 0.50 m above the plates to represent the electric field due to the electric field.

2. Calculate the electric field strength between the two plates.

3. Draw a vector 1.5 meters above the plates to represent the force on the particle due to the electric field.

4. Calculate the force on the particle.

5. Calculate the energy of the particle when it reaches plate B.

6. Calculate the particle's velocity when it reaches plate B (mass of a alpha particle is 2 protons + 2 neutrons)

\[ v = 2.0 \times 10^7 \text{ m/s} \]

1.3 \times 10^{-12} J = \frac{1}{2} m (v^2) \text{ (and solve for v)}

\[ \text{Kinetic energy is } \frac{1}{2} mv^2 \]

\[ W = q \Delta E = \frac{1}{2} mv^2 \]

\[ \text{Charge in energy is work or force times distance} \]

\[ q_1 + q_2 = 2 \text{e} + 2 \text{e} \text{ each with a charge of } 1.6 \times 10^{-19} \text{C} \]

\[ N = 8.3 \times 10^{-12} \text{ C} \]

\[ M = 4.1 \times 10^{-17} \text{ N} \]

\[ \text{He+2 has two excess protons each with a charge of } 1.6 \times 10^{-19} \text{C} \]

Answer Key:

- **0 Volts**
- **4 Volts**
- **10 Volts**
- **15 Volts**
- **20 Volts**
- **25 Volts**
- **30 Volts**
- **35 Volts**

**P = 1.5 meters**

**1.5 meters**

**4x10^7 Volts**

**4x10^7 Volts**

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**4x10^7 Volts**

**4x10^7 Volts**

**4x10^7 Volts**