



Electric Potential vs Electric Potential Energy

So many students mix up electric potential and electric potential energy! Here's how to tell them apart.

Electric Potential vs Electric Potential Energy

| Names | Symbol | Calculation |
|---|--------|------------------------------------|
| → Electric Potential → Potential | V | $V = k \frac{q}{r}$ (point charge) |
| → Electric Potential Energy → EPE | U_E | $U_E = qV$ |

Every point in space has a certain electric potential (V), which is determined by the surrounding charges. If we put a charge, often called a *test charge*, at any point, that charge has electric potential energy (U_E) that we can calculate using $U_E = qV$.

What about Electric Potential *Difference* or *Change in* Electric Potential?

| Names | Symbol | Calculation |
|--|--------------|----------------------------------|
| → Electric Potential <i>Difference</i> → Potential <i>Difference</i> → <i>Change in</i> Electric Potential → <i>Change in</i> Potential | ΔV | $\Delta V = V_f - V_i$ |
| → Electric Potential Energy <i>Difference</i> → EPE <i>Difference</i> → <i>Change in</i> Electric Potential Energy → <i>Change in</i> EPE | ΔU_E | $\Delta U_E = U_{E_f} - U_{E_i}$ |

The *difference*, or *change in*, a quantity is always between two points: initial and final. Going from point A (initial) to point B (final) is sometimes written as $\Delta V_{A \rightarrow B} = V_B - V_A$. The key thing to remember is that delta means final minus initial.

Luckily these are **not** vector calculations, so the math is usually straightforward. Yay!