

#ref #incomplete


## 1 | Voltage

- Units:  $\frac{Nm}{C} = \frac{J/C}{C} V$
- Amount of energy per unit of charge it takes to bring that charge to that point
  - If you have a ball and you are taking it up the hill, then it takes energy to do that
  - When you let go, it will roll back down the hill
  - Voltage = energy per charge is similar to energy per kilogram of raising the ball.
  - Field is the amount that it is resisting—the amount of force required to move the charge.
  - **Analogous to gravitational potential energy.**

### 1.1 | Zero Point

- If you have one positive and one negative, then the zero point of the voltage is between the two charges
- The zero can be defined anywhere, just like zero gravitational energy can be anywhere
  - However, conventionally, we define zero to be between two opposite charges
  - We also define the voltage infinity distance away to be zero

### 1.2 | Equipotential

- A line that shows where voltage is the same 
  - Joules of electric potential energy
  - Scalar, while electric field is a vector ### Relationship with Electric Field
  - Perpendicular to the electric field
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