		electric field and electric force		
	If $q_s > 0$, then dir \vec{E} is away from q_s . If $q_s < 0$, then dir \vec{E} is toward q_s .		If $q_0 > 0$, then dir $\vec{E} =$ dir \vec{F} . If $q_0 < 0$, then dir \vec{E} is opposite to dir \vec{F} .	\vec{F} on q ₀ "electric force" vector unit=N
<i>q</i> s "electric charge" scalar unit=C	Gauss's Law: $\oint \vec{E} \bullet d\vec{A} = \frac{\text{net } q_{\text{enclosed}}}{\varepsilon_0}$ For a uniform \vec{E} which is perpendicular to the Gaussian surface: $\dot{E}A = \frac{ \text{net } q_{\text{enclosed}} }{\varepsilon_0}$ Point source: $\dot{E} = \frac{k\dot{q}_s}{r^2}$ (Coulomb's Law)	\vec{E} at a point in space "electric field" vector; unit = N/C The \vec{E} at a point in space indicates what the \vec{F} would be on a +1C q ₀ at that point in space.	$\dot{F} = \dot{E}\dot{q}_{0}$ For point charges or nonoverlapping spherically symmetrical charge distributions: $\dot{F} = \frac{k\dot{q}_{1}\dot{q}_{2}}{r^{2}}$ (Coulomb's Law)	
	Spherical symmetry: Outside: $\dot{E} = \frac{\dot{Q}}{4\pi\varepsilon_0 r^2} = \frac{k\dot{Q}}{r^2}$ Inside uniformly charged sphere: $\dot{E} = \frac{k\dot{Q}r}{R^3}$ Inside hollow sphere: $E=0$			
	<i>Line symmetry:</i> Outside: $\dot{E} = \frac{\lambda}{2\pi\varepsilon_0 r}$ Inside hollow pipe: $E=0$ <i>Plane symmetry:</i> Outside: $\dot{E} = \frac{\dot{\sigma}}{2\varepsilon_0}$			

 $k = \frac{1}{4\pi\varepsilon_0}$, $\varepsilon_0 = \frac{1}{4\pi k}$. Units for λ are C/m. Units for σ are C/m². Units for ρ (not shown in chart) are C/m³.

$q_{ m s}$,	V at a point in space		$U \text{ of } q_0, q_s \text{ system}$			
charge"	$V = \frac{kq_s}{r}$	electric potential	$U = Vq_0$	electric potential energy			
scalar unit=C	This formula	scalar; unit=volt=J/C	For point charges or nonoverlapping spherically symmetric charge distributions: $U = \frac{kq_1q_2}{r}$	scalar; unit=J			
	works for a point source, or outside a spherically symmetric charge distribution.	The V at a point in space indicates what the U would be for a +1C q_0 at that point in space; i.e., the V at a point in space indicates how much work it would take to move a +1C q_0 from ∞ to that point in space.		The U of a system of charges indicates how much work it would take to move the charges from ∞ to their present positions.			
		For $q_0 > 0$, V is like "height".					
		For $q_0 < 0$, V is like "depth".					

electric potential energy and electric potential

electric potential difference and change in electric potential energy

<i>q</i> s "electric charge"	$\Delta V_{AB} = -\int_{A}^{B} \vec{E} \bullet d\vec{r}$	ΔV between two points in space "electric potential difference", "voltage" The symbol "V" is often used to mean " ΔV ".	$\Delta U = \Delta V \cdot q_0$	ΔU of q ₀ ,q _s system "change in electric potential energy"			
scalar unit=C	\vec{E} points from high V to low V, indicating the sign of ΔV	scalar; unit=volt=J/C		scalar; unit=J			
	For constant \vec{E} : $\Delta \vec{V} = \dot{E}_{\parallel} \cdot \Delta \dot{r}$	The ΔV between two points in space indicates what the ΔU would be for a +1C q ₀ moving between those two points in space;		The ΔU of a system of charges indicates how much work it took to			
	For point sources, or outside spherically symmetric charge distributions:	i.e., the ΔV between two points in space indicates how much work it would take to move a +1C q ₀ between those two points in space.		move the charges from their previous positions to their present positions.			
	$\Delta V_{AB} = \frac{kq_s}{r_B} - \frac{kq_s}{r_A}$	For $q_0 > 0$, ΔV is like "change in height". For $q_0 < 0$, ΔV is like "change in depth".		r			