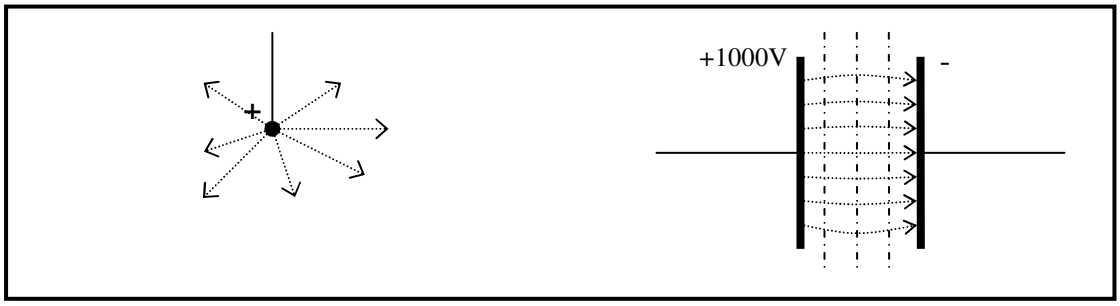
Fields and Forces: Summary Sheet

An electric field is a region where a charged particle experiences a force; similarly a gravitational field is a region where a particle with mass experiences a force.

Radial and Uniform Fields



- Lines of equipotential are where the potential difference is the same in an electric field. In a uniform field the distance between lines of equipotential should be regular, so half way across the plate separation there will be half the voltage.

Comparing Electric and Gravitational Fields

	Electric Fields	***Gravitational Fields***
Force in a Radial Field	$F = \frac{kQ_1Q_2}{r^2}$ $k = \frac{1}{4\pi\varepsilon_0}$	$F = \frac{Gm_1m_2}{r^2}$
Force in a Uniform Field	$F = EQ$ *where* $E = \frac{V}{d}$	$F = mg$ *Although the field of the Earth is not uniform, the curvature is so slight we model it as being so.*
Field Strength	E measured in Vm^{-1} or NC^{-1}	g in ms^{-2} or Nkg^{-1}
Nature	Can be attractive or repulsive.	Always attractive (although there may be such thing as anti-mass as yet undiscovered)
Shieldin g	Can be shielded against (for example Faraday Cage).	Cannot be shielded against.

Voltage and Energy

- A Volt is defined as the energy required to move one Coulomb of charge. Thus $E = QV$
- An electron volt is often a more convenient (although non-SI) way of measuring energy, it deals with charge in terms of multiples of e. Therefore one electron volt (eV) is 1 Joule × e.