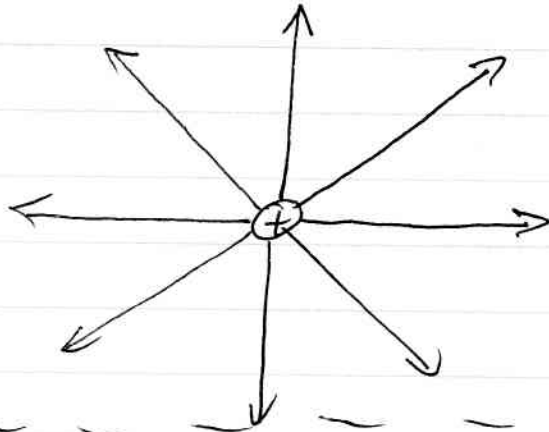


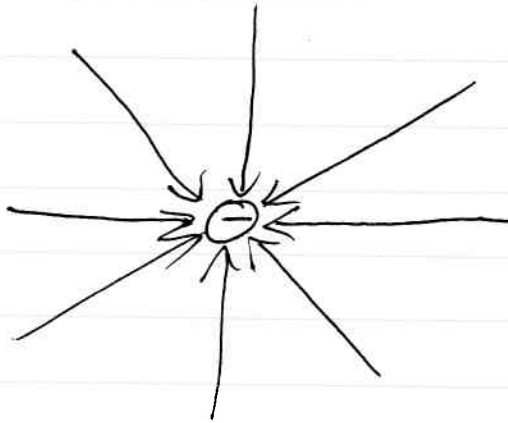
4-13

ANOTHER ILLUSTRATION OF AN ELECTRIC FIELD



DENSITY OR
SPACING OF
LINES $\Rightarrow$
STRENGTH

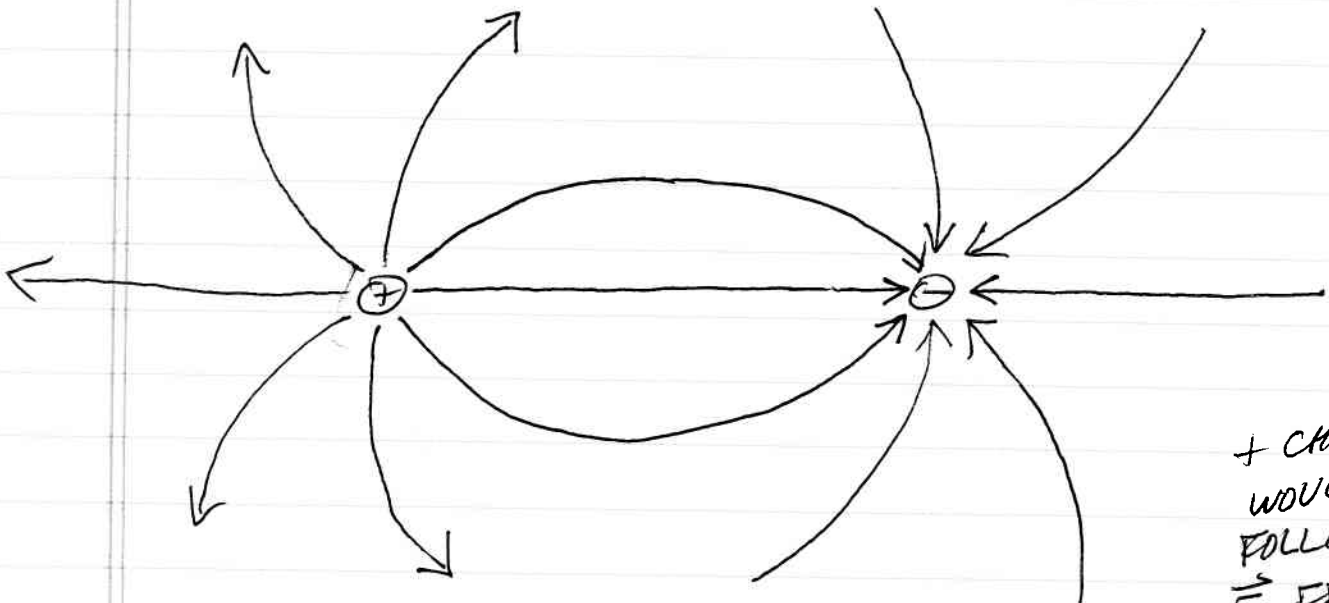
DIRECTION IS SAME
AS FORCE ON
A + TEST CHARGE



OF LINES
INDICATES
RELATIVE
STRENGTH

4 LINES = HALF STRENGTH
OF 8 LINES

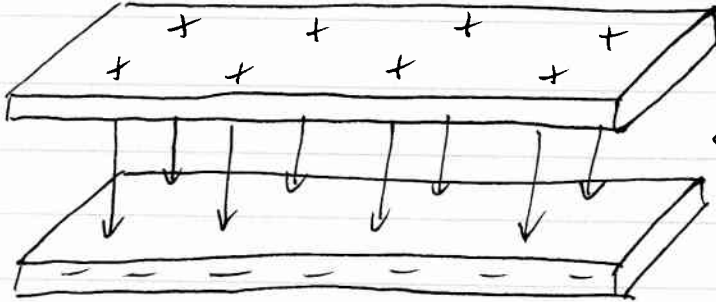
DIPOLE FIELD



+ CHARGES
WOULD
FOLLOW
 $\vec{E}$ FIELD
LINES

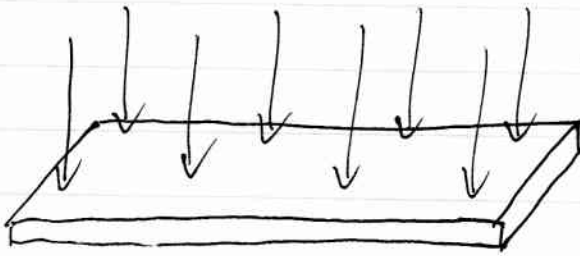
UNIFORM ELECTRIC FIELD

E IS CONSTANT
AND FIELD LINES ARE
PARALLEL



← $\vec{E}$ IS UNIFORM

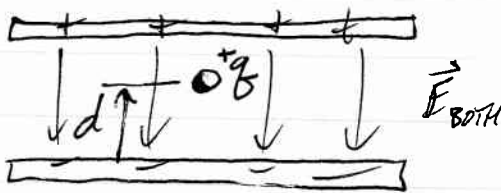
$$\vec{F}_E = q\vec{E} \quad \vec{E} = \frac{\vec{F}_E}{q}$$

UNIFORM GRAVITY FIELD

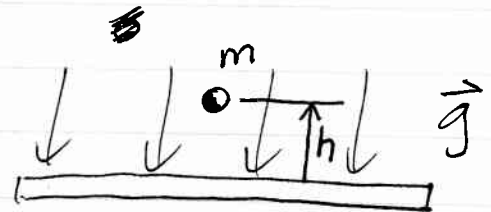
← $\vec{g}$ IS UNIFORM

$$\vec{F}_g = m \cdot \vec{g} \quad \vec{g} = \frac{\vec{F}_g}{m}$$

$$(g = 9.8 \text{ m/s}^2)$$

ELECTRIC POTENTIAL ENERGY

$$P_E = q(E_{\text{BOTH}})d \quad (J)$$



$$P_G = mgh$$

ELECTRIC POTENTIAL (OR ELECTRIC POTENTIAL ENERGY PER UNIT CHARGE)

$$\frac{P_E}{q} = \frac{qEd}{q} = Ed$$

$$\frac{P_G}{m} = \frac{mgh}{m} = g \cdot h$$

= VOLTAGE (MOTIVATION FOR A UNIT CHARGE TO MOVE)

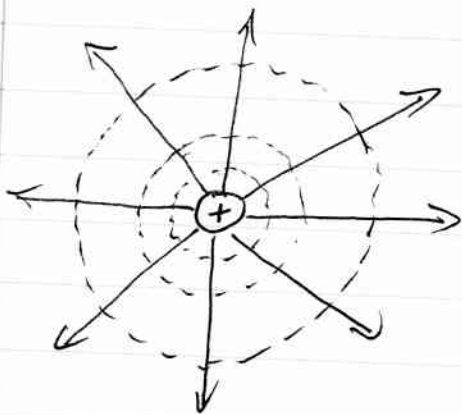
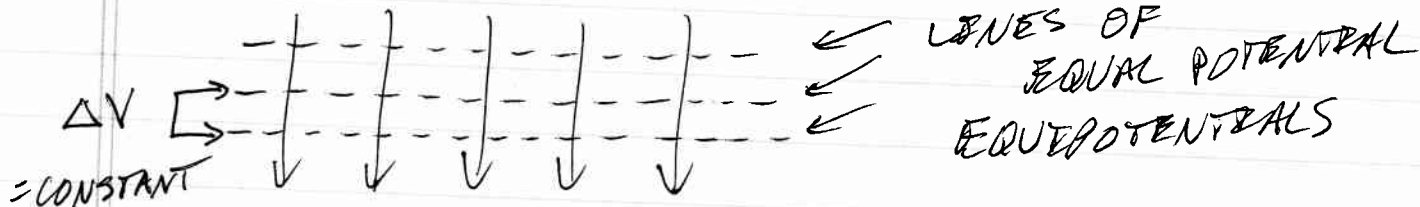
UNITS: VOLTS (V)

$$1V = \frac{1J}{1C} = \frac{1N \cdot m}{C}$$

$$E \text{ UNITS: } \left(\frac{N}{C}\right) \text{ OR } \left(\frac{V}{m}\right)$$

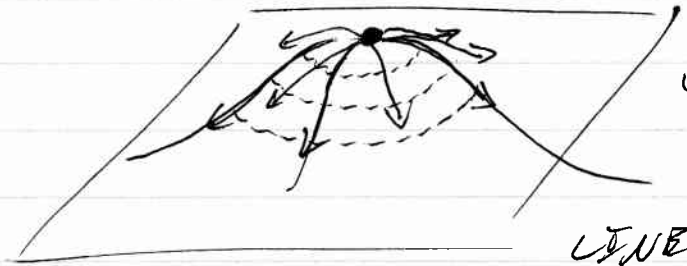
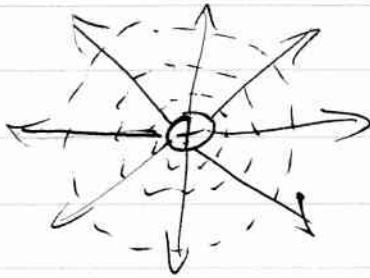
EQUIPOTENTIALS

~~UNIFORM~~ UNIFORM FIELD



- IT TAKES NO ENERGY TO MOVE ALONG AN EQUIPOTENTIAL
- EQUIPOTENTIALS ARE $\perp$ TO FIELD LINES
- NEVER CROSS EACH OTHER

2D CONTOUR ILLUSTRATION



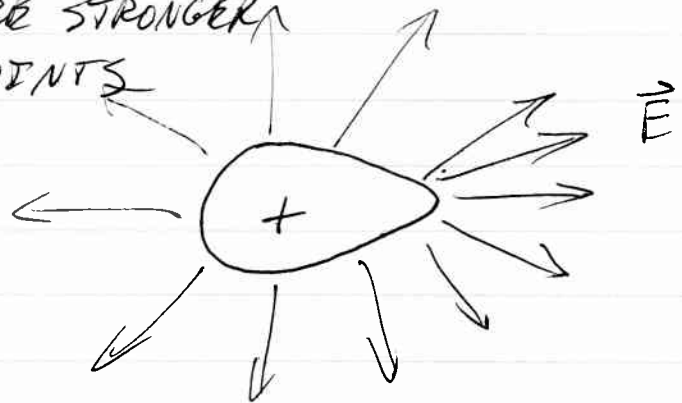
"WELL"

LINES
POINT
"DOWN HILL"



ELECTRIC FIELDS ARE STRONGER
NEAR SHARP POINTS

CHARGE ACCUMULATES
AT SHARP POINTS



FORK

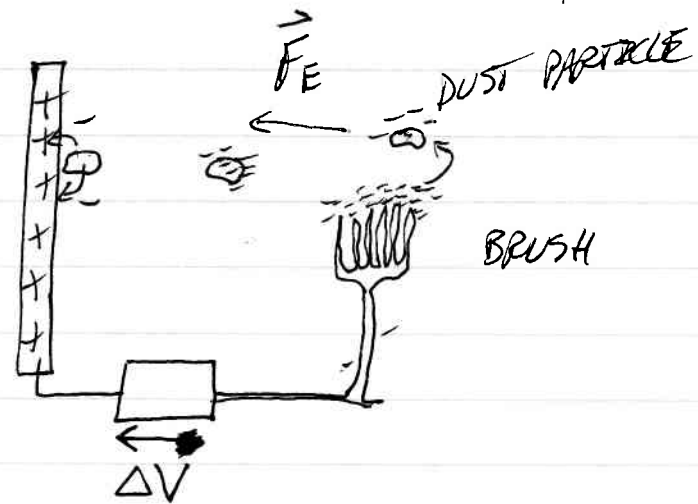
CHARGE WILL TEND TO
JUMP OFF, IF POSSIBLE

(SPARKING FORKS
IN MICROWAVE)

CORONAL DISCHARGE

USING THIS EFFECT

AIR CLEANER
IONIC



POLARIZING
AIR
CLEANER

