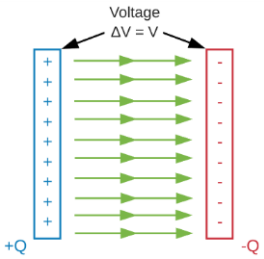
CONCEPT: ENERGY STORED BY CAPACITOR

● Remember: Capacitors separate charges, and this separation leads to potential energy stored. But HOW MUCH energy?

● Energy stored by ANY capacitor → $\mathbf{U} =$ _____ $=$ _____ $=$ _____

- Use **Q = CV** to change between all 3 forms



● ENERGY DENSITY (u) = Energy per unit volume → $\boldsymbol{u} =$ _____

- Volume of a parallel plate capacitor → $\boldsymbol{volume} =$ _____

→ $\boldsymbol{u} =$ _____ = _____

EXAMPLE: Two parallel plates of area 50 cm^2, with a separation of 10 mm, have a voltage across them of 20 V. What is the energy stored? The energy density?

EXAMPLE: What is the strength of the electric field in a capacitor storing 2.5 mJ per cubic-centimeter?

PRACTICE: DEFIBRILLATOR

A cardiac defibrillator can be modeled as a parallel plate capacitor. When it is charged to a voltage of 2 kV, it has a stored energy of 1 kJ. What is the capacitance of the defibrillator?

PRACTICE: ENERGY RELEASED BY FLASHBULB

Typically, a flashbulb will have a capacitance of 1000 mF. If the bulb were charged to a voltage of 500 V, how much energy is released when the flash goes off, if the bulb loses 80% of its charge in a single flash?