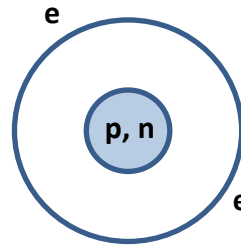


## CONCEPT: ELECTRIC CHARGE

- Atoms are made of protons, neutrons and electrons.



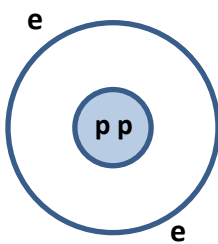
- ELECTRIC CHARGE is a property of matter, similar to MASS:

MASS (m)	ELECTRIC CHARGE (Q)
- Mass → Gravitational Force	- Electric Charge → Electric Force
- More Mass → More Gravity	- More Charge → More Electric Force
- Mass → ONLY _____	- Charge → _____ and _____

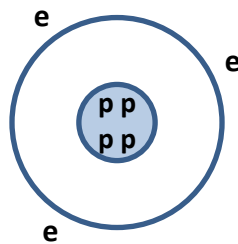
- ELEMENTARY charge →  $e = \text{_____ C}$  (\_\_\_\_\_)

- Charge of protons = \_\_\_\_\_ - Charge of electrons = \_\_\_\_\_

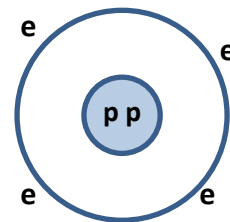
- The CHARGE of an object is the quantity of \_\_\_\_\_ of protons and electrons in it:



\_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

- Notice these charges are in WHOLE MULTIPLES of  $e$ .

→  $Q = (\# \text{prot} - \# \text{elec}) \times e$

- MOST materials are NEUTRAL → #Protons \_\_\_\_\_ #Electrons →  $Q_{\text{net}} = \text{_____}$

**PRACTICE: CHARGE OF ATOM**

What is the charge of an atom with 16 protons and 7 electrons?

**EXAMPLE: NUMBER OF ELECTRONS**

How many electrons make up  $-1.5 \times 10^{-5} \text{ C}$ ?

**EXAMPLE: ELECTRONS IN WATER**

Water has a density of 1 kg/L, a molecular weight of 18 g/mol, and 10 electrons per molecule.

- a) How many electrons does 2L of water have?
- b) What charge do these electrons represent?

**PRACTICE: ADDING ELECTRONS**

How many electrons do you have to add to decrease the charge of an object by  $16\mu\text{C}$ ?