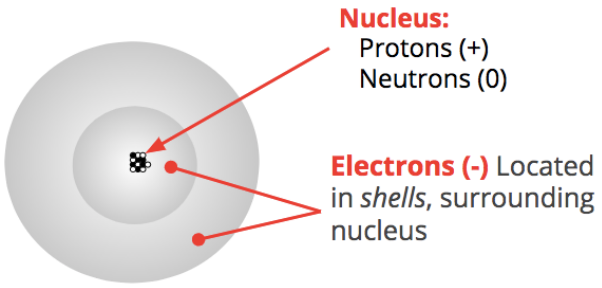
Charged vs. Uncharged Objects
Lesson Notes

Focus Question:
What is the structure of the atom and what implications does this have on our understanding of charged and uncharged objects?

Atomic Structure
Know the location, charge, mobility, and relative mass of the subatomic particles.



Proton	Neutron	Electron
+ Charge	No Charge	- Charge
In Nucleus	In Nucleus	Outside Nucleus
Tightly Bound	Tightly Bound	Loosely Bound
Massive	Massive	Not Massive

Uncharged Objects
Uncharged objects have a balance of the two types of charge. (# of p^+ = # of e^-)

Charged Objects
Charged objects have an imbalance of the two types of charge. (# of p^+ ≠ # of e^-)

Charged objects can be ...
1. Negatively-Charged: contain more electrons (e^-) than protons (p^+)
2. Positively-Charged: contain more protons (p^+) than electrons (e^-).

How do objects acquire an imbalance of the two types of charges?

A neutral object becomes negatively-charged by gaining electrons.

A neutral object becomes positively-charged by losing electrons.

Charge as a Quantity

The quantity (Q) of charge or amount of charge possessed by an object depends upon the relative # of protons and electrons. Determine the difference in these two #s and multiply by the charge of an electron or of a proton.

$$Q_{electron} = Q_{proton} = 1.6 \cdot 10^{-19} \text{ C}$$

(The electron has a negative type of charge ... not a negative amount of charge)

# of e^-	# of p^+	Charge Amount	Charge Type
9	10	$1.6 \cdot 10^{-19}$ C	Positive
1000	998	$3.2 \cdot 10^{-19}$ C	Negative
$8.0 \cdot 10^{7}$	$7.0 \cdot 10^{7}$	$1.6 \cdot 10^{-12}$ C	Negative
$8.0 \cdot 10^{12}$	$4.0 \cdot 10^{12}$	$6.4 \cdot 10^{-7}$ C	Negative
$2.2 \cdot 10^{14}$	$3.5 \cdot 10^{14}$	$\sim 2.1 \cdot 10^{5}$ C	Positive