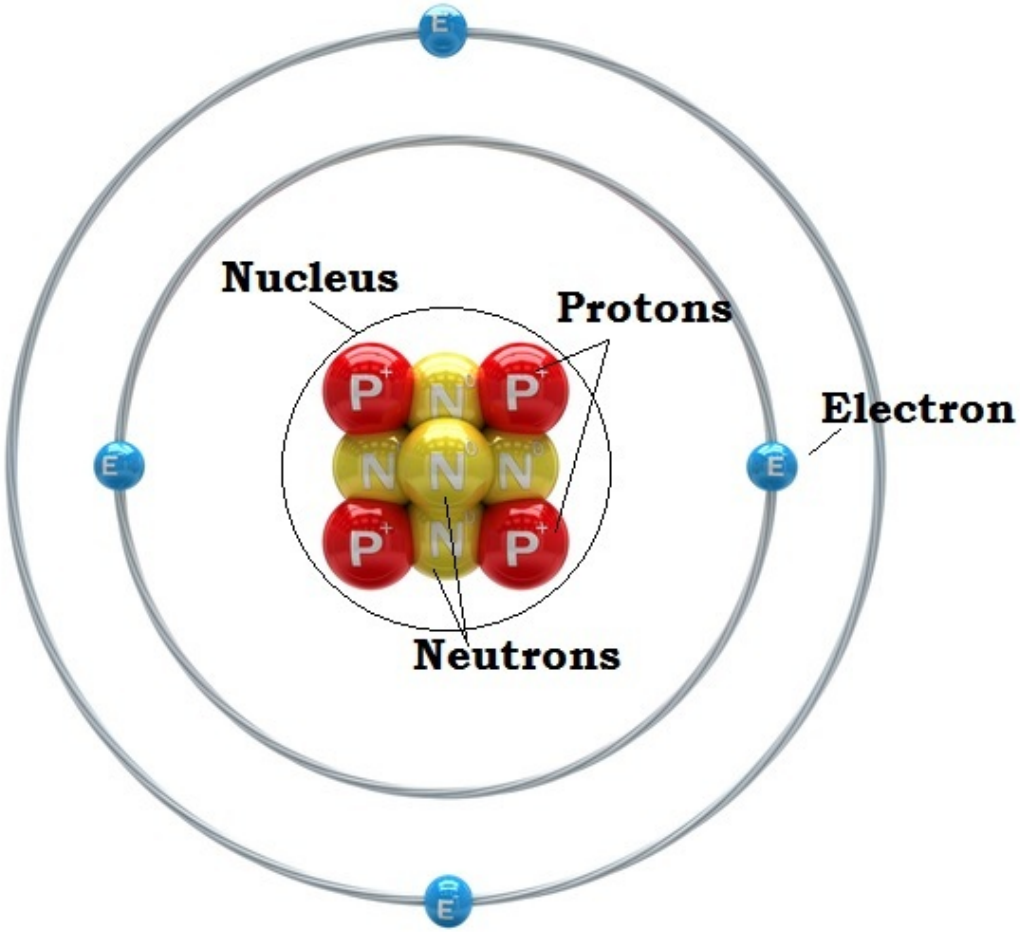
Part A: Basic Atoms



http://www.livescience.com/37206-atom-definition.html

Atoms Tiny pieces that make up the *matter* in the universe. Made of protons, neutrons, and electrons.

Protons Small, positively charged particle, stays in the nucleus.
Neutrons Small, neutral charged particles (no charge), stays in the nucleus.
Electrons Even smaller, negatively charged particle, remains outside the nucleus (1000 times smaller than protons and neutrons!)

A.1 What two particles are inside the nucleus?

A.2 Which particle has no charge?

A.3 Which particle is the smallest?

A.4
Write the charge of each particle: *positive*, *negative*, or *neutral*
Write the Location of each particle: *inside the nucleus* or *outside the nucleus*

Particle	**Charge**	**Where is it?**
Electron		
Proton		
Neutron		

Electric force

A force that affects all *charges*.
Two particles with the *same charge* repel.
Two particles with *different charges* attract.

A.5 On each row of the table, imagine two particles are next to each other.
Do they *attract*, *repel*, or *do nothing*? [consider only the electrical force!]

Particle 1	**Particle 2**	**Attract, repel, or no force?**
electron	electron	
electron	proton	
electron	neutron	
neutron	neutron	
neutron	proton	
proton	proton	

A.6 Which particle *never* experiences an electric force?

A.7
Which of the three particles is able to move between atoms in an *electric circuit*?

Answers:

A.1 Protons and neutrons
A.2 Neutron
A.3 Electron

A.4

Particle	**Charge**	**Where is it?**
Electron	Negative	Outside the nucleus
Proton	Positive	Inside the nucleus
Neutron	Neutral	Inside the nucleus

A.5

Particle 1	**Particle 2**	**Attract, repel, or no force?**
electron	electron	Repel
electron	proton	Attract
electron	neutron	Do nothing
neutron	neutron	Do nothing
neutron	proton	Do nothing
proton	proton	Repel

A.6 The neutron

NOTE: In this section, we are only considering the *electrical forces* on the objects. If you include other forces, such as magnetic forces, strong nuclear forces, and weak nuclear forces, then neutrons may experience forces.

A.7 The electron

Part B: What is a circuit

Electric Circuit Electric circuits move because electrons move *around* a wire, from one end to the other
Electric Current When electrons are moving consistently around a wire, we call that electric current.

Direct Current (DC) Circuit In a direct current circuit, the electric current moves in only one direction. Direct current comes from a *battery*.
Alternating Current (AC) Circuit The electric current constantly reverses direction (usually 60 times a second!) Alternating current comes from an electrical generator or from a wall outlet.
AC-DC Adapter When you plug an AC-DC adapter into the wall, giving it AC current, it gives you DC current. The most common example of an AC-DC adapter is a *charger* for your cell phone.

For each option, say if it is *direct current* or *alternating current*:

B.1 Current from a D battery:

B.2 Current from an electric outlet:

B.3 The current that comes out of a cell phone charger:

B.4 The current from a lemon battery:

B.5 Current that reverses direction:

B.6 Current in only one direction:

B.1 Direct current
B.2 Alternating current
B.3 Direct current [the charge converts AC to DC]
B.4 Direct current
B.5 Alternating current
B.6 Direct current

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