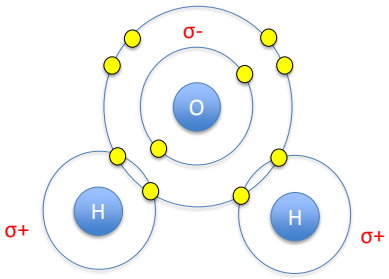


Atoms and Bonding

What is the difference between atoms, ions, and isotopes?

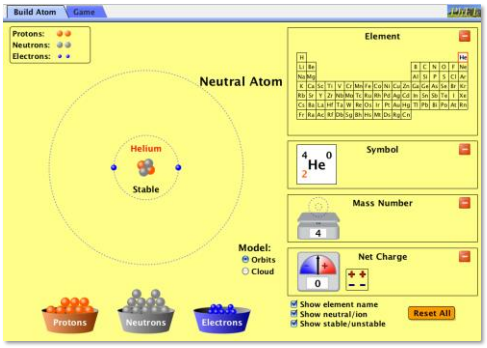
- Atoms = basic particle from which all elements are made
- Ions = atom that has become electrically charged by the addition or subtraction of electrons
- Isotopes = atom with the same number of protons and different number of neutrons from other atoms of the same element

Build an Atom

Run the simulation and build the following:
1. a hydrogen **atom**.
2. the hydrogen **ion** with a charge of +1.
3. Helium **atom**.
4. a *stable* **isotope** of helium.
5. an *unstable* **isotope** of helium.

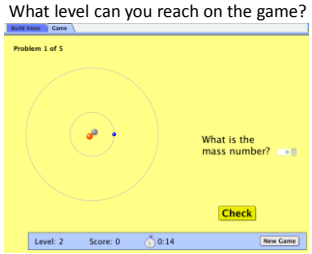
Answer the following:
1. Which *subatomic particle* determines the element's atomic number?
2. Which *two subatomic particles* determine the element's mass number?
3. How is ionic charge (net charge) determined and what makes an **ion**?
4. What is an **isotope** and how is it made?

Then **test yourself** (and research further):
http://www.quia.com/quiz/3320413.html
(firstnamelastname230, milk)



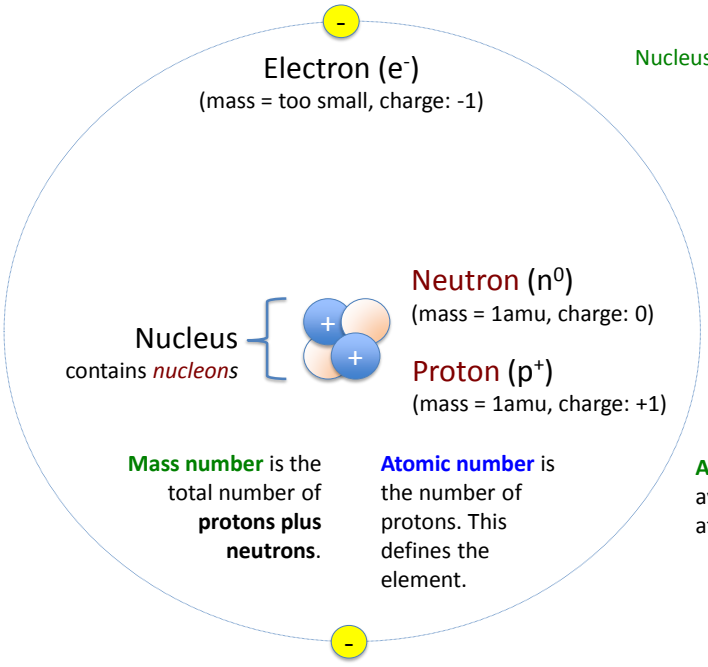
Build an Atom, from PhET. Click Run Now.
http://phet.colorado.edu/en/simulation/build-an-atom

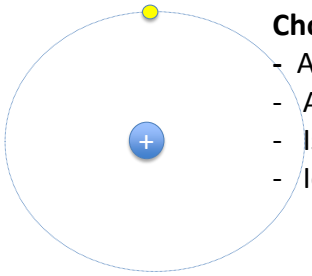
If you're done:
What level can you reach on the game?



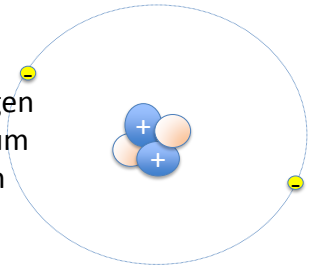
Atom

Nucleus and electron cloud

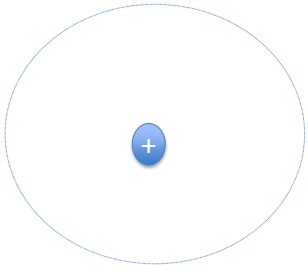


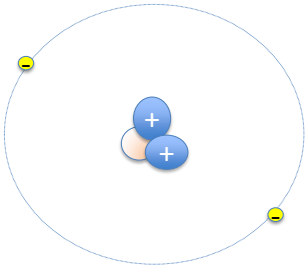


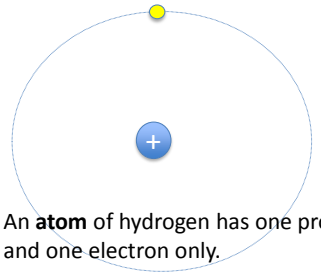
Choices:
- Atom of helium
- Atom of hydrogen
- Isotope of helium
- Ion of hydrogen



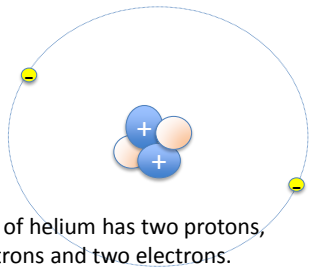
What do these represent?



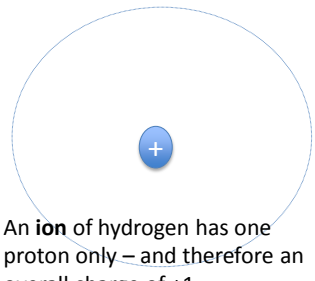




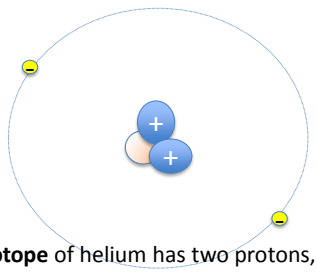
An **atom** of hydrogen has one proton and one electron only.



An **atom** of helium has two protons, two neutrons and two electrons.



An **ion** of hydrogen has one proton only – and therefore an overall charge of +1



This **isotope** of helium has two protons, <u>one</u> neutron and two electrons.

Atom, Ion or Isotope?

mass number = 12 C, atomic number = 6, Charge = 0

Mass number	Symbol	Atomic number	Charge	Label
12	C	6	Charge = 0	
1	H	1	Charge = +1	H^+ ion
238	U	92	Charge = 0	Uranium
235	U	92	Charge = 0	Uranium isotope
58	Co	27	Charge = 0	Cobalt
16	O	8	Charge = 2-	Oxygen ion
60	Co	27	Charge = 0	Cobalt isotope
40	Ca	20	Charge = 2+	Calcium ion
47	Ca	20	Charge = 0	Calcium isotope