

Name: \_\_\_\_\_

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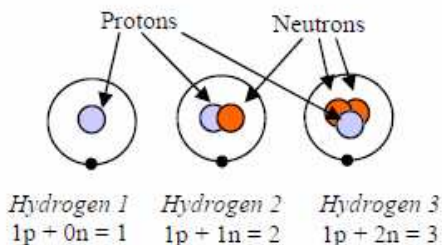
## Isotopes and Making Atoms

### Isotopes

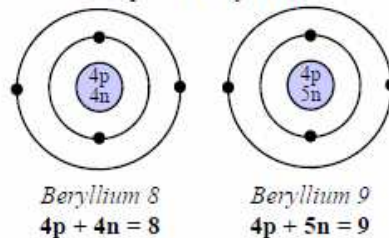
An isotope is a variation of an element. It has the same number of protons (same element), but a different number of neutrons (different isotope).

#### Isotopes of Hydrogen

Because they each have 1 proton, they are all hydrogen atoms, but are different *isotopes* because they have numbers of neutrons.

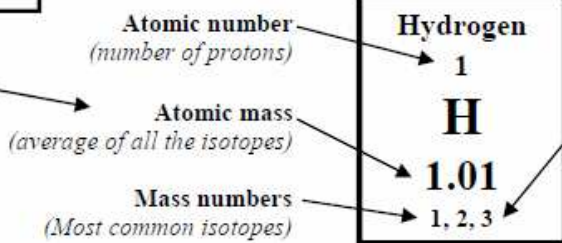


#### Isotopes of Beryllium



### Reading the Tiles

The atomic mass is an average. Round it to find the most common isotope.



#### Finding the # of Neutrons

Mass # = protons + neutrons

Neutrons = mass # - protons

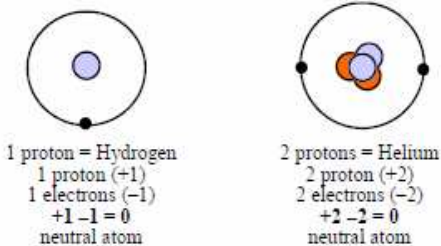
For Hydrogen 3:  
 $3 \text{ (mass \#)} - 1 \text{ (atomic \#)} = 2 \text{ (neutrons)}$

**Hydrogen 3 has 2 neutrons.**

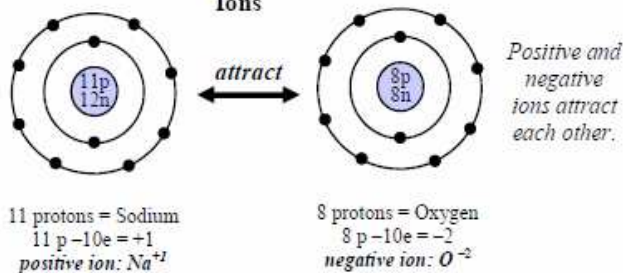
### Ions and Neutral Atoms

If the number of electrons equals the number of protons the atom is neutral. If not, it is an ion.

#### Neutral Atoms

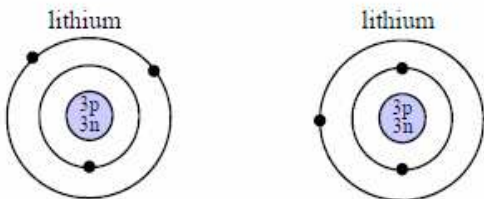
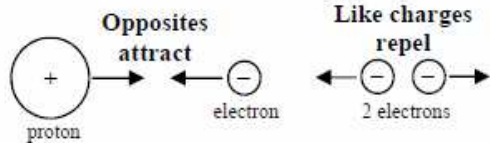


#### Ions



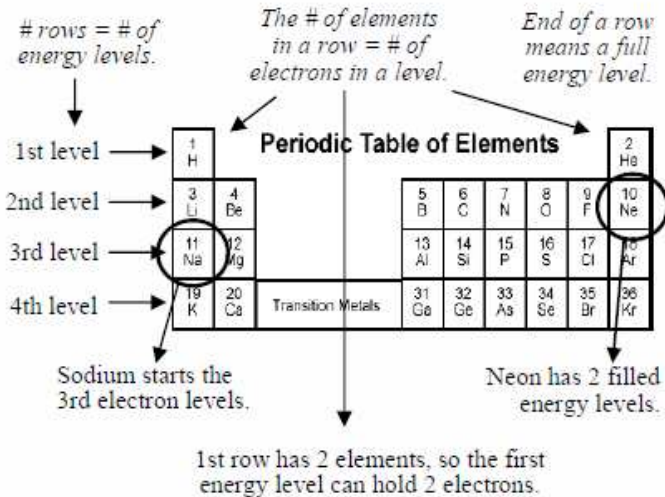
### Electrons Orbits


Electrons will want fill up inner orbits first to get as close to the nucleus as possible. They also want to stay as far away from each other as possible.





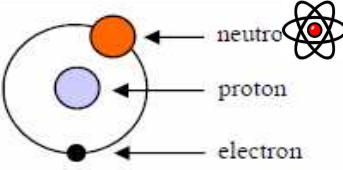
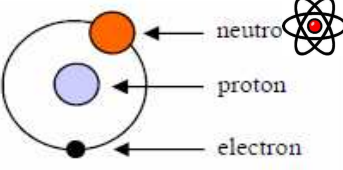
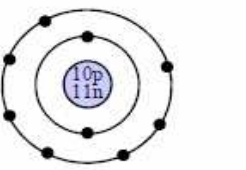

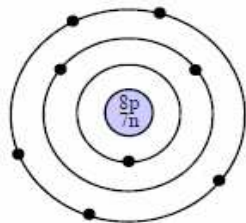
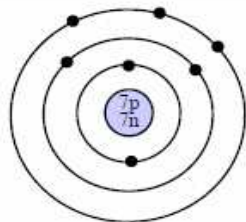


*Incorrect! - The electrons will fill up the inner levels first. The first level takes 2 electrons.*

*Correct! - Inner orbit is full (with 2); one outer electron.*



All sections marked with a  are considered essential concepts and must be completed to receive full credit on WS.

<p>1. Isotope</p> <p>2. Atomic mass</p> <p>3. Atomic #</p> <p>4. Neutral atom</p> <p>5. Ion</p> <p>6. Mass #</p>	<p>A. An average of all the isotopes; the mass of average atom. </p> <p>B. An atom with an equal number of electrons and protons.</p> <p>C. An atom with more or less electrons than protons.</p> <p>D. A variation of an element with a different number of neutrons.</p> <p>E. Total number of protons and neutrons in the nucleus.</p> <p>F. Number of protons; determines the element.</p>	<p><i>Give abbreviations and number of protons</i> </p> <p>Calcium (<u>Ca</u>) <u>20</u>      Boron ( ) _____</p> <p>Potassium ( ) _____      Selenium ( ) _____</p> <p>Copper ( ) _____      Silver ( ) _____</p> <p>Zirconium ( ) _____      Mercury ( ) _____</p>
<p>7 protons and 10 electrons. <i>Neutral atom or ion?</i></p> <p>15 protons and 15 electrons. <i>Neutral atom or ion?</i></p> <p>35 protons and 37 electrons. <i>Neutral atom or ion?</i></p> <p>89 protons and 89 electrons. <i>Neutral atom or ion?</i></p> <p><b>Give the element abbreviation and charge.</b></p> <p>5 protons and 2 electrons: Element: <u>B</u> Charge: <u>+3</u></p> <p>16 protons and 18 electrons: Element: <u>  </u> Charge: <u>  </u></p> <p>35 protons and 36 electrons: Element: <u>  </u> Charge: <u>  </u></p> <p>12 protons and 10 electrons: Element: <u>  </u> Charge: <u>  </u></p>	<p><i>Which of the following are isotopes?</i> </p> <p>Element A: 15 protons; 15 electrons; 16 neutrons</p> <p>Element B: 14 protons; 16 electrons; 14 neutrons</p> <p>Element C: 15 protons; 18 electrons; 15 neutrons</p> <p>Element D: 16 protons; 18 electrons; 15 neutrons</p> <p>Element E: 15 protons; 18 electrons; 14 neutrons</p> <p>Sulfur 32 has <u>16</u> protons and <u>16</u> neutrons. (<math>32 - 16p = 16n</math>)</p> <p>Magnesium 25 has <u>  </u> protons and <u>  </u> neutrons </p> <p>Carbon 14 has <u>  </u> protons and <u>  </u> neutrons.</p> <p>Lithium 7 has <u>  </u> protons and <u>  </u> neutrons.</p> <p>Chlorine 35 has <u>  </u> protons and <u>  </u> neutrons.</p> <p>Fluorine 19 has <u>  </u> protons and <u>  </u> neutrons.</p>	
<p>What's wrong with this picture of an atom?</p> 	<p>Oxygen 16 has how many neutrons?</p> <p>Beryllium 8 has how many neutrons?</p> <p>Boron 11 has how many neutrons?</p>	
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<p>This picture is supposed to be of a neutral atom. Fix it.</p> 	<p>Which row is Lithium (Li) in? <u>2</u> It has electrons in levels 1 and 2. </p> <p>Which row is phosphorous ( ) in? <u>  </u> So, phosphorous has electrons in which electron levels?</p> <p>Which row is calcium ( ) in? <u>  </u> So, calcium has electrons in what levels?</p>	
<p>What is wrong with this picture of an atom?</p> 	<p>Which row is argon ( ) in? <u>  </u> So, argon has electrons in what levels?</p> <p>Argon ( ) is at the end of row <u>  </u>. So argon has <u>  </u> full electron levels.</p> <p>Helium ( ) is at the end of row <u>  </u>. So helium has <u>  </u> full electron levels.</p>	
<p>What is wrong with this picture of an atom?</p> 	<p>Xenon ( ) is at the end of row <u>  </u>. So xenon has <u>  </u> full electron levels.</p> <p>How many full electron levels does Calcium have?</p> <p>How many full electron levels does Sulfur have?</p>	