

Honors Biology

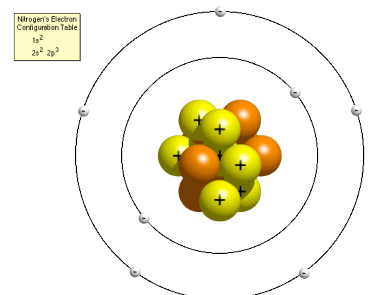
Chapter 2 Notes

Chemical Foundation for Cells

- *What is 'bioremediation'?*
 - Why can artificial fertilizers be bad to the environment?
 - Why do farmers use holding ponds?
 - How can these be harmful to the environment?
 - How does bioremediation in this situation help farmers?
- *Properties of Elements:*

- *Elements Common in Living Things:*

- *Structure of Atoms*



- What does the Atomic Number represent?
- What does the Mass Number represent?

• **Atomic Quiz (Draw the atom pictured):** Note: If you need element help go to www.webelements.com

- What is the name of the element?
- Is this element chemically stable?
- How will this element most likely bond with another element?
- How many protons does this element have? Why?
- If the atomic weight of this element is 35 amu's, how many neutrons does this element have?
- What is the chemical formula for calcium chloride?

• **Periodic Table of Elements:**

- What does #17 represent?
- What subatomic particle(s) can be determined from the #17?
- How are elements listed on the periodic table?
- What group on the Periodic Table is this element place in?
- What does the period number represent?
- How many neutrons does this element have?
- What do we call elements that vary in the number of neutrons they have?
- Are there periodic trends in the Periodic Table? What are they?

Chlorine

17
Cl
35.453

- ***Electrons and Energy Levels***

- How many electrons can each energy level hold?
- What is the maximum of electrons an atom can hold in its outer shell?
- What is the 'octet rule'?

- ***From Atoms to Molecules:***

- What are molecules?
- What are molecules the build blocks of?
- What are compounds? Explain the proportions of the compound water:

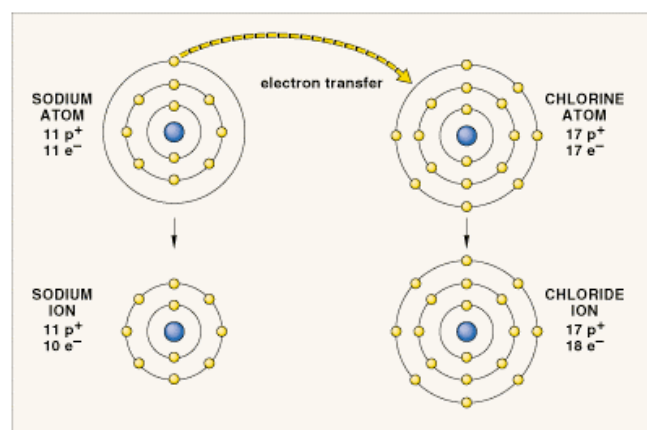
- What is the difference between a compound and a mixture?

- ***What are Ions?***

- Define an ion:
- How does an atom become a positively charged ion?
- How does an atom become a negatively charged ion?
- What property of an atom determines whether an atom is going to loss or gain electrons to become an ion?

- ***Ionic Bonding of Elements:***

- Who does the electron configuration of Sodium and chlorine compare?



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- What caused these atoms to become ionized?
- What will now happen to these atoms?
- What properties make the compound aspirin, the unique substance aspirin?
- What causes two elements to bond together in an ionic bond?

- ***Covalent Bonding:***

- What causes to elements to bond together covalently?
- What type of covalent bonding does water molecules to hold the atoms together use?

- ***Isotopes:***

- What defines an atom as an isotope?
- How are atoms of isotopes compared chemically with the same kind atoms that are not isotopes?

- What are radioisotopes? How are they different than an isotope?
- What happens to radioisotopes as they decay (give off radiation)?
- What are the isotopes of hydrogen and causes a hydrogen atom to become an isotope?
- How do we calculate the number of neutrons in an atom?
- What is atomic weight of an atom? How is it calculated?
- Calculate the number of protons, electrons, and neutrons in a Lithium atom? Make a Bohr diagram on the atom below.

- ***Radioactive Tracer:***

- What is a Radioactive Tracer?
- Give some examples:

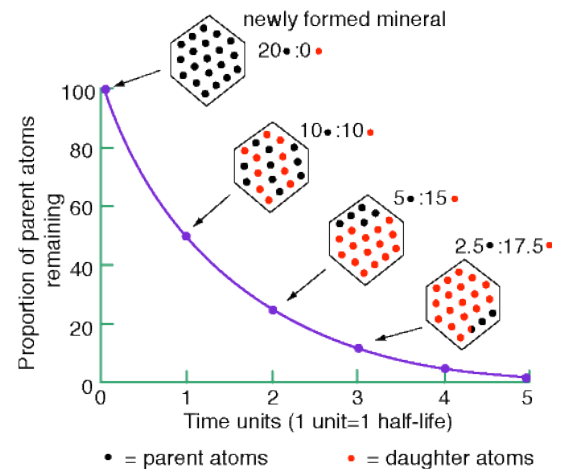
- How does your body treat a radioisotope?
- PROBLEM: A person has demonstrated poor growth & metabolism, what can be done to help diagnose this problem?

- ***Radioactive Decay of Elements:***

- What causes an atom to transmute?
- PROBLEM: What does Uranium – 238 transmute into when an Alpha particle is emitted from the nucleus of this atom?

- ***The Half–Life of a Radioactive Element:***

- What is a half-life?
- PROBLEM: The half-life of carbon-14 is 5730 years. (+ or – 40 yrs). How many years must pass for a substance to go through 6 half – lifes?



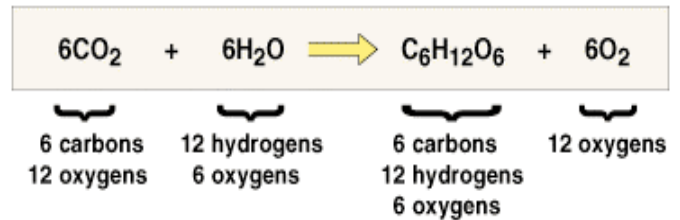
- PROBLEM: A mammoth should have $\frac{1}{4}$ of a gram of carbon-14 in its body when alive. If there is only $\frac{1}{64}^{\text{th}}$ of a gram in the fossilized bones of this mammoth, then how old is this fossil?

- How does carbon-14 accumulate into an organism?

- ***When Atoms Bond in a Chemical Reaction:***

- What is a chemical formula?

- Where are the reactants and products in a chemical formula?



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- PROBLEM: What is the molecular weight of glucose?

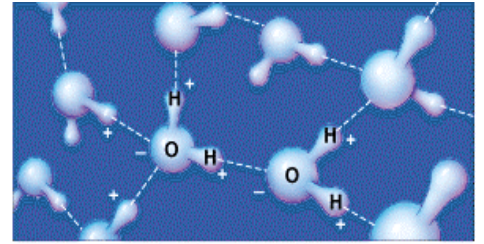
- ***Important Bonds in Biological Molecules:***

- Ionic Bonding
- Covalent Bonding: What are the types of covalent bonding and what are their differences?

- Can you have electrons shared in the following bonding examples:

- Covalent
- Polar
- Non-polar

- What are Hydrogen bonds?



- Question: What do you notice about the positioning of the water molecules in ice?

- Question: Is ice more dense or less dense than liquid water? Why

- Question: How does water get to the leaves of trees hundreds of feet tall?

- ***Properties of Water***

- What is Polarity?
- What does hydrophilic mean?
- What does hydrophobic mean?
- How does temperature affect the properties of water?

- What is cohesion?
- What are the parts of a solution?

- PROBLEM: Why does salt dissolve in water and not in alcohol?

- ***Comparing Cohesion and Adhesion***

- Define cohesion:
- Define adhesion:

- ***Classifying Solutions as an Acid or a Base***

- Define an Acid:
- Define a Base:
- What is the pH scale?

- ***A Closer Look at the pH Scale:***

- What happens when there is a change of 1 on the pH scale in terms of hydrogen concentration?
- Question: If you ate 3 oranges, what would happen to your pH? What could you eat to neutralize your pH?
- How does the pollution in this picture harm the environment?

- ***Buffers Against Shifts in the pH***

- Question: What is the difference between regular and buffered aspirin?
- Explain the buffering system your body uses to maintain the proper pH in your blood.