AP Biology 12

**The Chemistry of Life and The Cell "Building the Foundations"**

**Concept 1: Analyzing and the chemistry of life (Ch 2-5)**

Chapter 2: The Chemical Context of Life (reading package) & Chapter 3: Water and Life

***Chapter 3: Water and Life***

**YOU MUST KNOW**

* The importance of hydrogen bonds to the properties of water.
* Four unique properties of water and how each contributes to life on Earth.
* How to interpret the pH scale.
* The importance of buffers in biological systems.

***Why is Water So Special?***

The Structure of Water

* Covalent bonds between the \_\_\_\_\_\_\_\_
* A polar molecule – charge ­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* 2 water molecules will form a loose, weak bond known as a ­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**There are 4 properties of water that contribute to Earth’s suitability for life.**

1. **Universal Solvent**

* other charged particles can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in it. For example:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_substances are water-soluble

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ substances are non-polar (oil) and do not dissolve in water.

2. **Cohesion** *(water molecule joined to water molecule)*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- water molecule attached to some other molecule

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_movement up thin xylem tubes and evaporation through stomata

Water molecules ­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_ together due to the hydrogen bonding buy the flow \_\_\_\_\_\_\_\_\_\_.

Our blood is \_\_\_\_\_\_ water. Water helps our joints to move \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Activity: **How is the Surface Tension of Water Affected By Soap**

3. **Temperature Regulator**

High \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hydrogen bonds absorb heat \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and then hold it for a\_\_\_\_\_\_\_\_\_\_\_ time

This is why there are \_\_\_\_\_\_\_\_\_\_\_\_fluctuations in our body temperatures and in the \_\_\_\_\_\_\_

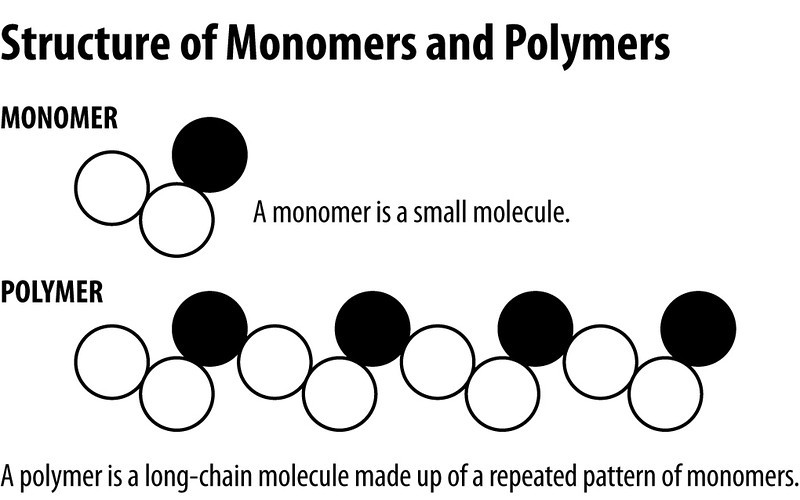
Also sweat uses body heat to evaporate it and this \_\_\_\_\_\_\_\_\_\_\_\_\_ the body down

4. **Insulator**

Water is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_as a solid than a liquid, therefore, ice floats.

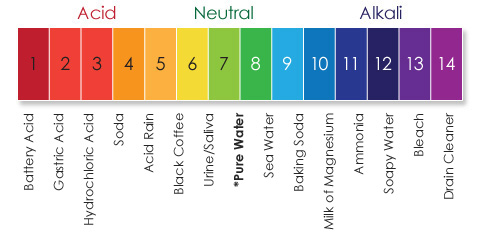
This keeps large bodies of water from freezing solid and therefore \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Reactions that Involve Biological Molecules & WATER**



**Monomers:** small \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_that can be chemically bonded to form polymers e.g. glucose, fatty acids, nucleotides and amino acids

**Polymers**: large molecules made up of a linked series of repeated simple \_\_\_\_\_\_\_\_\_\_\_\_\_e.g. polysaccharides such as glycogen, starch and cellulose and also DNA, proteins and fats.



**Interpreting the pH Scale**

What is an acid?

What is a base?

What is a buffer?

An essential buffer in our bodies is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. It moderate pH in blood…and in the ocean!

**Chapter 4:** Caron and the Molecular Diversity of Life

Carbon needs **­­­­­­­­­­**\_\_\_\_\_\_\_covalent bonds to ‘feel satisfied’. Instead of drawing the electrons all the time, we draw \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_to represent a \_\_\_\_\_\_\_\_\_\_\_\_\_\_(covalent bond)

An isomer is:

Other important elements:

If arranged in single bonds, the carbon molecule can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Ex:

If arranged in double bonds, the carbon molecule must be\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Ex:

Functional Groups allow for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Examples:

**Chapter 5:** The Structure and Function of Macromolecules

To prepare:

* Read Holtzclaw p 38-42
* Campbell
  + Examine at figures from Chapter 5
  + Read “Exploring Protein Structure” Pg. 82-83
  + Read “Inquiry 5.25” p. 86