

Day 1 - Sept 22

Orientation

- No exam, only culminating (project type, maybe 2)
- Fill out the virtual integrity forms from the tdsb
- 70% term, 30% final
- Online quizzes
- Review starts tmrw
 - How do we return signed forms? → tdsb email??
- Do ur homework smh
- Reading n question homework most nights
- Videos r available afterwards

What is Biology

- Bio overlaps w chem, tech, toxicology, medicine, physics, astronomy
- She had a prof who had a freezer full of dead birds

5 Units

- Biochem
 - Different functional groups to name molecules
- Metabolic processes
 - Cell structure n transport
 - Cell respiration, photosynthesis
- Molecular genetics
 - Dna structures
- Homeostasis
 - Nervous system
 - Endocrine system
 - Reproductive system
- Population dynamics
 - May use as isp
 - Pop growth, management
 - Resource management

Day 2 - Sept 23

Chem Review and Properties of Water

Ionic vs covalent bonds

- Ionic is stronger
- Ionic transfer electrons, covalent share
- Ionic bonds produce ions
- Ionic = metal + non-metal
- Covalent = 2 non-metals

Polar Covalent bond

- Unequal sharing of electrons
- 2 Non-metals
- Electronegativity

Intermolecular forces - van der Waal forces

- London dispersion
 - Exist between all atoms
 - Uneven distribution of electrons creating temporary dipole
 - Dipole: molecule with a slight charge (either positive or negative)
 - Weakest of van der Waals forces
 - Ex: liquid helium
- Dipole-dipole forces
 - Exist in polar molecules
 - Since polar attracts polar (like attracts like)
- Hydrogen bond
 - Not a bond
 - Forms between electropositive and electronegative polar molecules
 - Strongest of the forces
- There's also this thing called an ion-dipole

Electronegativity

- Ability to attract a shared electron pair when in a covalent bond
- Greater EN means higher chance of attracting electron

- Up and to the right
- Nobles gases given EN of 0
- Difference in EN of the 2 atoms in the bond, 0.4 - 1.7 polar bond, more than 1.7 = ionic bond

Water

- Solid form is less dense than liquid, ice floats
- High heat capacity
- 70% of body is made up
- Vital for transport
- Universal solvent
- Polar molecule
- High heat capacity

Properties of water

- Cohesion = water attracted to other water molecules → polar attracts polar
- Adhesion = water attracted to other materials → meniscus on graduated cylinder
- Surface tension = measure of difficulty to stretch or break surface of liquid
- Capillary action → due to cohesion and adhesion
 - Water is able to be transported easily from the roots of a plant all the way up to its leaves
 - Binds to other water molecules and the xylem in the plant
- High heat capacity
 - Harder to heat up water because of hydrogen bonds
- Density
 - Water is less dense as a solid
 - Bc hydrogen bonds are stable in ice
 - Each molecule bound to 4 of its neighbours
 - In liquid molecules are constantly bonding and rebonding

Acids and bases

- 1 - 6 = acidic, 7 = neutral, 8 - 14 alkaline (basic)
- Ranges from 1 to 14
- Logarithmic / exponential scale
- Get 10x bigger / smaller
- Acid
 - Donates H^+ when added to aqueous solutions
 - 0 - 6.9
 - Taste sour
 - React with certain metals to give off hydrogen gas

- Conducts electricity in solution → wth so do bases
- Base
 - Donates an OH⁻ when added to aqueous solution
 - 7.1 - 14
 - Tastes bitter
- Buffers
 - Compounds used to maintain a constant pH within a system
 - Resist changes to the pH of a solution

Day 3 - Sept 24

Homework:

- Watch paperclip video
- Read textbook page 25 to 27
- Finish remaining questions on Hydro Nomenclature and Functional Group nomenclature worksheet
- QUIZ ON MONDAY, Sept 28
- Molview .org

Why do we eat

- Nutrients
- Carbon - the central atom
- Atoms of 4 elements make up roughly 99% of mass of most cells
- H, N, C, O
- With certain exceptions, molecules with carbon are called organic compounds
- Most also contain hydrogen and oxygen

Molecular formula

- Indicates number of atoms in the molecule

Structural formula

- Indicates ratio of atoms with molecule

Prefixes:

- 1 carbon - meth-
- 2 carbon - eth-
- 3 carbon - prop-
- 4 carbon - but-
- 5 carbon - pent-
- 6 carbon - hex-
- 7 carbon - hept-
- 8 carbon - oct-
- 9 carbon - non-
- 10 carbon - dec-

Alkanes [$C_n H_{2n+2}$]

- Characterized by single carbon bonds
- Ends in -ane
- Chain identified by standard prefix
- All single bonds

Alkenes [$C_n H_{2n}$]

- Ends in -ene
- Same prefix for identification
- Contains **AT LEAST** 1 DOUBLE bond
- For any organic chemical with more than 3 carbons, you have to specify WHERE in the chain the double bond occurs
 - I.e. 1-butene indicates first carbon being double bonded
- 2 carbon - ethene
- 3 carbon - propene
- 4 carbon - butene
 - 1-butene indicates first carbon being double bonded
 - 2-butene indicates second carbon being double bonded
- 5 carbon - pentene
- 6 carbon - hexene
- 7 carbon - heptene
- 8 carbon - octene
- 9 carbon - nonene
- 10 carbon - decene

Alkynes

- Ends in -yne
- Same prefix for identification
- Contains **AT LEAST** 1 TRIPLE bond
- For any organic chemical with more than 3 carbons, you have to specify WHERE in the chain the triple bond occurs
 - I.e. 1-butyne indicates first carbon being triple bonded
- 2 carbon - ethyne
- 3 carbon - propyne
- 4 carbon - butyne
 - 1-butyne indicates first carbon being triple bonded
 - 2-butyne indicates second carbon being triple bonded
- 5 carbon - pentyne
- 6 carbon - hexyne
- 7 carbon - heptyne
- 8 carbon - octyne
- 9 carbon - nonyne
- 10 carbon - decyne

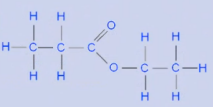
Functional Groups

- Possess certain chemical properties
- More reactive than hydrocarbon portions
- hydrophilic except for phosphates??
- Hydroxyl group
 - [R-OH]
 - Characteristics of alcohol
 - Names end in -ol
 - Ex: methanol
- Aldehyde group
 - characteristics of sugars
 - [R-C-H]
=O
 - names end in -al
 - Ex. butt anal :(())
- **Ketone** group
 - Characteristics of sugar
 - Names end in -one
 - R - C - R'
=O

- Ex. propanone
- Carboxyl group
 - Characteristics of organic acid
 - names end in -oic acid
 - $[R-C-OH]$
 $\quad \quad \quad =O$
 - Ex. propanoic acid
- Amino group
 - characteristics of amino acid
 - Name has amino
 - $[R - N - H]$
 $\quad \quad \quad H$
- Ester group
 - Characteristics of fats
 - End in -oate
 - $[R - C - OR']$
 $\quad \quad \quad =O$

F. Ester Group $[R-C-OR']$

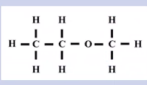
- Characteristics of fats
- Names end with "-oate"

Molecular Formula	Name	Structural Formula
$C_5H_{10}O_2$	Ethyl propanoate	

- May have substituent chains attached which will need to be named
- Ether group

G. Ether Group $[R-O-R']$

- Characteristics of sugars
- Names end with the "ether"
- Order of chain determined by alphabetical order

Molecular Formula	Name	Structural Formula
C_3H_8O	Ethyl methyl ether	

Hi. My name is Andrew and I have had
literally no coffee in 7 months

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Nomenclature Quiz

- (after lesson, beginning at 10:45)
- Brightspace
- Covers all nomenclature stuff (sept 22 - 24) + review in MC
- Part A: 7 - 10 MC
- Part B: 3 questions - Naming molecules → give structure or give name
- Identify functional groups within structure
- Part C: 3 questions - Draw structural diagrams given name or chemical formula
- Chemical formula given → form where carbons are separated to make it easier
(chemical formula will be in the form that tells you what is attached to each carbon)
- Part D: 3 - 4 questions - short answers, similar to what we did on the worksheets