Welcome to IB Chemistry!!! I am so excited to have you in my class this year.

Chemistry can be a challenging subject. But chemistry is also a wonderful subject to help your brain grow and develop new thinking skills that will help you after high school.

1) Chemistry involves abstract concepts that cannot be observed. We simply cannot see atoms, the basis of chemistry.

   → Taking chemistry will help you grow your abstract reasoning skills.

2) Chemistry topic builds on the topic before it. Therefore, if you have not yet understood one topic, you may find the next topic difficult to learn.

   → Taking chemistry will help teach you to stay organized and make connections between different topics.

3) Chemistry requires analytical skills and thinking.

   → Therefore chemistry is a great class for you to learn and practice your analytical skills and thinking.

4) Chemistry requires you to apply math skills to process lab data and draw conclusions.

   → By the end of the class you will have a lot more confidence in solving word problems and problem solving in general.

Even though chemistry can be challenging, if you are an engaged student you will have no problem passing the course.

These are the characteristics of an engaged chemistry student:

- Being present in class both physically and mentally. - No phones allowed
- Participating in class, including asking questions when you do not understand something.
- Being an active member of your lab group.
- Making up class and work when you cannot be present in class.
- Doing your work on time, including homework.
- Studying for tests.
- Coming for extra help when you need to.
- Checking google classroom and email to stay organized and know assignment due dates.
- Reading all your teachers' formative feedback on your assignments.

If you want to take a look at the class policies here is a link to them: Chemistry Class Policies

Chemistry

Name _____

Date _____

Overview of IB Chemistry

Topics covered year 1 - In the order the units are taught in

Unit	Section	Subsections
1 - Matter	Structure 1: Models of the particulate nature of matter	Structure 1.1: Introduction to the particulate nature of matter ■ Elements, compounds and mixtures ■ The kinetic molecular theory ■ Kinetic energy and temperature
2 - Atomic theory		Structure 1.2: The nuclear atom ■ The atomic model ■ Isotopes Structure 1.3 - Electron configuration ■ Atomic emission spectra ■ Electron Configuration
3 - Periodic trends	Structure 3: The classification of matter	Structure 3.1: The periodic table: Classification of elements ■ Periods, groups and blocks ■ Periodicity and electron configuration ■ Periodicity in the reactivity of elements
4 - Ionic bonding and bond types	Structure 2: Models of bonding and structure	Structure 2.1: The ionic model ■ The ionic bond ■ Ionic structures and properties
	Structure 3: The classification of matter	Structure 3.1: The periodic table: Classification of elements ■ Oxidation states
5 - Covalent bonding and molecules	Structure 2: Models of bonding and structure	Structure 2.2: The covalent model ■ Covalent bonding, the octet rule and lewis formulas ■ Single, double and triple covalent bonds ■ Coordination bonds ■ The Valence Shell Electron Pair Repulsion (VSEPR) model ■ Bond Polarity ■ Molecule polarity ■ Covalent network structures ■ Intermolecular forces ■ Chromatography

6 - Metallic model and alloys	Structure 2: Models of bonding and structure	Structure 2.3: The metallic model ■ The metallic bond Structure 2.4: From models to materials ■ The bonding triangle ■ Applications of the bonding triangle ■ Alloys
7 - Periodic Trends	Structure 3: The classification of matter	Structure 3.1: The periodic table: Classification of elements ■ Periodicity in reactivity ■ Metal and non-metal oxides
8 - Composition stoichiometry	Structure 1: Models of the particulate nature of matter	Structure 1.4: Counting particles by mass: The mole ■ The mole as a unit of amount ■ Relative atomic mass and relative formula mass ■ Molar mass ■ Molar concentrations
10 - Ideal Gases	Structure 1: Models of the particulate nature of matter	Structure 1.4: Counting particles by mass: The mole ■ Avagadro's law Structure 1.5 ■ Using mole ratios in equations ■ The limiting reactant and theoretical yield ■ Percent yield ■ Atom economy
9 - Reaction Stoichiometry	Reactivity 2: How much, how fast and how far?	Reactivity 2.1 - How much? The amount of chemical change ■ Using mole ratios in equations ■ The limiting reactant and theoretical yield ■ Percent yield ■ Atom economy

Year 2:

10 - Functional groups	Structure 3: The classification of matter	Structure 3.2: Functional groups: Classification of organic compounds ■ Empirical, molecular, full structural, condensed structural, and skeletal formula of organic compounds ■ Aromatic compounds ■ Class and functional groups of organic compounds ■ Naming organic compounds ■ Homologous series ■ Isomers ■ Physical properties of organic compounds ■ Polymers

11 - Thermochemistry	Reactivity 1: What drives chemical reactions	Reactivity 1.1: Measuring Enthalpy changes ■ Chemical reactions involve heat transfers ■ Endothermic and exothermic reactions ■ Energetic stability ■ Measuring enthalpy changes (combustion and solutions) ■ Thermochemical equations ■ Combustion reactions
		Reactivity 1.2: Energy Cycles in reactions ■ Bond enthalpy ■ Hess's law
		Reactivity 1.3: Energy from fuels ■ Complete and incomplete combustion reactions ■ Fossil fuels - climate impact ■ Biofuels
12 - Kinetics and Equilibrium	Reactivity 2: How much, how fast and how far?	Reactivity 2.2: How fast? The rate of chemical change ■ Rate of reaction ■ Collision theory ■ Factors that influence the rate of reaction
		Reactivity 2.3: How far? The extent of chemical change ■ Dynamic Equilibrium in chemical and physical systems ■ Equilibrium Law ■ Le Chatelier's principal
13 - Proton Transfer reactions	Reactivity 3: What are the mechanisms of chemical change	Reactivity 3.1: Proton Transfer reactions ■ Arrhenius acid and bases ■ Bronsted-Lowery acids and base ■ Amphiprotic species ■ pH scale ■ Ion product constant of water ■ Strong and weak acids ■ Neutralization reactions ■ pH titration curves
Internal Assessment		
14 - Electron transfer reactions	Reactivity 3: What are the mechanisms of chemical change	Reactivity 3.2: Electron transfer reactions ■ Redox reactions ■ Half-equations (balancing Redox reactions) ■ Redox titrations ■ Trends in the ease of oxidation and reduction of elements (activity series of metals) ■ Oxidation of metals by acids ■ Voltaic and electrochemical cells ■ Rechargeable cells ■ Fuel cells ■ Oxidation of functional groups in organic compounds

15 - Electron sharing reactions	Reactivity 3: What are the mechanisms of chemical change	Reactivity 3.3: Electron sharing reactions ■ Radicals ■ Homolytic fission ■ Radical substitution reactions of alkanes
		Reactivity 3.4: Electron pair-sharing reactions ■ Nucleophiles ■ Nucleophilic substitution reactions ■ Heterolytic fission ■ Electrophiles ■ Electrophilic addition of alkenes

For summer homework I would like you to do the following assignment. These assignments will be due on the first day of class. This summer homework is a review of material you were taught in your freshman year science course.

1) The 1st assignment focuses on what chemistry is and why it is important.
2) The 2nd assignment is about how matter can be classified.

The reading required to complete the summer homework is in your textbook and posted on goggle classroom. The google classroom code is: a4hv6hc2. I have already set up your google classroom and you should have access to it. If you cannot get into your google classroom or have any other questions please email Ms. Banks at ebanks-moulton@msad51.org

You are responsible for answering all the questions in this document. EACH PERSON must complete their own copy.

Part 1: What is chemistry?

Read pages 3 to 20 in the IB Chemistry Book and answer the following:

1) What is chemistry? _____

_____

_____

2) What are some of the challenges with studying the fundamental particles of chemistry? Atoms, compounds, molecules?

_____

_____

_____

_____

3) What is an atom? _____

_____

4) Sketch the matter classification flow chart on page 8.

5) What is an element? _____

_____

6) What is a chemical symbol? _____

_____

7) What is a native element? _____

_____

8) What is a chemical formula? _____

_____

9) What is a mixture? _____

_____

10) What is a homogeneous mixture? _____

_____

11) What is a heterogeneous mixture? _____

_____

12) Summarize the difference between filtration, solvation, crystallization and distillation.

13) Classify the following as a mixture or a pure substance.

Material	**Pure Substance or Mixture**	**If the material is a pure substance, is it an element or a compound?** **If the material is a mixture, is it a homogeneous or heterogeneous?**
sugar and pure water		
iron fillings		
limestone ($CaCO_3$)		
orange juice with pulp		
water and salt		
salt water with seaweed		
air		
aluminum		
acetylene (C_2H_2)		

pure water (H_2O)		
soil		
chromium		
muddy water		
pizza		
brass (Cu mixed with Zn)		

Do Q1 to Q6 on page 14

22) What is the kinetic molecular theory?

23) Fill in the following table about the different states of matter

	Solid	Liquid	Gas
Particle Spacing			
Intermolecular Forces			
Shape			
Volume			

24) What are intermolecular forces?

25) What is an aqueous solution?

26) What is the difference between a solute and solvent?

27) Sketch the figure on page 17

Do Q7 to Q13 on pages 19-20