Al-Bayan Bilingual School

High School Science & Technology Department

AP Chemistry

Summer Assignment

SUMMER PREPARATION AND STUDY UNITS AP CHEMISTRY 2020-2021 ACADEMIC YEAR

The AP Chemistry Course is described at (**https://apstudents.collegeboard.org/courses/ap-chemistry**.

Units 1 to 4, units 6, 8 and 9 were partly studied in grade 11 and must be reviewed over the summer to prepare you for the AP 2020-2021 Course. **You must complete this assignment and bring it with you on your first day of AP Chemistry. This is not optional. It is required and taken for your first grade.**

The summer assignment is meant to help you review the material learned in the previous chemistry courses and to prepare you for the AP course. Print copies of your self assessment results and submit first day of school year. Performance on this assessment will be used to assess students' readiness and will guide instructions and tutoring throughout the academic year.

The highlighted sections are the ones we will cover in AP chemistry in addition to going into more depth for sections covered during grade 10 and PreAP chemistry.

DURING THE SUMMER, COMPLETE THE INTERACTIVE ASSIGNMENTS on chapters 1 to 8 and 11, 14 and 16 AT THE WEBSITE:
http://www.sciencegeek.net/Chemistry/Review/

For each chapter there is a presentation on the website to help you review the material.

Unit 1: Atomic Structure and Properties

Please review with interactives of unit 1 and 2 at the website:
http://www.sciencegeek.net/Chemistry/Review/)
You'll learn about the composition of atoms and ways scientists measure and categorize these molecular building blocks.
Topics include:

- **Moles and molar mass**
- **Mass spectroscopy of elements**
- **Elemental composition of pure substances**
- **Composition of mixtures**
- **Atomic structure and electron configuration**
- **Photoelectron spectroscopy**
- **Periodic trends**
- **Valence electrons and ionic compounds**

Unit 2: Molecular and Ionic Compound Structure and Properties

Please review with interactives of unit 2 and 3 at the website:
http://www.sciencegeek.net/Chemistry/Review/

You'll discover the range of chemical bonds and how their structure can affect the properties of the molecules created.

Topics include:

- **Types of chemical bonds**
- **Intramolecular force and potential energy**
- **Structure of ionic solids**
- **Structure of metals and alloys**
- **Lewis diagrams**
- **Resonance**
- **VSEPR and bond hybridization**

Unit 3: Intermolecular Forces and Properties

Please review with interactives of unit 3 and 4 at the website:
http://www.sciencegeek.net/Chemistry/Review/

You'll explore how atoms come together to create solids, liquids, and gases, and how subatomic forces govern the properties of everything around you.

Topics may include:

- **Intermolecular forces**
- **Solids, liquids, and gases**
- **Kinetic molecular theory**
- **Solutions and mixtures**
- **Photoelectric effect**

Unit 4: Chemical Reactions

(Partly Covered in Previous Course – Please review with interactives of unit 5 at the website: http://www.sciencegeek.net/Chemistry/Review/)

You'll learn how to differentiate physical and chemical processes, and how to measure and express chemical reactions via chemical equations.

Topics may include:

- **Introduction for reactions**
- **Net ionic equations**
- **Representations of reactions**
- **Physical and chemical changes**
- **Stoichiometry**
- **Types of chemical reactions**

Unit 5: Kinetics

(Not Covered in Previous Course – Do not Review)

You'll explore various methods to observe the changes that occur during a chemical reaction and the effects of a series of reactions.

Topics include:

- **Reaction rate**
- **Introduction to rate law**
- **Elementary reactions**
- **Collision model**
- **Introduction to reaction mechanisms**
- **Multistep reaction energy profile**
- **Catalysis**

Unit 6: Thermodynamics

You'll learn about energy changes in chemical reactions and how a transfer of energy can change a substance's physical qualities.

Topics include:

- **Endothermic and exothermic processes**
- **Heat transfer and thermal equilibrium**
- **Heat capacity and calorimetry**
- **Energy of phase changes**
- **Introduction to enthalpy of reaction**
- **Enthalpy of formation**
- **Hess's law**

Unit 7: Equilibrium

(Not Covered in Previous Course – Do not Review)

You'll chart how chemical reactions change over time, what causes substances to reach equilibrium, and how systems react when that equilibrium is disturbed.

Topics include:

- **Introduction to equilibrium**
- **Calculating the equilibrium constant**
- **Calculating equilibrium concentrations**
- **Introduction to Le Châtelier's principle**
- **Introduction to solubility equilibria**
- **pH and solubility**
- **Free energy of dissolution**

Unit 8: Acids and Bases

(Covered in Previous Course – Review except for buffers)

You'll learn more about pH, the qualities and properties of acids and bases, and how they interact in chemical reactions.

Topics include:

- **Introduction to acids and bases**
- **pH and pOH of strong acids and bases**
- **Acid-base reactions and buffers**
- **Molecular structure of acids and bases**
- **pH and pK_a**
- **Properties of buffers**

Unit 9: Applications of Thermodynamics

(Covered in Previous Course – Review except electrochemistry)

You'll be introduced to the concept of "thermodynamic favorability" for reactions, meaning how likely they are to occur given energy changes and environmental factors.

Topics include:

- **Introduction to entropy**
- **Gibbs free energy and thermodynamic favorability**
- **Thermodynamic and kinetic control**
- **Free energy and equilibrium**
- **Galvanic (voltaic) and electrolyte cells**
- **Electrolysis and Faraday's law**