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| **MONDAY** | **TUESDAY** | **WEDNESDAY** | **THURSDAY** | **FRIDAY** |
| **Stoichiometry Review and Introduction to Equilibrium (AfL)**  **Hook – The Throwing of the Balls!**  - heterogeneous and homogeneous equilibrium  E2.1 | **Le Chatelier’s Principle**  - predict conditions that affect equilibrium  - How does dynamic equilibrium respond to change?  **STSE**🡪 How can we connect this to how biological systems adapt to change?  E2.1, E2.2, E3.3 | **Equilibrium Law – Keq**  -the equilibrium constant  **Misconception Activity 1 – Dance Dance Revolution**  **(AfL/AaL)**  -examine opposing rates  - practice writing equilibrium expressions  E2.1, E3.4 | **Equilibrium Calculations**  -how to measure equilibrium concentrations (change in colour, pH, pressure)  **Activity 1 – Modeling Dynamic Equilibrium with buttons (AfL/AaL)**  (to be handed in class)  E2.4, E3.1, E3.2 | **Equilibrium Calculations**  -solving equilibrium problems  -favourable vs. Unfavourable reactions  - Kc ( examine the effects of a large Kc vs. a small Kc)  E2.4 |
| **Case Study – The Haber Process, production of Ammonia (AoL)**  E1.1, A1.8, A1.9, A1.10  **Quiz - Equilibrium Calculations (AfL/AaL)**  E2.4 | **Common Ion Effect**  -ions in aqueous solution  -concentration effect  **STSE**🡪 Salt water and the effectiveness of soap activity  Class time (30 min. For Blog entry) E1.2, A1.3 | **Solubility and Ksp Lab**  Informal lab report to be completed in class **(AoL)**  E2.3, A1.4, A1.5 | **Equilibrium and Solubility**  -analyze the effects of temperature, volume and the presence of a catalyst on solubility  **Blog Entry # 1 Due** A1.11  E2.2, E2.3 | **Acid-Base Review**  **Activity 2 – Acid/Base Review (AfL/AaL)**  -H3O+ ion, conjugate acid/base [air, monoprotic and polyprotic acids  (from Gr. 11) |
| **Bronsted-Lowry Theory**  **Misconception Activity 2 – Strength vs. Concentration**  **(AfL/AaL)**  -molecular structure and acid/base strength  - donating vs. accepting electrons  E3.6, E3.7 | **Kw, pH and pOH**  - Kw = [H3O+] [OH-]  - describe the concept of pH and pOH  -practice pH and pOH calculations using [H3O+] and [OH-]  E3.4, E3.5 | **Ka Calculations**  **Quiz- Acids, Bases and pH (AfL/AaL)**  -acid dissociation constant  -% dissociation  E3.4 | **Ionization and Kb**  -explain the base dissociation constant  -practice solving Kb problems and calculations  Class time (30 min. For Blog entry) E1.2, A1.3  E3.4 | **Salts of Acids and Bases**  -analyze the acidic and basic properties of salts  -predict whether a salt solution will be acidic, basic or neutral  **STSE** 🡪Sodium Fluoride and the safety of drinking water  **Blog Entry # 2 Due** A1.11 |
| **Titration Calculations**  -titration curves  Titrations involving strong acid/weak base & strong base/weak acid  -solve problems using titration data  -explain equivalence point and end point  E2.5, E3.7 | **Titration Lab**  Formal Lab Report  **(AoL)**  E2.5, A1.4, A1.5 | **Buffers**  -properties and components of buffers  -systems in which buffers are found  **STSE**🡪How do buffers affect the pH of our blood?  E1.1, E3.8 | **Review**  **Blog Entry # 3 Due** A1.11 **(AoL)** | **Unit Test**  **(AoL)** |

Our essential question for this unit is: “What role do chemical systems in equilibrium play in the life of humans and how do we use chemical equilibrium in technological or industrial processes?” In order to address this question, our unit is broken down into three main groupings while aligning with the ministry expectations. The unit starts off with equilibrium, then moves into solubility and ends off with acids and bases. We feel that this sequence also moves from the more simple concepts to the more complex allowing for students to be continually building on their prior knowledge. Throughout the unit, various STSE topics are addressed in order to supplement material from class or as a lesson in it of itself. A case study that examines the Haber process for ammonia production will allow students to assess conditions that affect chemical equilibrium in industry as well the economic and environmental impact of this particular process. Throughout the unit, students will also encounter questions and activities that will allow them to connect the concept of chemical equilibrium to the real world. Such activities include: 1. Making relationships between how chemical systems and biological systems adapt to change, 2. Examine how fresh water and salt water react with soap and examine the environmental significance of the common-ion effect, 3. Sodium fluoride and the safety of drinking water around the world, and 4. How do buffers affect the pH in our blood? All of the aforementioned topics will allow students to understand the practicality of studying equilibrium and serve to support the essential question for this unit.

There are several opportunities for both assessment and evaluation throughout this unit. This unit consists of 4 Assessment OF Learning pieces including: The Ksp Solubility Lab (informal lab report), The Titration Lab (formal lab report), The STSE Blog Project and the Final Unit Test. Assessment FOR and AS Learning are also distributed throughout the unit including: The Stoichiometry Review, the Dance Dance Revolution activity for Equilibrium Law, The Modelling Equilibrium with Buttons activity, the Equilibrium Calculations Quiz, the Acid/Base Review, the Acid Strength vs. Concentration activity and the Acid, Base and pH quiz.