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| **Lesson Plan:** |

**Big Ideas**

1. Acid or base alone is different when they're mixed in water. Water acting as a weak acid/base sets pH/pOH limit even when strong acid/base is added.

**PLOs**

**E1** analyse the equilibrium that exists in water

**E3** explain the significance of the Ka and Kb equilibrium expressions

**Material and equipment needed**

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| Powerpoint | Chem Datatable | White Boards | Speaker | Liquid nitrogen video |

**Assessment Plan:**

**Formative -**

**Hook and Introduction**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 10:15 - 10:25 | * News/Video | * Liquid nitrogen video * Can mention about quiz + states!!! |  |

**Development**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 10:25-10:40 | * Position of equilibrium | * Sample problem (10min) * They try - Think-Pair-Share (5min) | * Sample problem |
| 10:40-10:55 | * Levelling effect | * Given the side with the weaker acid/base is favored, what do we expect here below? * HSO4- + H3O+ <-> H2SO4 + H2O occur? -> Think-Pair-Share * Which side is favored? (5min) * What about bases? * NH3 + OH- <-> NH2- + H2O (2min) * Levelling effect!!!!! * Statement + those reactions in the forward direction NEVER happen (5min) | * Question about sulfuric acid |
| 10:55-11:05 | * Ionization Kw | * On powerpoint - depends on temperature of water * What if temperature of water changes? | * What happens to the relative ionizations when temperature changes? |
| 11:05-11:25 | * Strong acid/Strong bas mixture calculations | * Walkthrough a problem (5 min) * Students try a problem (18 min) * Vote (2 min) | * Eyes closed, vote |
| 11:25-11:30 | * Ka/Kb link | * Call on student volunteer to help write Ka expression and chemical reaction of HA * Call another student volunteer to help write Kb  expression and chemical reaction of A- * Have students try adding the 2 chemical reactions and multiplying the Ka and Kb expressions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Alternate plan: if students need to go over calculation of previous problem, do that instead and the above is for homework. |  |

**Closure**

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| **Time** | **Activity** | **Teaching notes** | **Assessment** |
| 5 min | * Hand - in on scrap piece of paper -> Exit slip | Question 1: complete the non-existing chemical reaction (leveling effect).  Question 2: What do you use to find [OH-] if you're given [H3O+]?  Logs in Math?  Tutorial quiz handed back.  Lab next Tues  Quiz next Thurs  Unit test Fri after Easter long weekend |  |

HW:

Practice questions

pg 239: 9-12

pg 246: 1-6, 8-10