**Unit 10: Acids and Bases** Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| **Learning Target** |
| 1. I CAN describe the properties of both acids and bases |
| 1. I CAN describe the Arrhenius definition of an acid and a base in terms of H+ and OH- ions |
| 1. *I CAN describe the differences between dissociation and ionization. \*review* |
| 1. I CAN label and describe the pH scale in terms of H+ and OH- ions |
| 1. I CAN calculate the pH and pOH of a solution when given the concentration of an acid or base. |
| 1. I CAN write and balance the equation for an acid-base neutralization reaction. |
| 1. I CAN draw and describe the neutralization of an acid by a base (reactants and products). |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Chemistry Important Dates! | | | | | | | |
| Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
| May 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |

**Notes on Properties of Acids and Bases (Complete the Table Below)**

|  |  |  |  |
| --- | --- | --- | --- |
| **Acids** | | **Bases** | |
| **Properties** | | **Properties** | |
| **Examples:** | | **Examples:** | |
| **Arrhenius Definition:** | | **Arrhenius Definition:** | |
| **How they behave in water (write reaction)** | | **How they behave in water (write reaction)** | |
| **Strong Acids** | **Weak Acids** | **Strong Bases** | **Weak Bases** |

**Using your knowledge of acids and bases, fill in the following blanks with the correct answer:**

1. A \_\_\_\_\_\_\_\_\_\_\_\_ taste is a characteristic of all acids in aqueous solution.
2. Acids react with some metals to produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_ gas.
3. Acids react with bases to produce a \_\_\_\_\_\_\_\_\_\_\_\_ and water *\*review\**
4. Acids have a pH \_\_\_\_\_\_\_\_\_ than 7.
5. Bases tend to taste \_\_\_\_\_\_\_\_\_\_\_\_\_\_ and feel \_\_\_\_\_\_\_\_\_\_\_\_\_.
6. Like acids, aqueous basic solutions conduct electricity and are identified as good \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
7. Bases have a pH \_\_\_\_\_\_\_\_\_\_\_\_ than 7.
8. An Acid is a substance that releases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions in solution.
9. An acid is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ donor.
10. A base is a substance that releases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions in solution.
11. A base is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ acceptor.
12. An indicator is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
13. Classify the following as an acid, base or salt:
    1. KI b. HNO3 c. NaOH d. KOH e. NaCl f. HF g. Ca(OH)2
14. Complete the following ionization and dissociation equations:
    1. HCl 🡪 \_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_\_ b. NaOH 🡪 \_\_\_\_\_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_\_\_

**pH and pOH Practice**

**Notes on Calculating pH and pOH Write all equations and examples.**

**On the following scales, draw a representation of H+ and OH= ions:   
pH Scale:**

0🡨-------------------------------------------------------🡪 7🡨-------------------------------------------------------🡪14

**How to Calculate pH: How to Calculate [H+]:**

**pOH Scale:**

0🡨-------------------------------------------------------🡪 7🡨-------------------------------------------------------🡪14

**How to Calculate pOH: How to Calculate [OH-]:**

**Notes on Neutralization Reactions and Salts (DO NOT watch the accelerated lesson)**

**Neutralization Practice**

1. EXPLAIN what happens in a neutralization reaction.
2. Predict the products and balance the following chemical equations. Identify the acid, base, and salt.
   1. H2SO4 + LiOH 🡪

* 1. HNO3 + Mg(OH)2 🡪

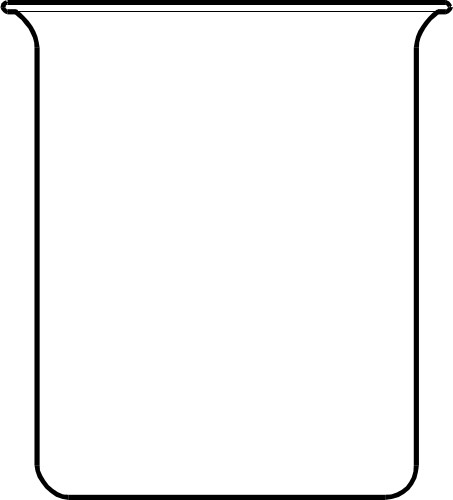
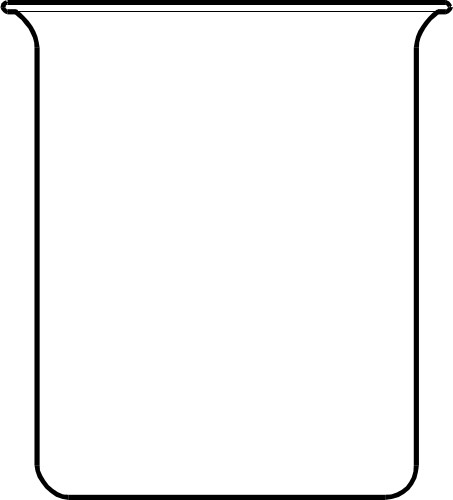
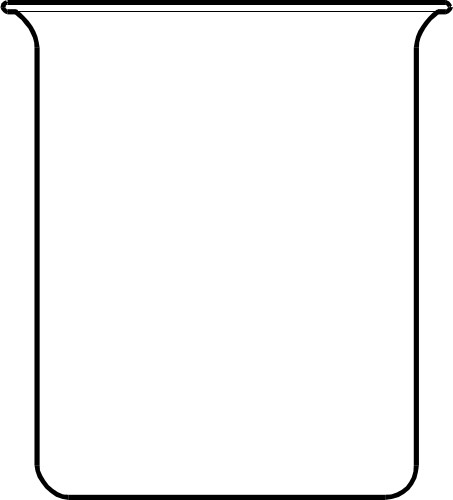
1. Hydrochloric acid reacts with ammonium hydroxide. Write the equation for this process, and indicate which of the reagents is the acid, base, and the salt.

**Acid- Base Neutralization Practice**

1. Write an equation for the reaction of aqueous sodium hydroxide with a solution of nitric acid. Next, describe if the substance has dissolved, dissociated, ionized, or precipitated. Then, draw the solutions interacting with water in the beakers below. Finally, circle the appropriate term of the solution in the beaker, is it an acid, base or salt.

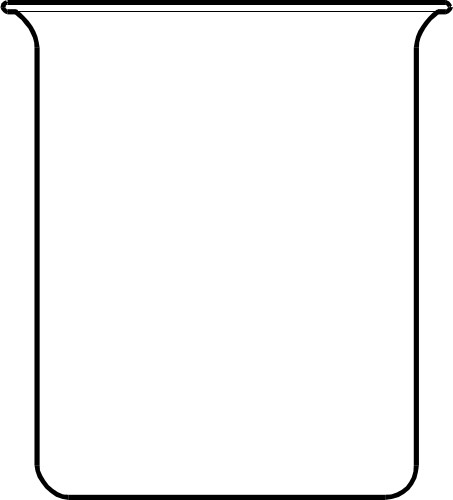
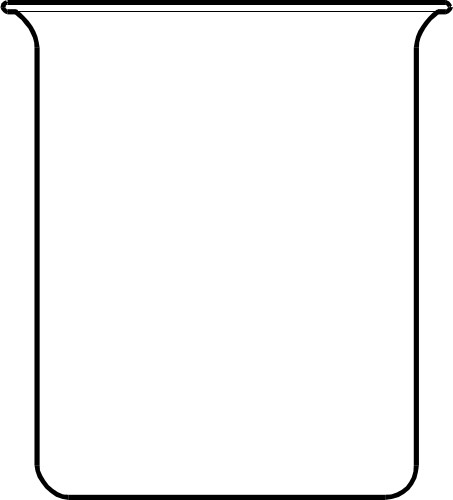
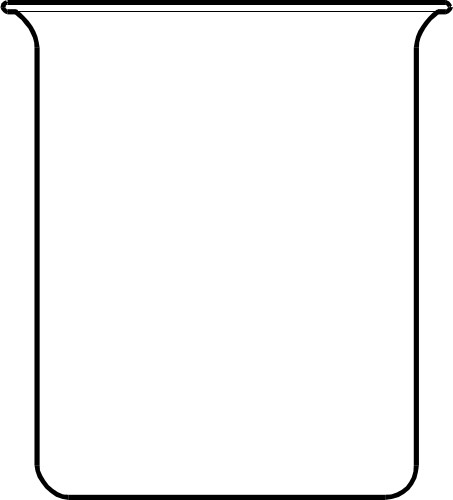
\_\_\_\_\_NaOH(aq)\_\_\_\_\_\_\_ **+** \_\_\_\_\_\_\_HNO3\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **+** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

dissolve dissolve dissolve dissolve  
dissociate dissociate dissociate dissociate  
ionize ionize ionize ionize   
precipitate precipitate precipitate precipitate  
no interaction no interaction no interaction no interaction

Acid Base Salt Acid Base Salt Acid Base Salt

1. Write an equation for the reaction of a solution of calcium hydroxide and phosphoric acid. Next, draw the solutions interacting with water the beakers below, and describe if the substance has dissolved, dissociated, ionized, or precipitated. Indicate which is the acid, base, and salt.

1. Write the formula used to calculate the pH of a solution:
2. If an acid has an H+ concentration of 6.8 x 10-4 M, what is the pH of the acid? Show Work!
3. If an acid has an H+ concentration of 3.7 x 10-2 M, what is the pH of the acid? Show Work!
4. If a solution has an H+ concentration of 1.2 x 10-9 M, is it an acid or a base? Explain how you know. Show Work!
5. If a solution has a H+ concentration of 1.5 x 10­­-1­ M, is it an acid or a base? Explain how you know. Show Work!

**Acid- Base Neutralization Review**

1. For the following reactions, write a balanced chemical equation including the states of matter and identify which substance is the acid, base, salt, or water. State which chemical process(s) of solvation would occur for each substance (dissolve, dissociate, ionize, precipitate, or no interaction)  
     
   **Example: HNO3 (aq) + LiOH (aq) 🡪 HOH (l) + LiNO3 (aq)**   
     
     
   1. H2SO4 (aq) + NaOH (aq) 🡪
   2. \_\_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_ 🡪 HOH + K3PO4
2. On the following pH scale, draw a representation of the concentration of hydrogen ions and hydroxide ions at a pH of 3, 7, and 10. Label the areas that are acidic, basic, or neutral.   
     
    0 🡨-------------------------------------------------------🡪 7🡨-------------------------------------------------------🡪 14

1. For the following, calculate the pH and identify whether the solution is an acidic, basic, or neutral (circle one).
   1. 0.150 M HCl (aq) pH= \_\_\_\_\_\_\_ acid base neutral
   2. A solution with an [H­+] of 0.04M pH= \_\_\_\_\_\_\_ acid base neutral
   3. A solution with an [H­+] of 1.34M pH= \_\_\_\_\_\_\_ acid base neutral