Compounds are classified in different ways: ACIDS and BASES

**Confounding Colour**

|  |  |  |
| --- | --- | --- |
| **Predict** | **Observe** | **Explain** |
|  |  |  |

**What is an ACID?**

* **Acidus (Latin word) meaning sour**
* **Substances which produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as the only POSITIVE ions when it is dissolved in water.**
* **Recognized in many cases as having the hydrogen at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the compound. [Example: HCl, HNO3 ]**
  + **Acetic acid sometimes written in two ways: HCH3COO or CH3COOH**

**\*Note: not all substances that contain hydrogen are acids. Example: NH3, CH4**

**Common Acids**

|  |  |  |
| --- | --- | --- |
| **Formula** | **Chemical Name** | **Examples of Uses** |
| **HCl(aq)** |  | * Produced in stomach to help digest food |
| **H2SO4(aq)** |  | * Used in automobile batteries * Used to clean metals |
| **HNO2(aq)** |  | * Used to make fertilizers |

**What is a BASE?**

* **A base is a substance that can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from another substance**
* **Any METAL OXIDE or METAL HYDROXIDE**
  + **Example: CuO, NaOH, NH4OH**

**OR**

* **A substance that reacts with an acid to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
  + **NEUTRALIZATION REACTION**
* **Can recognize many bases because of: \_\_\_\_\_\_\_\_\_\_\_\_\_**

**Common Bases**

|  |  |  |
| --- | --- | --- |
| **Formula** | **Chemical Name** | **Examples of Users** |
| **NaOH** |  | * Drain and oven cleaner * Used to manufacture paper, glass and soap |
| **Mg(OH)2** |  | * Active ingredient in some antacids |
| **Ca(OH)2** |  | * Soil and water treatment |
| **NH4OH** |  | * Kitchen cleaner * Used to make fertilizer |

**PROPERTIES OF ACIDS AND BASES**

|  |  |  |
| --- | --- | --- |
| **Property** | **Acid** | **Base** |
| **Taste**  CAUTION: Never taste chemicals in the classroom. | * Acids taste \_\_\_\_\_\_\_\_\_\_\_ | * Bases taste \_\_\_\_\_\_\_\_\_\_\_\_ |
| **Touch**  CAUTION: Never touch chemicals with your bare skin in the classroom | * Many acids will \_\_\_\_\_\_\_\_\_ your skin. | * Bases feel \_\_\_\_\_\_\_\_\_\_\_\_\_ * Many bases will \_\_\_\_\_\_\_\_\_ your skin |
| **Indicator Tests**  **pH** | * Acids turn blue litmus paper \_\_\_\_\_\_\_\_\_\_\_ * \_\_\_\_\_\_\_\_ than 7 | * Bases turn red litmus paper \_\_\_\_\_\_\_\_\_\_\_   \_\_\_\_\_\_\_\_ than 7 |
| **Reaction with some metals, such as magnesium or zinc** | * Acids \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ metal | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Electrical Conductivity** | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Production of ions** | * Acids form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions when dissolved in water | * Bases form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions when dissolved in solution. |

**QUICK REVIEW!**

**How can you recognize an acid and base by their chemical formula?**

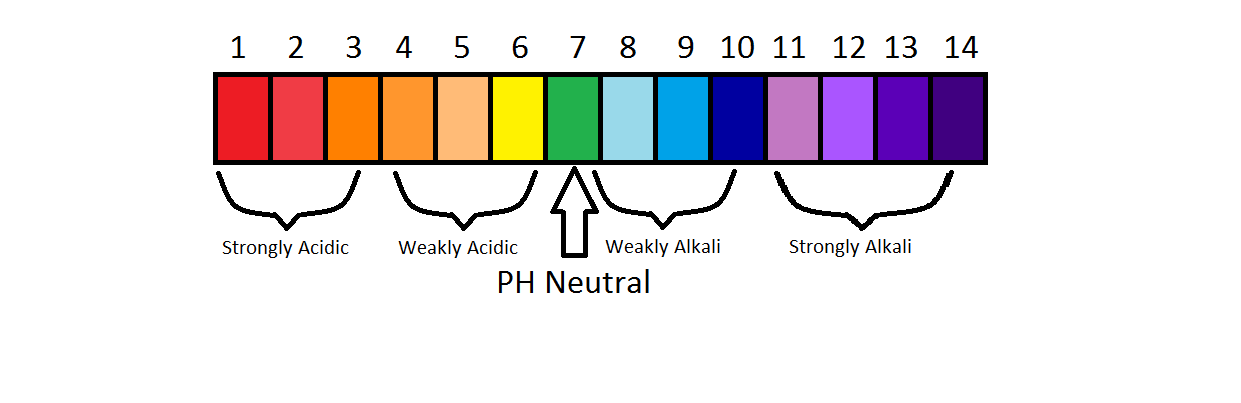
**What does corrosive mean?**

**What does BAR and BRB stand for?**

**pH SCALE**

Many of the solutions that acids and bases form are clear liquids and look like water. However, they could be quite dangerous depending on their pH level. A safe way to determine whether a solution is acidic or basic, is to use a \_\_\_\_\_.

**pH indicators** are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that change from one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to another colour depending on the pH level of the solution that they are placed in. Each indicator changes at a specific pH.

**Universal indicator** changes a variety of colours depending on the pH

**Investigation into some Common Household Products**

**Your task:**

1. Choose 6 common household products and write their names in the first column below
2. Place a paper towel under your spot plate and label next to 6 “spots” the names of your products above
3. Place 3 or 4 drops of each household product in the labeled spot on your spot plate.
4. In the second column, predict whether each of the household items is an acid or a base and briefly explain why you think this.
5. Add 1-2 drops of universal indicator to each “spot” and write down the colour it turns
6. Check the pH scale at the front of the room to see your results and write down the pH in the next column and indicate if it actually is an acid or a base.

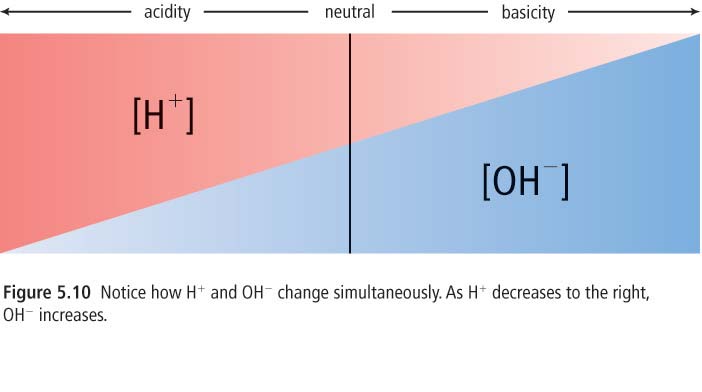
|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Household Product** | **Prediction**  **(Acid or Base? Why?)** | **Universal Indicator Colour** | **pH** | **Acid or Base**  **(final answer)** |
|  |  |  |  |  |
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**USING THE PH SCALE**

* **We know, for example: A solution of pH 3 is MORE acidic and contains HIGHER [H+] than a solution of pH 6 for the same concentration of both solutions**
* **How do we know how many times more acidic?**

**EXAMPLE:**

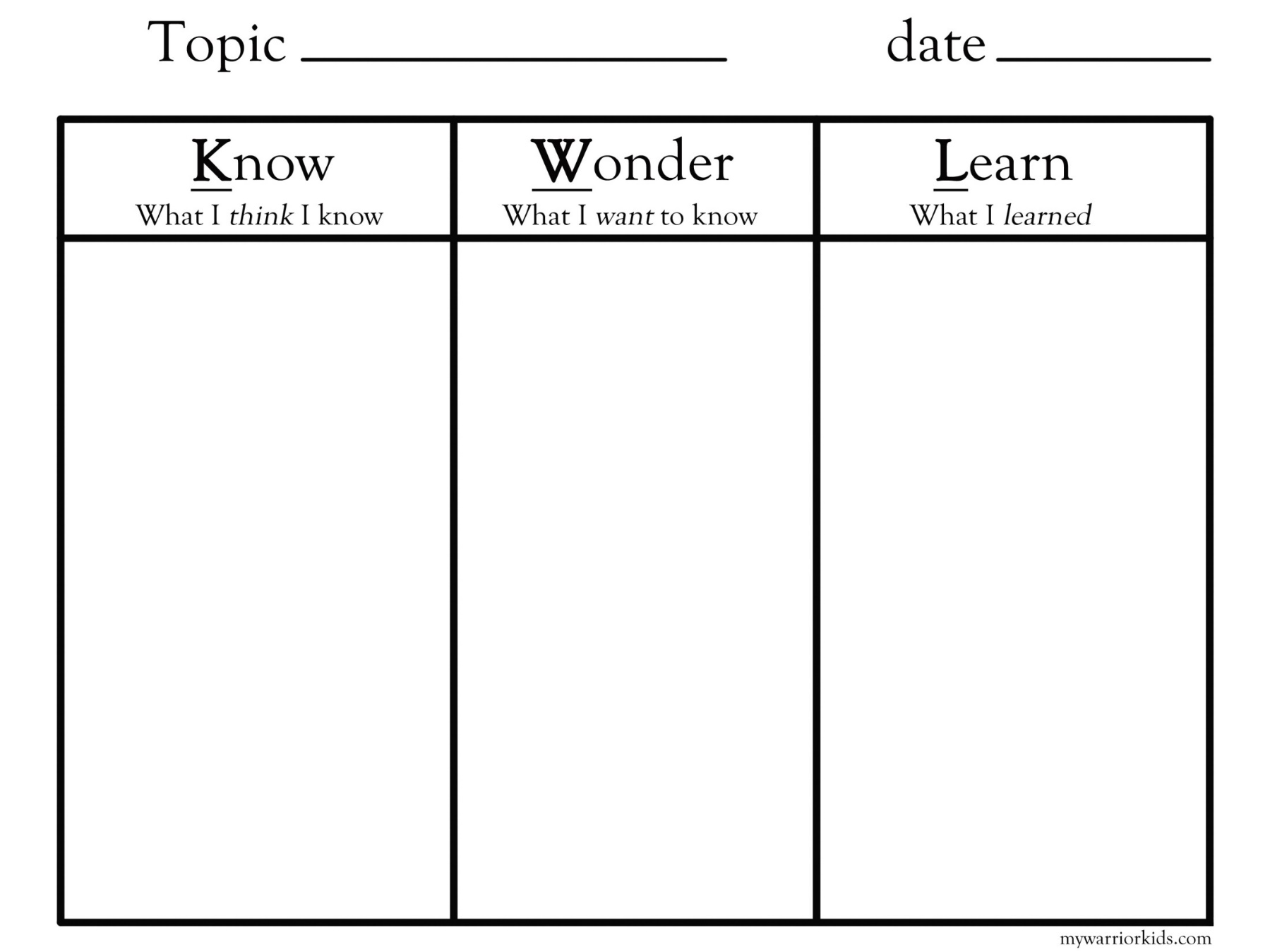
**PRODUCTION OF IONS**

* Acids produce H+ when dissolved in solution; Bases produce OH-
* Testing pH measures H+(aq) concentration
* [H+] refers to the number of hydrogen ions in a specific volume of solution
* When separate solutions containing H+ and OH- ions are combined, they react by forming water: H+ + OH- 🡪 H2O

**QUICK REVIEW!**

**How does litmus paper work?**

**On the ph scale: What numbers are acidic? Basic? Neutral?**

**How many times more acidic is ph 2 than ph 8?**