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| **Lab Write Up - Acid & Base** |
| **PR-LAB**  **Title:** Red Cabbage Lab: Acids and Bases  **Introduction:**  The pigments in red cabbage are excellent examples of natural pH indicators. With colors ranging from red to pink to violet to blue to green, they can brighten up any discussion of acids and bases. The red cabbage indicator lab was to understand how different chemicals, acids and bases, react and change color because of it. The lab was also to understand neutralization reactions and why they occur. Most directions for preparing red cabbage indicator solution require boiling the cabbage in water because red cabbage contains a water-soluble pigment called anthocyanin that changes color when it is mixed with an acid or a base. It is red, pink, or magenta in acids, (pH < 7), purple in neutral solutions (pH ≈7), and ranges from blue to green to yellow in alkaline solutions (pH > 7).  **Material:**   * Pre-Cut Cabbage * Blender * Strainer * Large Container * Beakers * Goggle * Lab clothes * Glove * Lemon Soda * White Vinegar * Apple Juice * Baking Soda * Shampoo (transparent) * Conditioner (transparent) * Hand Sanitizer * Bleach   **Safety and hazards:**   * Lemon Soda -- none * White Vinegar   + Hazard Statements     - Causes skiing irritation     - Causes serious eye irritation   + Precautionary Statements     - If medical advice is needed, have product container or label at hand     - Keep out of reach of children     - Read label before use     - Don’t eat, drink or smoke when using this product     - Wear protective gloves/protective clothing/eye protection/face protection     - Wash skin thoroughly after handling     - Take off contaminated clothing and wash before reuse     - IF ON SKIN: wash with soap and water     - If skin irritation occurs: get medical advice/attention     - IF IN EYES: rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do continue rinsing     - If eyes irritation persists, get medical advice/attention     - Specific treatment (see supplemental first aid instruction on this label)   + Flammability:     - The mixture is being classified on the basis of the classification of the flammable ingredient at or equal to 50% * Apple Juice -- none * Baking Soda   + Hazards Statements     - Coughing and sneezing if a high concentration of dust has been inhaled     - Gastrointestinal irritation can occur if large amounts have been ingested     - Mild irritation, such as redness and slight pain, may result from eye contact     - In dry form, it’s typically non-irritating to intact skin; however, it can cause irritation to damaged skin when moisture is present   + Precautions Statements     - Skin -- protective gloves and clothing should be worn.     - Eyes -- Since sodium bicarbonate is most-often seen in a powder-like state, chemical safety goggles should be worn and an area to wash eyes and skin should be located in the work area. If this chemical gets into a worker’s eyes, it can cause mild to moderate irritation.     - Managing Exposure to Sodium Bicarbonate -- Even though sodium bicarbonate is relatively safe compared to other chemicals in the workplace, as with any chemical, all unnecessary exposure should be avoided. In the event exposure occurs, the following steps should be taken:     - Eye Contact -- Flush eyes with plenty of water and seek medical attention if irritation occurs.     - Skin Contact -- Wash skin with plenty of soap and water and seek medical attention if irritation occurs.     - Inhalation -- Individuals should be removed from exposure and immediately moved to an area with fresh air. Seek medical attention immediately if any breathing difficulty occurs.     - Ingestion -- Drink plenty of water and seek medical attention if discomfort persists. * Shampoo (transparent)   + Hazard Statements     - This is a personal care or cosmetic product that is safe for consumers and other users under intended and reasonably foreseeable use. Additional information on toxicological endpoints is available from the supplier upon request.     - Eyes -- Contact may cause mild, transient irritation. Some redness and/or stinging may occur     - Skin -- Not expected to be irritating, sensitizing, photoallergic or phototoxic when used as intended. If irritation occurs following intended use or prolonged contact it is expected to be mild and transient     - Inhalation -- Not expected to be irritating to the respiratory system. Not volatile therefore limited inhalation exposure anticipated     - Ingestion -- Product used as intended is not expected to cause gastrointestinal irritation. Accidental ingestion of undiluted product may cause mild gastrointestinal irritation with nausea, vomiting and diarrhea   + Precautions Statements     - Eye -- Thorough rinsing for 15 - 20 minutes of the affected eye with water is recommended. If discomfort or irritation persists, contact a physician     - Skin Problem -- Discontinue use of product. Apply cold compresses to affected areas to relieve any discomfort. If discomfort persists, contact a physician     - Inhalation -- If respiratory irritation occurs, remove individual to fresh air     - Ingestion -- Accidental ingestion of product may necessitate medical attention. In case of accidental ingestion dilute with fluids (water or milk) and treat symptomatically. Do not induce vomiting. Note: After first aid treatment, the caller should be advised that 1) a hospital emergency room or family physician should be consulted if anything unusual occurs or appears necessary in the judgment of the caller, and 2) that the subsequent management of the accident should be dictated by any persistent symptoms and under the direction of the physician * Conditioner (transparent)   + Hazard Statements     - Flammable     - Repeated exposure may cause skin dryness or cracking     - Vapours may cause drowsiness and dizziness     - Fine abrasive paste used to remove minor imperfections in surface coating   + Precaution Statements     - Inhalation -- Remove victim to fresh air. Get medical attention for any breathing difficulty     - Ingestion -- Rinse mouth thoroughly with water. Give one glass of water or milk. Seek medical advice     - Skin -- Wash affected areas with copious quantities of soap and water immediately. Remove contaminated clothing and wash before reuse. GGet medical attention if irritation develops     - Eyes -- If in eye, irrigate immediately with copious amounts of water for 15 minutes with eyelids held open. Seek medical advice if ill effects persist. * Hand Sanitizer   + Hazard Statements     - Ensure there is adequate ventilation to prevent the build-up of vapors which can lead to a potential fire or explosion.     - Manage ignition sources properly, such as ensuring that all electrical wiring and instrumentation meets the electrical (hazardous area) classification for the use of flammable liquids. This often means replacing instrumentation and motors with those designed to proper standards.     - Store product in approved areas in the proper containers, and verify activities meet the occupancy permit requirements as approved by local fire authorities. This often means not storing flammable liquids in large plastic containers (totes and drums) and limiting the volume stored.   + Precaution Statements     - If alcohol-based hand sanitizer is spilled or otherwise released, all potential ignition sources must be immediately removed from the area to mitigate the possibility of a fire.     - Spilled hand sanitizer should be cleaned up with water immediately.     - Alcohol-based hand sanitizers should be stored away from all heat and ignition sources, including (but not limited to) sparks; open flames; any types of electrical outlets, switches or equipment; and extreme heat.     - Hand sanitizer products should not be allowed to come in contact with any type of oxidizing agent (such as acetyl chloride) or reducing agent.     - Children should not be allowed to use or access hand sanitizer unless properly supervised by an adult.     - Alcohol-based hand sanitizer products should be stored in secure locations that do not experience extremely hot temperatures.     - Hand sanitizer dispensers should not be located in corridors, exits, or open areas that lead to them. * Bleach   + Hazard Statements     - H315 - Causes skin irritation     - H318 - Causes serious eye damage     - H401 - Toxic to aquatic life   + Precaution Statements     - P264 - Wash exposed skin thoroughly after handling     - P273 - Avoid release to the environment     - P280 - Wear protective gloves, protective clothing, eye protection, face protection     - P302 + P352 - IF ON SKIN: Wash with plenty of soap and water     - P305+P351+P338 - If in eyes: Rinse cautiously with water for several minutes. Remove contact     - lenses, if present and easy to do. Continue rinsing     - P310 - Immediately call a poison center or doctor/physician     - P332 + P313 - If skin irritation occurs: Get medical advice/attention     - P362 - Take off contaminated clothing and wash it before reuse     - P501 - Dispose of contents/container to comply with local, state and federal regulations   **Methods**   1. Add 800 ml of water into the cup and put the red cabbage leaves into the cup 2. Close the tip and let it sit about 30 seconds 3. After 30 seconds, filter out the leaves and pour the mixture into a larger container 4. Label each cup with the name of liquids 5. Pour each liquid into difference cup (except for baking soda)    1. Vinegar & Bleach & Apple Juice & Lemon Soda-- 20 to 25 ml    2. Shampoo & Hand Sanitizer -- 2 poun    3. Baking Soda -- 1 spoon   **Pre Laboratory Prediction**   * Hand Sanitizer - basic * Lemon Soda - acidic * White Vinegar - neutral * Baking Soda - basics * Shampoo - basic * Conditioner - acidic * Bleach - basics   **DURING LAB**  **Result**   |  |  |  | | --- | --- | --- | | **Liquid** | **Color Change/pH** | **Actual pH** | | Lemon Soda | Pink | 2 | | White Vinegar | Red | 4 | | Apple Juice | pink/red | 3 | | Baking Soda | Blue | 8 | | Shampoo | Magenta | 5.5 | | Bleach | yellow | 11 | | Hand Sanitizer | purple | ~7 |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Strong Acid** | **Weak Acid** | **Neutral** | **Weak Bases** | **Strong Bases** | | Apple juice  Lemon Soda | White vinegar  Shampoo | Hand Sanitizaer | Baking Soda | Bleach |   **Concept Questions**   1. Does the addition of water (baking soda + water) alter the pH of weak acids/bases? How does it change the pH of strong acids/bases? Why or why not?   The expansion of water does not have a huge affect on the pH of strong acids/bases, but it does have a huge affect on powerless acids/bases. This can be because the hydrogen particles in water include the concentration of hydrogen particles in acids/bases. Because frail acids/bases have moo concentration of hydrogen particles, the addition of water contains a huge affect on the pH.   1. How does a difference in 1 pH unit change in terms of H+ concentration? Example: How does a pH of 3 differ from pH of 4? Which one is stronger or weaker? Why?   A distinction in 1 unit may be a 10X contrast in concentration For illustration; a liquid with pH of 3 is 10X more acidic than a fluid with a pH of 4. Subsequently, a fluid with a pH of 3 is more grounded.   1. Look at the ingredients for each liquid you tested. Which ingredients contribute to each of the liquid’s pH level?  * Lemon Soda: citric acid * Apple juice: ascorbic acid * White vinegar: acetic acid * Shampoo: citric acid * Baking soda: sodium bicarbonate * Bleach: alkaline bases   **Real Life Application**   1. Neutralization: Whenever you mix acid with a base, they neutralize each other. If this is the case, why is Alka-Seltzer used to treat stomach aches? (Note: excess stomach acids cause stomach aches)   The abundant stomach corrosive is neutralized with a base (Alka-Seltzer). A neutralization reaction continuously produces salt and water.   1. Acid Rain: what is acid rain and how is it a problem to oceans, rivers, lakes, ponds etc.?   Corrosive rain is rain that's marginally acidic due to contamination within the discuss. Corrosive rain greatly affects the biological systems of seas, waterways, and lakes since once the water becomes to acidic certain angle begin to kick the bucket. Not as it were is corrosive rain, haze, or snow perilous to sea life but too to human’s respiratory framework as well. |