

Acid Base Lab

Problem Statement:

pH is a measurement of the amount of H_3O^+ ions and OH^- ions in a solution. When there is more H_3O^+ or hydronium ions, you have an acid. When there is more OH^- or hydroxide ions, you have a base. Acids and bases are measured on a scale on 0-14, with 7 being neutral, acids being 0-7 and bases 7-14. This lab will let you predict and discover the relative pH of items easily found around a house.

Hypothesis:

If we test the pH of common household items, then we can determine if the material is an acid, base, or neutral.

Materials:

- | | |
|---------------------|------------------------------|
| *Turns | *pH indicator (Blackberries) |
| *Coke | *Litmus paper |
| *Test tubes | *Tap Water |
| *Construction paper | *Aspirin |
| *Bowl | *Ziploc bag |
| *Scissors | *Vinegar |
| *Graduated Cylinder | |

Procedure:

Making the Paper

1. Remove any stems or leaves from your berries and place the berries in a Ziploc bag.
2. Zip up the bag and mash your berries until they look like jam.
3. Add a small amount of water to thin the juice a bit.
4. Mix it all up and pour your berry liquid into a bowl.

- Cut {} thin strips of the white construction paper and dip them into your mashed berries. Push the strips all the way into the berry mush to make sure they are good and coated with the juice.
- After taking your "berry" well-soaked paper out of the juice , pull the strips between your thumb and index finger to remove any excess juice and pulp.
- Lay the strips onto paper towels and allow them to dry (for about 5 minutes).
- Once your paper strips have dried, carefully pick off any large pieces of pulp or berry skins. You're ready to use your Berry pH paper .

Experiment:

- Predict the pH for the 5 different common household items. Write your predictions into the data table below.
- Test only one solution at a time. It is important not to contaminate the solutions. Take one litmus paper and submerge it into one solution and record the data. Complete this step 4 more times (once for each solution with a new litmus paper).
- Take one Berry pH indicator strip and submerge it into one solution and record the data. Complete this step 4 more times (once for each solution with a new berry pH strip).

Data Table: (40)

Material	Predicted pH	pH of litmus paper	Color of Berry pH paper	Acid or Base
Tap water	7	~6	-	Neutral
tums	6	8	8	Base
Vinegar	8	2	4	Acid
Coke	3	2	4	Acid

Analysis : Use complete sentences and explain your reasoning for Questions 2 - 8.

- The independent variable in the experiment is the. **Was the PH paper** and the dependent variable is the. **Was is it was acid or base**
The control group is the. **The control group is the color of Berry Ph paper.**
- When in a basic solution , the anthocyanin has an extra hydroxyl which then becomes a(n) in a(n) solution . (10)
- What was the pH of Coke? Coke has many acids in it including phosphoric acid and carbonic acid. When carbonic acid (H_2CO_3) ionizes in water , what are the two products? (10). **The pH for coke was 2 and 4**

For the human body to operate, blood pH must be kept at a stable range. Buffer systems help to keep the pH levels within this range. A buffer can absorb either hydrogen ions (H^+) or hydroxide ions (OH^-). Kidneys produce hydrogen carbonate (HCO_3^-) that acts as a buffer. Answer the question below.

4. What organelle in the cell creates CO_2 ? (5)

The human body needs to regulate its pH level to keep it in a certain range. Outside this range of pH, proteins are denatured and broken apart, enzymes stop functioning, and the body cannot sustain itself. Maintaining this balance is a part of homeostasis. Answer the questions below.

5. What was the pH of Turns? How does Turns help with acid
inrtiOE§tion/hBiJrtburn?Whv do vouthinkthil hum n EtomohpHr ng i 10 107
(10)

6. Water can help neutralize the pH of strong acids or bases. If you were to take an aspirin, what other food ingredient could you take to help neutralize the pH? (6)

7. Hydrangea plant? have flowers that turn blue when in acidic soil and pink when in basic soil. Fertilizers have a compound called ammonium (NH_3^-). After adding fertilizer to soil, a bacterium converts ammonium to nitrate. During this process $3H^+$ are released into the soil. What do fertilizers do to the pH of soil? (7)

8. If your hydrangea flowers were pink in color, what could you add to make the flowers blue? (8)

**DO NOT FORGET TO CLEAN UP YOUR LAB STATION!
DO NOT DISPOSE OF THE TEST TUBES!
THROW THE BERRY PH INDICATOR STRIPS AND LITMUS PAPER AWAY!
THROW THE ZIPLOC BAG AWAY!**