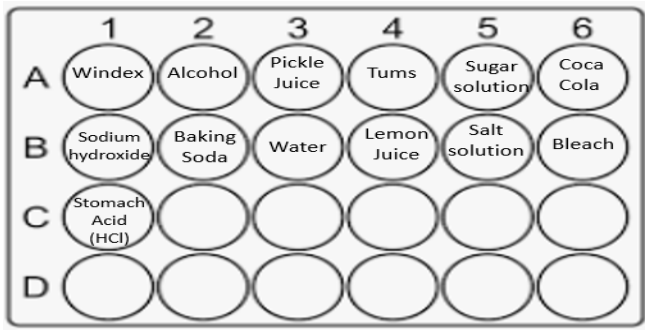
Acids, Bases & Buffers

Indicators: *Acid-Base indicators are chemicals used to identify how acidic, alkaline (basic) or neutral a substance is. The results of the indicators may be qualitative (weak/strong) or quantitative (pH #). Some indicators only work in certain pH ranges, others work all the way across the scale 0-14. We will use only a few of the many, many indicators. We will use red and blue litmus paper and pH hydrion paper.*

Part I: obtain a well plate as shown in the image below.

- Pipet a sample of each substance in the correct well as shown in the diagram to the right ►
- Take note of the well numbering system.
  - *Columns 1-6*
  - *Rows A-D*
- Once you have samples transferred into wells A1 – C1 continue to Part II.



Part II: the litmus test: Litmus paper can be used to identify substances as being acids, bases or neutral. It cannot tell us specifics about the pH or strength of the acid/base. In the table below use red and blue litmus paper to test each substance. Record your results as prompted in the table.

Substance	**Insert Red Litmus Paper** What happened (red or blue)	**Insert Blue Litmus Paper** What happened (red or blue)	**Identify It** (Acid, Base or Neutral)
Windex – **A1**			
Alcohol – **A2**			
Pickle Juice – **A3**			
Tums – **A4**			
Sugar solution – **A5**			
Coca-Cola – **A6**			
Sodium Hydroxide – **B1**			
Baking Soda – **B2**			
Water (H_2O) – **B3**			
Lemon Juice – **B4**			
Salt solution – **B5**			
Bleach – **B6**			
Stomach Acid (HCl) – **C1**			

Part III pH paper. pH or hydrion paper can be used to determine both the nature of a substance (acid, base or neutral) as well as the pH or strength of the substance. In the table below use pH paper to test each substance. Record your results as prompted in the table.

Substance	**Insert pH Paper!** (color)	**Match color to pH** (pH)	**Identify it!** (acid, base, neutral)	**Identify the strength!** (strong, weak, neutral)
Windex – **A1**				
Alcohol – **A2**				
Pickle Juice – **A3**				
Tums – **A4**				
Sugar solution – **A5**				
Coca-Cola – **A6**				
Sodium Hydroxide – **B1**				
Baking Soda – **B2**				
Water (H_2O) – **B3**				
Lemon Juice – **B4**				
Salt solution – **B5**				
Bleach – **B6**				
Stomach Acid (HCl) – **C1**				

PART IV the taste test! Alright, so word on the street is that acids taste sour and bases taste bitter. I guess you're gonna find out. This part is not required, but it is fun. When you are ready to taste one of the items in the table see your teacher. None of the items can hurt you. Please let your teacher know if you have any allergies. If you taste one you must taste them all.

Substance	How does it taste? (sour or bitter)	Identify it! (acid or base)
Pickle Juice (acetic acid)		
Lemon Juice (citric acid)		
Dark Chocolate		
Baking Soda		

Part V is it a buffer? Buffers resist a change in pH by neutralizing acids and bases that are added to the solution. Once enough new acid or base has been added the buffer will no longer be able to hold the pH.

- Watch the video on how to use a pH meter… Click Here for Video
- Obtain an unknown sample (W – er), unknown sample (B – er), sample labeled ACID and then return to your station.
- When one of the pH meter stations opens you and your team should go there, take you materials with you.
- When you arrive at the station you are to determine if the two unknowns are buffers?

General Procedures.

- Remove protective cap from electrode of pH meter.
- Rinse the electrode with distilled water (found in squirt bottle)
- pH meter is already calibrated.
- Insert electrode into one of the unknowns
- Record the pH
- Add approximately 50 µL (microliters) ACID to the sample
- Record the pH again
- Wash the electrode with the squirt bottle and repeat this process with the other unknown.
- Once finished make sure the probe has been washed and put back in protective storage liquid & container.

Unknown ID	Unknown pH	pH after addition of acid	Is it a buffer? (yes or no)
W – er			
B – er			