

The “Juicy” Gossip on pH



Acids: Substances that easily release hydrogen ions when they react with metals. Examples: hydrochloric acid, stomach acid, vinegar

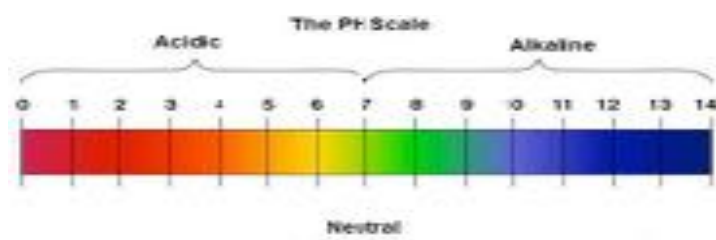
Bases: Substances that easily remove hydrogen ions from other compounds when they are combined. Examples: ammonia, sea water, caffeine

Neutrals: Substances that are neither acids nor bases. Examples: blood, tap water, saliva

What is pH?

pH is the measure of how acidic or basic (alkaline) a substance is. There is no unit for pH.

To determine the pH of substance, we use a **pH scale**. The pH scale ranks substances from 0 to 14, where strong acids are close to zero, neutral substances are around 7 and strong bases are close to 14.



Finding pH

Using indicators, there are several methods to calculate the pH of substances. Indicators change different colour when exposed to acids or bases.

Litmus paper – When added to a substance, this indicator turns **red in acid** and **blue in a base**.

Universal Indicator (pH indicator paper) – Upon contact with a substance, pH paper will change colour, which is compared to a colour spectrum (see image above) to determine the pH level. pH indicator paper can help determine if a substance is a strong acid or strong base.

So, what’s the juicy gossip all about?

For an upcoming picnic I am going to be making lemon pie (yum!). However, one guest, Sally, easily gets heartburn and needs you to determine the pH level of the pie’s key ingredients. (Some people get heartburn from acidic food, requiring them to consume antacids, which help neutralize the acid in the stomach.) If the ingredients are strong acids, Sally will need to bring antacids to the picnic. The key ingredients are: lemon juice, milk, baking soda, salt, and eggs.

The “Juicy” Gossip on pH

Your task:

Working with a partner, design an experiment to test the pH level of the pie's 5 key ingredients and rank them by increasing acidity (1 being the most acidic and 5 being the most basic). If applicable, state which ingredients are strong acids or strong bases.

Don't forget to make a prediction, write your method down, put your results in the table, rank the ingredients by their pH level, and write a conclusion.

Prediction:

I think these items will be acidic:

I think these items will be basic:

Materials and Equipment available:

- Spotting tile, litmus paper, universal indicator, dropper, Universal Indicator pH paper (comes with colour scale)

- Lemon juice, Milk, Baking soda, Salt, Eggs, Distilled water

Table One : pH level of lemon pie key ingredients

Ingredient	Litmus paper colour (red or blue)	Litmus paper result (acid or base)	Universal Indicator colour	Universal Indicator pH level	Rank of acidity (1 is most acidic and 5 is least acidic)
Lemon juice					
Milk					
Baking soda					
Salt					
Eggs					

*Note: would have to be somewhat flexible on the Universal pH paper colour change, as it is not always exact (paper could be old).

Conclusion: