pH and pOH

This table summarizes the relationship between pH, pOH, $[H_3O^+]$ and $[OH^-]$.

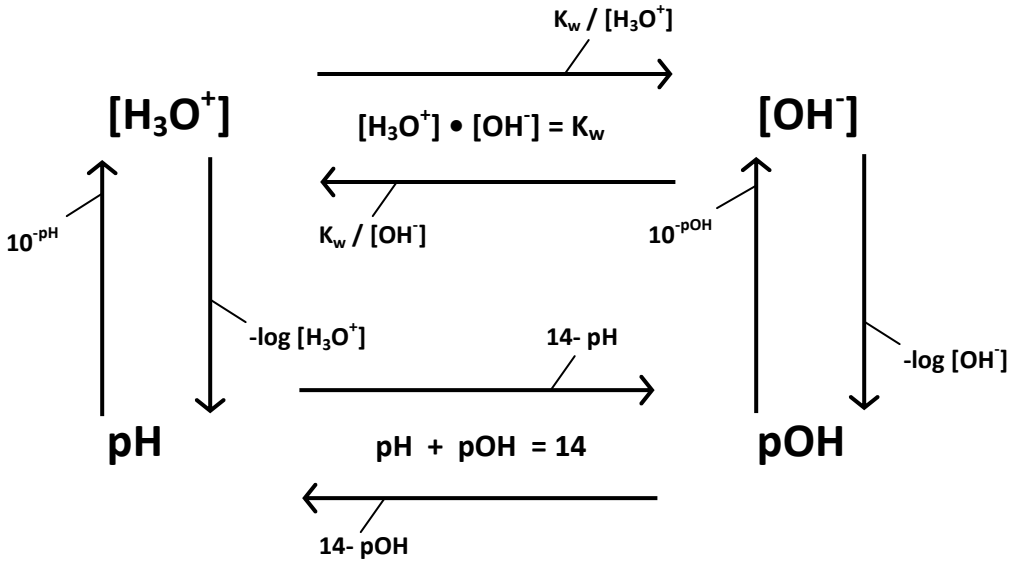
Solution becomes more ***ACIDIC*** ⟵ ⟶ Solution becomes more ***BASIC***

$[H_3O^+]$	1	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	10^{-6}	10^{-7}	10^{-8}	10^{-9}	10^{-10}	10^{-11}	10^{-12}	10^{-13}	10^{-14}
pH	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
pOH	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
$[OH^-]$	10^{-14}	10^{-13}	10^{-12}	10^{-11}	10^{-10}	10^{-9}	10^{-8}	10^{-7}	10^{-6}	10^{-5}	10^{-4}	10^{-3}	10^{-2}	10^{-1}	1

↑

Solution is ***NEUTRAL***

If you are given any ONE of pH, pOH, $[H_3O^+]$ and $[OH^-]$, you can calculate the remaining three!



Activity: Finding Acidic and Basic Solutions

You will find the common solutions around the room. At each station only one of the four values has been provided. Determine the other three for each solution. Classify each solution as either acidic, basic, or neutral.

Solution	pH	pOH	$[H_3O^+]$ M	$[OH^-]$ M	Acidic/Basic/Neutral?
Unpolluted rain water					
Saliva					
Stomach Acid					
Tears					
Coffee					
Urine					
Windex					
Lemon Juice					
Tomato Juice					
Pepto-Bismol					

UNPOLLUTED RAIN WATER

pH = 5.5

SALIVA

pOH = 7.3

STOMACH ACID

$[H_3O^+] = 0.031\ M$

TEARS

$[OH^-] = 2.5 \times 10^{-7}\ M$

COFFEE

pH = 5.1

URINE

pOH = 8.0

WINDEX

$[H_3O^+] = 2.0 \times 10^{-11}\ M$

LEMON JUICE

$[OH^-] = 2.0 \times 10^{-12}\ M$

TOMATO JUICE

pH = 4.2

PEPTO-BISMOL

pOH = 8.2

ANSWER KEY

Solution	pH	pOH	$[H_3O^+]$ M	$[OH^-]$ M	Acidic/Basic/Neutral?
Unpolluted rain water	5.5	8.5	3×10^{-6}	3×10^{-9}	Acidic
Saliva	6.7	7.3	2×10^{-7}	5×10^{-8}	Acidic
Stomach Acid	1.51	12.49	0.031	3.2×10^{-13}	Acidic
Tears	7.40	6.60	4.0×10^{-8}	2.5×10^{-7}	Basic
Coffee	5.1	8.9	8×10^{-6}	1×10^{-9}	Acidic
Urine	6.0	8.0	1×10^{-6}	1×10^{-8}	Acidic
Windex	10.70	3.30	2.0×10^{-11}	5.0×10^{-4}	Basic
Lemon Juice	2.30	11.70	5.0×10^{-3}	2.0×10^{-12}	Acidic
Tomato Juice	4.2	9.8	6×10^{-5}	2×10^{-10}	Acidic
Pepto-Bismol	5.8	8.2	2×10^{-6}	6×10^{-9}	Acidic