

Indicators

The pH Scale When dealing with solutions, eg of acids and alkalis, we often use the pH scale.

- Acidic solutions have a pH of less than 7. The lower the number, the more acidic is the solution.
- Neutral solutions have a pH of 7.
- Alkaline solutions have a pH greater than 7. The higher the number, the more alkaline is the solution.

Indicators are substances which have different colours according to pH. The table below shows the colours of a range of indicators when placed in solutions of various pH.

Indicator	pH												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Thymol blue	R	*	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bromocresol green	Y	Y	Y	*	B	B	B	B	B	B	B	B	B
Bromocresol purple	Y	Y	Y	Y	Y	*	V	V	V	V	V	V	V
Universal indicator	R	R	R	O	Y	Y	G	B	B	P	V	V	V
Alizarin yellow	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	*	V	V
Litmus	R	R	R	R	R	*	*	*	B	B	B	B	B

R = red, O = orange, G = green, B = blue, P = purple, Y = yellow and V = violet. * = pH range (to the nearest whole number) when indicator is changing colour .

At which pH do the following changes occur?

- 1 Alizarin yellow going from yellow to violet.
- 2 Universal indicator from yellow to green.
- 3 Copy and complete the table below. The first row has been done for you.

Aqueous solution	Colour in indicator				pH	Acid/alkali /neutral
	Thymol blue	Litmus	Alizarin yellow	Universal indicator		
KOH	Y	B	V	V	12 to 13	alkali
NaCl	Y	*	Y	G		
HCl	R	R	Y	R		
CH ₃ COOH	Y	R	Y	R		
Ca(OH) ₂	Y	B	*	P		

Which solution is:

- 4 the most acidic?
- 5 the most alkaline?
- 6 neutral?