

Acids and bases around us

Indicators

Universal indicator is a mixture of indicators having colours across the entire range of pH values. Litmus is another indicator which shows whether or not a substance is acidic or basic, but does not give the same degree of accuracy as universal indicator. There are many other indicators which change colour depending on the pH of the solution being tested. You may even have made your own indicator using plant material. Look carefully at the chart below which shows colour changes for various indicators, then answer the questions.

pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Universal Indicator	Red		Orange		Yellow		Green	Blue Green		Blue	Indigo		Purple		
Litmus	Red						Blue								
Bromothymol blue	Orange	Yellow				Green		Blue Green		Blue					
Methyl orange	Red		Orange												
Phenolphthalein	Colourless						Pink		Deep pink			Red			
Geranium Red	Blue	Purple		Red		Orange				Yellow					

Colour range of different indicators.

For some of these questions it may not be possible to give an exact answer. If this is the case, give a range of pH values.

- 1 Is it possible to use methyl orange to indicate a neutral solution? Explain your answer.
- 2 Geranium red indicator was made in a school laboratory. Suggest how you think the pH values for the various colours of this indicator may have been established.
- 3 Solution X turns blue with litmus and solution Y turns blue with bromothymol blue. Which solution is more basic? Why?
- 4 What are the pH values of the following solutions:
 - a acid rain which turns yellow with bromothymol blue, and purple with geranium red?
 - b sea water which turns pink with phenolphthalein, and green with bromothymol blue?
 - c battery acid which turns red with methyl orange, and orange with bromothymol blue?
 - d ammonia which turns blue green with bromothymol blue, and yellow with geranium red?