

2

Acidic, Basic, and Neutral

2.1 Nature — Our Science Laboratory

2.1.1 Litmus as an indicator

Activity 2.1 Testing the nature of samples with blue and red litmus papers

S.No.	Name of the Solution	Effect on Blue Litmus	Effect on Red Litmus	Nature of Solution
1.	Lemon juice	Turns blue litmus red	No effect	Acidic
2.	Soap solution	No effect	Turns red litmus blue	Basic
3.	Amla juice	Turns blue litmus red	No effect	Acidic
4.	Tamarind water	Turns blue litmus red	No effect	Acidic
5.	Vinegar	Turns blue litmus red	No effect	Acidic
6.	Baking soda solution	No effect	Turns red litmus blue	Basic
7.	Lime water	No effect	Turns red litmus blue	Basic
8.	Tap water	No effect	No effect	Neutral
9.	Washing powder solution	No effect	Turns red litmus blue	Basic
10.	Sugar solution	No effect	No effect	Neutral
11.	Salt solution	No effect	No effect	Neutral
12.	(Example: Orange juice)	Turns blue litmus red	No effect	Acidic

Group A Acidic Solutions	Group B Basic Solutions	Group C Neutral Solutions
Lemon juice Amla juice Tamarind water Vinegar Orange juice (example)	Soap solution Baking soda solution Lime water Washing powder solution	Tap water Sugar solution Salt solution

Activity 2.2 Taste of Solution

Lemon - Citric acid

Curd - Lactic acid

Tamarind - Tartaric acid

Vinegar - Acetic acid

2.1.2 Red rose as an indicator

Testing the nature of samples with the red rose extract

S.No.	Name of the Solution	Colour Change with Red Rose Extract	Nature of Solution
1.	Lemon juice	Turns red	Acidic
2.	Soap solution	Turns green	Basic
3.	Amla juice	Turns red	Acidic
4.	Tamarind water	Turns red	Acidic
5.	Vinegar	Turns red	Acidic
6.	Baking soda solution	Turns green	Basic
7.	Lime water	Turns green	Basic
8.	Tap water	No change	Neutral
9.	Washing powder solution	Turns green	Basic
10.	Sugar solution	No change	Neutral
11.	Salt solution	No change	Neutral
12.	(Example: Orange juice)	Turns red	Acidic

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1. A solution turns the red litmus paper to blue. Excess addition of which of the following solution would reverse the change?

- (i) Lime water
- (ii) Baking soda
- (iii) Vinegar**
- (iv) Common salt solution

2. You are provided with three unknown solutions labelled A, B, and C, but you do not know which of these are acidic, basic, or neutral. Upon adding a few drops of red litmus solution to solution A, it turns blue. When a few drops of turmeric solution are added to solution B, it turns red. Finally, after adding a few drops of red rose extract to solution C, it turns green.

Based on the observations, which of the following is the correct sequence for the nature of solutions A, B, and C?

- (i) Acidic, acidic, and acidic
- (ii) Neutral, basic, and basic
- (iii) Basic, basic, and acidic
- (iv) Basic, basic, and basic**

3. Observe and analyse Figs. 2.13, 2.14, and 2.15, in which red rose extract paper strips are used. Label the nature of solutions present in each of the containers.



Fig. 2.13

Basic

Fig. 2.14

Neutral

Fig. 2.15

Acidic

Ans:

4. A liquid sample from the laboratory was tested using various indicators: Based on the tests, identify the acidic or basic nature of the liquid and justify your answer.

Indicator	Red litmus	Blue litmus	Turmeric
Change	No change	Turned red	No change in colour

Ans: The liquid is **acidic**, because it turned blue litmus red and did not affect turmeric.

5. Manya is blindfolded. She is given two unknown solutions to test and determine whether they are acidic or basic. Which indicator should Manya use to test the solutions and why?

Ans: Manya should use olfactory indicators like onion, as they change smell in acids and bases and she is blindfolded.

6. Could you suggest various materials which can be used for writing the message on the white sheet of paper (given at the beginning of the chapter) and what could be in the spray bottle? Make a table of various possible combinations and the colour of the writing obtained.

Ans:

Writing Material	Spray Material	Colour of Message
Soap solution	Turmeric solution	Red
Baking soda solution	Turmeric solution	Red
Acidic solution (e.g., vinegar)	Red cabbage extract	Pink/red
Basic solution (e.g., lime water)	Red cabbage extract	Green

7. Grape juice was mixed with red rose extract; the mixture got a tint of red colour. What will happen if baking soda is added to this mixture? Justify your answer.

Ans: Adding baking soda will turn the mixture green because baking soda is basic and red rose extract turns green in bases.

8. Keerthi wrote a secret message to her grandmother on her birthday using orange juice. Can you assist her grandmother in revealing the message? Which indicator would you use to make it visible?

Ans: Spray turmeric solution. Orange juice is slightly acidic, and turmeric remains yellow. If soap solution is sprayed after, it will reveal the writing as red.

9. How can natural indicators be prepared? Explain by giving an example.

Ans: Natural indicators can be prepared by extracting colours from natural sources. Example: Red rose petals crushed in hot water give a red-coloured indicator.

10. Three liquids are given to you. One is vinegar, another is a baking soda solution, and the third is a sugar solution. Can you identify them only using turmeric paper? Explain.

Ans:

Vinegar will not change turmeric paper colour (remains yellow).

Baking soda solution will turn turmeric paper red.

Sugar solution will not change turmeric paper colour.

Thus, baking soda solution can be identified easily; vinegar and sugar solution can be differentiated by other indicators.

11. The extract of red rose turns the liquid X to green. What will the nature of liquid X be? What will happen when excess of amla juice is added to liquid X?

Ans: Liquid X is basic in nature (turns red rose extract green). Adding amla juice (acidic) will neutralize it, and the colour will return to red.

12. Observe and analyse the information given in the following flowchart. Complete the missing information.

Ans:

