

# Natural Indicators – Teacher's Instructions



## For Demonstration/Class activity

### ***Make sure you have...***

Vinegar (Ethanoic/Acetic Acid,  $\text{CH}_3\text{COOH}$ )

Sodium Hydroxide (NaOH, 1M) solution

Turmeric

Red Cabbage Juice (boil chopped red cabbage in water for 15 min)

Beetroot Juice (boil chopped fresh beetroot in water for 15 min)

Water ( $\text{H}_2\text{O}$ )

Spatulas

Pipettes

2 X 50 ml Beakers per person

### ***What to Do...***

#### **Turmeric**

1. Add a spatula full of turmeric to two beakers
2. Fill the two beakers with water (about 20 ml)
3. Add a few drops of vinegar to the first beaker

**The colour should not change**

4. Add a few drops of sodium hydroxide to the second beaker

**The colour should change to a deep red**

5. Wash the beakers up (solutions can go down the sink)

#### **Red Cabbage**

6. Fill the two beakers with red cabbage juice (about 20 ml)

7. Add a few drops of vinegar to the first beaker

**The colour should change to pink**

8. Add a few drops of sodium hydroxide to the second beaker

**The colour should change to green**

9. Wash the beakers up (solutions can go down the sink)

### Beetroot Juice

10. Fill the two beakers with beetroot juice (about 20 ml)

11. Add a few drops of vinegar to the first beaker

**The colour should not change**

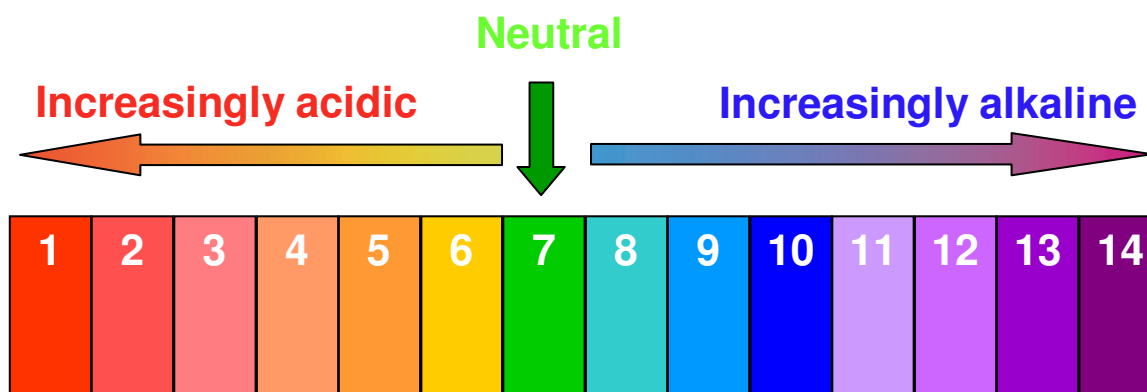
12. Add a few drops of sodium hydroxide to the second beaker

**The colour should change to yellow**

13. Wash everything up (solutions can go down the sink)

### What's Happening?

An indicator is a chemical that changes colour depending on whether it is in an acid or an alkali. Schools and Universities often use an indicator called “Yamada Universal Indicator” which is red in an acid (*e.g.* vinegar, lemon juice), purple in an alkali (*e.g.* bicarbonate of soda, bleach) and green in something that is neutral (*e.g.* water).



*Yamada Universal Indicator is used to determine how acid or alkali a substance is*

# CHEMICAL

making the chemical connection

Many plants contain their own indicators – turmeric, red cabbage juice and beetroot juice are three good examples. Other examples are tea and red grape juice. Hydrangea flowers are different colours depending on whether the soil is acid or alkali. In acid soil they are blue and in alkaline soil they are red!



*Hydrangea flowers are blue in acid soil and red in alkaline soil. You can even get mixtures!*