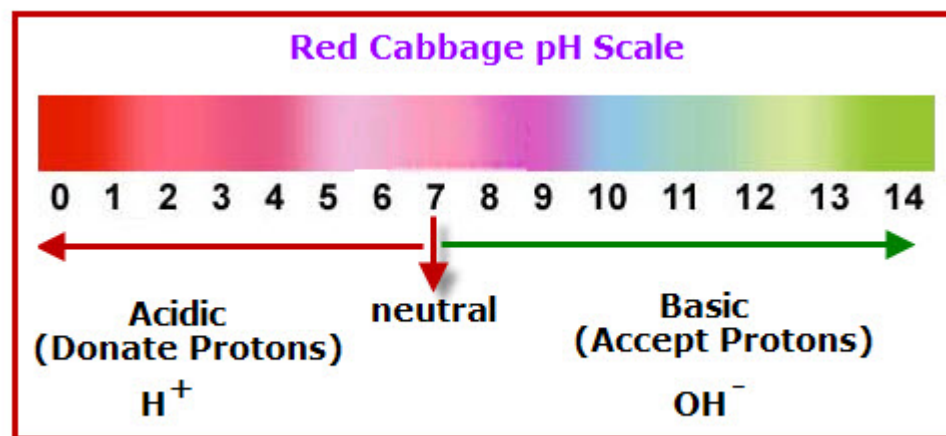


Indicators



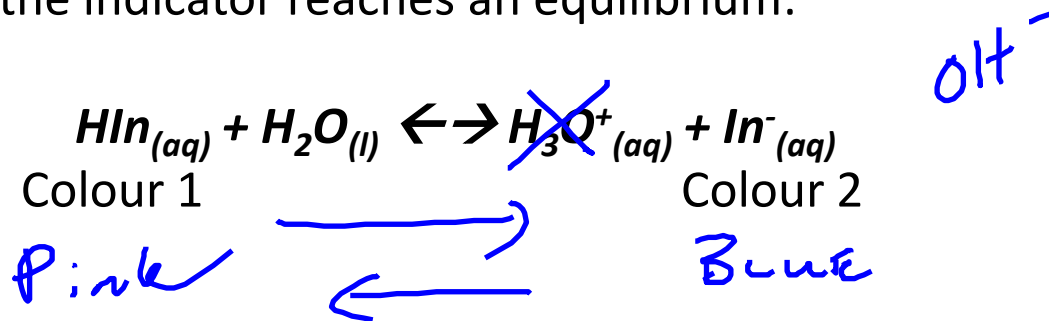
Outcomes:

- Describe how an acid-base indicator works in terms of colour shifts and Le Chatelier's Principle.

Indicators:

An acid-base indicator is a **WEAK ACID** or **BASE** that undergoes a **COLOUR** change when they **GAIN** or **LOSE HYDROGEN** ions. The first indicators were **DYES** from natural sources (ex. **RED CABBAGE JUICE**).

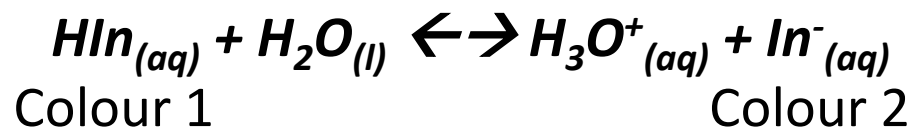
The ionization of the indicator reaches an equilibrium:



Adding an **ACID** will **INCREASE** **H₃O⁺**. According to Le Chatelier:

- Equilibrium will shift to the **LEFT** to **REDUCE** the **ADDED PRODUCT**.
- This will **DECREASE** **[In⁻]**, and **INCREASE** the **[HIn]**, increasing **COLOUR** **1**.

Indicators:



Adding a **BASE** will **DECREASE** **H₃O⁺**, since they react with added **OH⁻** to produce **WATER**. According to Le Chatelier:

- Equilibrium will shift to the **RIGHT** to **REPLACE** the **LOST PRODUCTS**.
- This will **INCREASE** the **[In⁻]**, and **DECREASE** the **[HIn]**, increasing **COLOUR 2**.

Some Notes on Indicators:

- Indicators are not as exact as **pH METERS**.
- Indicators are affected by the **COLOUR** of the solution.