# Testing acids and bases on a microscale – teacher notes

In this experiment, students test various substances with indicator solution and look for colour changes.

## Topic

Acids and bases, indicators

## Timing

15 minutes

## Equipment

### Apparatus

* Eye protection
* Student worksheet
* Clear plastic sheet (eg ohp sheet)
* Plastic pipettes

### Chemicals

Solutions should be contained in plastic pipettes. See the accompanying guidance on apparatus and techniques for microscale chemistry (<https://rsc.li/3nKSpWB>), which includes instructions for preparing solutions.

* Sodium hydroxide, 1 mol dm–3
* Hydrochloric acid, 1 mol dm–3
* Sulphuric acid, 1 mol dm–3
* Nitric acid, 1 mol dm–3
* Sodium carbonate, 0.5 mol dm–3
* Ammonia solution, 1 mol dm–3
* Vinegar
* Lemon juice
* Household bleach (diluted 1:1 with water – see note 10 below)
* Soap solution
* Full-range indicator solution (diluted 1:1 with deionised water – see notes 11 and 12)

## Health, safety and technical notes

1. Read our standard health and safety guidance (<https://rsc.li/3yjoGsv>).
2. Wear eye protection throughout (splash-resistant goggles to BS EN166 3).
3. Hydrochloric acid, HCl (aq), 1 mol dm–3is low hazard – see CLEAPSS Hazcard HC047a and CLEAPSS Recipe Book RB043.
4. Nitric acid, HNO3(aq), dilute 1 mol dm–3 is CORROSIVE – see CLEAPSS Hazcard HC067 and CLEAPSS Recipe Book RB061.
5. Sulfuric acid, H2SO4(aq), 1 mol dm–3is an IRRITANT – see CLEAPSS Hazcard HC098a and CLEAPSS Recipe Book RB098.
6. Sodium hydroxide solution, NaOH(aq), 1 mol dm–3 is CORROSIVE – see CLEAPSS Hazcard HC091a and CLEAPSS Recipe Book RB085.
7. Sodium carbonate, Na2CO3.10H2O, 0.5 mol dm–3 is low hazard – see CLEAPSS Hazcard HC095A and CLEAPSS Recipe Book RB080.
8. Vinegar, lemon juice and soap solution are all of low hazard.
9. Ammonia solution, NH3(aq), 1 mol dm–3 is an IRRITANT – see CLEAPSS Hazcard HC006 and CLEAPSS Recipe Book RB006.
10. A 1:1 dilution of bleach is an irritant and if mixed with acid can release toxic chlorine – see CLEAPSS Hazcard HC089.
11. A 1:1 solution of universal indicator is (probably) flammable (depending on the formulation) – keep away from sources of ignition and see CLEAPSS Hazcard HC032.
12. Full-range indicator is a solution in propanol (or methylated spirits) which has a low surface tension and spreads out if used neat. Adding water increases the surface tension while still keeping the indicator in solution.