

Investigating Acids and Bases

Aim: Students will investigate different acids and bases and will produce an operational definition of acids and bases.

Materials: Safety glasses, distilled water, red litmus paper, blue litmus paper, phenolphthalein, bromothymol blue, pH paper, methyl orange

Acids: Hydrochloric acid (HCl)
Sulphuric acid (H₂SO₄)
Nitric acid (HNO₃)

Bases: Sodium hydroxide (NaOH)
Potassium hydroxide (KOH)
Calcium hydroxide (Ca(OH)₂)

Consumer Products: Ammonia, Vinegar, Bleach, Baking Soda

Procedure:

1. Place 4 drops of distilled water in each of 5 clean spots in a spot plate.
2. Spot #1: Touch the solution with your index finger and rub your thumb with the finger together to note the feel of the solution.
3. Spot #2
 - a) Touch the solution with a piece of red litmus paper. Record the colour change if any.
 - b) Touch the solution with a piece of blue litmus paper. Record the colour change if any.
 - c) Touch the solution with the pH paper. Record the colour and the value by comparing the colour to the chart.
4. Spot #3: Add 2 drops of phenolphthalein to the solution. Record your observations.
5. Spot #4: Add 2 drops of methyl orange to the solution and record your observations.
6. Spot #5: Add 2 drops of bromothymol blue to the solution and record your observations.
7. Repeat steps 1-6 using the Acids, Bases, and Consumer Products instead of the distilled water.
8. Observe the conductivity tests by the teacher and record your observations

Discussion Questions:

1. What is the easiest method to identify an acid or a base? *why?*
2. Classify each of the consumer products as an acid or base. Explain how you arrived at your answers.
3. List chemical properties and physical properties common to all acids.
4. Observe the chemical formulae for all of the acids. What atoms are common? What atom(s) gives an acid its chemical properties?
5. Observe the chemical formulae for all of the bases. What atoms are common? What atom(s) gives a base its chemical properties?

Observations

	Well #1	Well #2			Well #3	Well #4	Well #5
	touch	red litmus	blue litmus	pH paper	phenol- phthalein	methyl orange	bromthymol blue
distilled H ₂ O							
HCl							
H ₂ SO ₄							
HNO ₃							
NaOH							
KOH							
Ca(OH) ₂							
ammonia							
vinegar							
lemon juice							
bleach							
baking soda							