# Periodicity

## Period 3 oxides summary

Complete the diagram showing the formulae of the period 3 oxides, their pH in water, the nature of the oxide and the species present in the solution.



# Reactions of Period 3 oxides

Write balanced equations for the following reactions illustrating the reactions of period 3 oxides with water, acids and bases.

1. Phosphorus oxide with water
2. Sulfur dioxide with water
3. Sulfur trioxide with water
4. Sodium oxide with hydrochloric acid
5. Magnesium oxide with sulphuric acid
6. Aluminium oxide with sulphuric acid
7. Aluminium oxide with sodium hydroxide
8. Silicon dioxide with sodium hydroxide
9. Phosphorus oxide with sodium hydroxide
10. Sulfur dioxide with sodium carbonate

## Structure and bonding in Period 3 oxides

**1.** Complete the table to show the bonding present in the period 3 oxides.



1. Explain why Al2O3 displays amphoteric properties with reference to the ions present.
2. marks)
3. In water, SiO2 maintains a pH of 7. With reference to the structure and bonding in SiO2 explain this observation.

(1 mark)

1. Na2O reacts with water to give a solution with a pH of 14 whereas MgO reacts with water to give a solution with a pH of 10. Write equations for both reactions and explain the observed differences in pH.
2. marks)

# A white sheet with black text  Description automatically generatedPeriodicity – Answers



(a) Al3+ ion is small and highly charged (1 mark) and polarises the oxide ion (1 mark)

(b) SiO2 has a covalent macromolecular structure so is insoluble in water (1 mark)

(c) Na2O + H2O → 2NaOH (1 mark) MgO + H2O → Mg(OH)2 (1 mark) MgO is only sparingly soluble/is less soluble (1 mark)