Knowledge Summary

Year 9 Term 4 2023/24

Science

Chemistry Module
Structure and Bonding

Essential Questions/Knowledge

- What are the three states of matter and their state symbols.
- Describe the process of melting, freezing, boiling, and condensing.
- Use the particle model to draw a representation of how particles are arranged in the three states of matter.
- State the particles involved in ionic and covalent bonding.
- Describe, with an example, how a Group 1 metal atom becomes a positive ion.
- Describe, with an example, how a Group 7 non-metal atom becomes a negative ion.
- What are the charges of ions of Group 1, Group 2, Group 6, and Group 7 elements.
- Describe an ionic lattice.
- State that ionic compounds have high melting points and can dissolve in water.
- State that ionic compounds can conduct electricity when molten or dissolved in water.
- Describe an ionic lattice

How students will be assessed on their knowledge

- Daily retrieval
- In-class tasks
- Extended writing questions
- End of unit assessments

Questions/Knowledge to deepen understanding

- Use the particle model to describe how energy, movement, and attraction between particles change as a substance is heated or cooled.
- Suggest why substances have different melting and boiling points from each other.
- Evaluate a model, explaining its limitations.
- Draw dot and cross diagrams of unfamiliar ionic compounds.
- Suggest and explain the charge of a monatomic ion based on its position in the periodic table.
- Suggest the charge on unfamiliar ions using the position of the element in the periodic table.
- Explain the ratio of metal and non-metal ions in compounds.
- Generate the formulae of a wide range of ionic compounds when the charges of the ions are given.
- Explain in detail why ionic compounds cannot conduct electricity when they are solid but can when molten or in solution.
- Justify in terms of properties that a compound has ionic bonding.
- Apply the ionic model to make predictions of the physical properties of ionic compounds.

Key Concepts

- States of Matter
- Atoms Into Ions
- Ionic Bonding
- Giant Ionic Structures
- Covalent Bonding
- Structures of Simple Molecules
- Giant Covalent Structures
- Fullerenes and Graphene
- Bonding in Metals
- Giant Metallic Structures

Tier 2 and 3 vocabulary linked to the unit

- Liquids
- Gases
- Particles
- Matter
- Energy
- Evaporation
- Ionic Compound
- Atoms
- Covalent
- Electrostatic Forces
- Conductivity
- Bonding
- Diatonic
- Intermolecular Forces
- Fullerene
- Graphene