Scheme of Learning: Bonding & Structure

Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	**Bonding & Structure**	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

Topic Overview:

Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. Theories of bonding explain how atoms are held together in these structures. Scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. The properties of these materials may offer new applications in a range of different technologies.

Lesson Sequence:

We begin with a recap of previous chemistry knowledge by looking at the structure of the atom. It is essential for this topic, and indeed all of Chemistry, that pupils have a firm understanding of what electrons are. We look at how an atom can lose or gain an electron to form an ion. This leads onto how these electrons are transferred in ionic compounds. Pupils need to be able to explain the properties of small and giant ionic compounds.

We then move onto bonding between non-metals where electrons are not transferred, but shared. Again, pupils need to be able to describe the structure and properties of simple and giant covalent structures including diamond, graphite, fullerenes and graphene.

The final type of bonding we study is metallic bonding, Pupils needs to be able to explain why metals conduct heat and electricity with reference to their electrons.

Pupils need to be able to explain how the forces of attraction in solids, liquids and gases affect their properties. Finally, Separate Chemists learn about nanoparticles and their applications.

Sequence of Lessons:	
1	Atoms into Ions
2	Ionic Bonding
3	Giant Ionic Structures – *mid topic assessment*
4	Covalent Bonding
5	Structure of Simple Molecules
6	Giant Covalent Structures
7	Fullerenes & Graphene
8	Bonding in Metals
9	States of Matter
10	Nanoparticles – *Separate Chemistry Only*
11	Revision
12	Test

Resources:	
1	n/a
2	n/a
3	Salt (NaCl), Carbon electrodes, Crocodile clips, Power packs, Wires, Bulbs
4	n/a
5	n/a
6	n/a
7	n/a
8	n/a
9	n/a
10	Nanoparticle Info Sheets
11	n/a
12	Test in shared area

Supportive Reading:

Literacy tasks	Writing longer answer opportunities in various lessons and peer marking

Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of 'explain'.