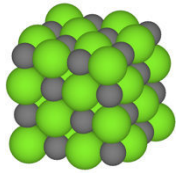
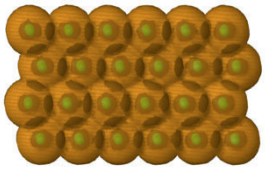
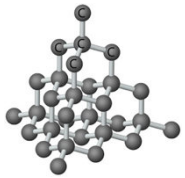
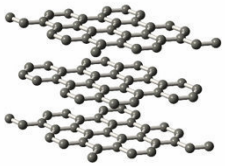
Structure, bonding and physical properties of different substances

Substance	Structure	Bonding	Typical physical property	Reason
Sodium chloride 	Giant ionic lattice	Ionic Strong electrostatic forces of attraction between oppositely charged ions	High melting point and boiling point	Many strong ionic bonds must be broken
			Good conductor of electricity when molten or in solution	Ions are free to move
			Does not conduct electricity when solid	Ions are not free to move
Magnesium 	Giant metallic	Metallic Strong electrostatic forces of attraction between positive ions and delocalised electrons	High melting point and boiling point	Many strong metallic bonds must be broken or overcome
			Malleable and ductile	Layers of atoms that can slide over each other
			Good conductor of electricity	Delocalised electrons that can move through the structure
Methane 	Simple molecular	Covalent bonds between the atoms in each molecule Weak intermolecular between molecules	Low melting point and boiling point	Only very weak intermolecular forces between molecules
			Poor conductor of electricity	No ions or delocalised electrons
Diamond 	Giant covalent	Covalent Each carbon atom is covalently bonded to four other carbon atoms	High melting point and boiling point	Many strong covalent bonds must be broken
			Hard	Giant lattice with strong covalent bonds
			Does not conduct electricity	No ions or delocalised electrons
Graphite 	Giant covalent	Layers of carbon atoms, joined by covalent bonds within a layer Weak intermolecular forces between layers	High melting point and boiling point	Many strong covalent bonds must be broken
			Soft and slippery	Weak intermolecular forces between layers
			Good conductor of electricity	Delocalised electrons that can move through the structure