Chestnut Grove Academy

# Chemistry

## 2. Bonding and Structure

# Revisiting Booklet

Name:

Topics

1. Chemical bonds
2. Ionic bonding
3. Ionic compounds
4. Covalent Bonding
5. Covalent compounds
6. Metallic Bonding
7. States of matter
8. Properties of materials
9. TRIPLE ONLY – nanoparticles

1. Chemical Bonding

What is a compound?

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What is a chemical bond?

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Name the three types of chemical bonding, and describe which elements they usually form between.

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## 2. Ionic Bonding

What is an ion?

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What is an ionic bond?

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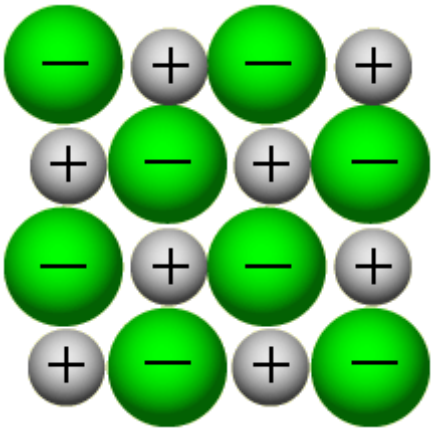
Draw the ionic bonding in:

| | |
|---|---|
| Sodium chloride, NaCl | Magnesium chloride, $MgCl_2$ |
| Magnesium oxide, MgO | Lithium oxide, $Li_2O$ |

## 3. Ionic Compounds

Explain what this diagram shows.



Why do ionic compounds conduct electricity when molten or aqueous (dissolved in water)?

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Why do ionic compounds have high melting and boiling points?

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## 4. Covalent Bonding

What is a covalent bond?

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Draw the covalent bonding in:

| | |
|---|---|
| Hydrogen, $H_2$ | Ammonia, $NH_3$ |
| Hydrochloric acid, HCl | Oxygen, $O_2$ |

5. Covalent Compounds

What is the difference between a simple covalent molecule and a giant covalent structure?

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Give three examples of giant covalent structures.

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Why do the above substances have very high melting points?

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Complete the table about the two different forms of carbon.

| Allotrope | Diagram | Number of C atoms bonded | Uses | Properties |
|---|---|---|---|---|
| Diamond | | | | |
| Graphite | | | | |

Why can graphite conduct electricity but not diamond?

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Explain, in terms of its structure and bonding, why graphite is used in pencil leads

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How is *graphene* different to graphite?

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List some uses of graphene and fullerenes.

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6. Metallic Bonding

**Draw and label the structure of metallic bonding.**

How are metallic bonds held together?

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Why do metals conduct electricity?

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Why can metals be shaped?

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What is an alloy?

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Draw a diagram to show the arrangement of particles in an alloy

Using your diagram to help you, explain why alloys are harder than pure metals.

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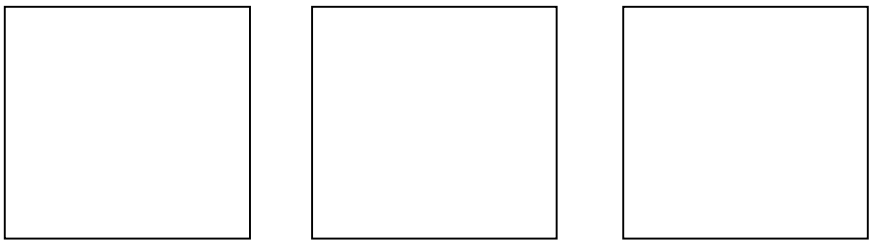
7. States of Matter

Draw the arrangement of particles in a solid, liquid and gas



If a substance has a low boiling point, what is its state at room temperature? .....

**What forces are overcome when a substance boils? .....**

If a substance has a high boiling point, what does this tell you about the forces between the particles?

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8. Properties of Materials

| | Diagram of structure | How are the atoms /ions held together? | Properties |
|---|---|---|---|
| Giant Ionic Lattice | | | |
| Giant Covalent | | | |
| Polymers | | | |
| Metals | | | |
| Small covalent | | | |
| Graphene/fullerene | | | |

## 10. TRIPLE ONLY – Nanoparticles

What is the typical radius of a nanoparticle?

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Why do nanoparticles have properties that are different from those for the same materials in bulk?

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What are some uses of nanoparticles?

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What are some of the risks associated with nanoparticles?

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