N5 Chemistry: Unit 1 – Chemical Changes and Structure REVISION

Lesson 23 – Ions

Learning Outcomes

By the end of this lesson, you should have revised:

1. The layout of the periodic table.
2. How to use the atomic number and mass number of an element to determine its structure.
3. How to write and draw electron arrangements for different elements.

Success Criteria

You will have been successful in this lesson if you:

1. Watch the links provided
2. Complete revision questions provided
3. Complete and submit homework assigned

There is also a further reading section to help you gain more depth of understanding for this section.

If you have any questions about the content of this lesson, you should ask your class teacher either through your class MS team or via email. MS Teams will be monitored throughout the week by a chemistry teacher. If you need help or clarification with either the task or the content of the lesson, just ask.

Links to Prior Knowledge

You may wish to revise the following to help you understand this lesson:

- N5 Unit 1: Atomic Structure and Bonding Related to Properties of Materials

You do not need to copy any notes as this is all revision, but you should complete all questions and tasks as outlined in this document.

Watch the video first:

Lesson 23: Ions - https://youtu.be/FUmWSXhDoc0

You should also consult your Unit 1 Notes and printed notes to help further consolidate your knowledge. A digital copy of the printed notes can be found on the S4 Chemistry Team.

Further Reading

To learn more about this topic, try the following online resources:

BBC Bitesize: https://www.bbc.co.uk/bitesize/guides/zjgmn39/revision/2

Scholar: Log in through GLOW

National 5 Chemistry → Chemical Changes and Structure → 4. Ionic compounds → 4.2 Ions

Evans2 chem web: https://www.evans2chemweb.co.uk/

Username: snhs password: giffnock

Select any teacher → revision → National 5 → Unit 1 → Atomic Structure and Bonding related to Properties.

Extension Questions:

Yellow/Purple book Ionic bonding page 27-28

Complete the following questions in your class work jotter. The answers will be posted on Teams on Wednesday for you to self-assess.

Practice Questions – Ions

1. A sodium ion can be represented as Na^+ and a chloride ion as Cl^-.

Show the symbols (including the charge) for the following ions:

a. lithium
b. sulfide
c. beryllium
d. phosphide (4)

2. Ions are formed when atoms lose or gain electrons. This can be shown using ion-electron equations.

e.g. $K \rightarrow K^+ + e^-$

Write the ion-electron equations for the formation of the following ions:

a. calcium
b. fluoride (2)

3. Give the electron arrangements for the following:

a. a calcium atom
b. a calcium ion
c. a fluorine atom
d. a fluoride ion (4)

4. Copy and complete the missing values in the table. (5)

Element	Electrons	Protons	Neutrons
$^{19}_{9}F^{-}$		9	
$^{39}_{19}K^{+}$			20
$^{16}_{8}O^{2-}$	10		
$^{20}_{10}Ne$		10	
$^{27}_{13}Al^{3+}$			14

Total: 15 marks

Past-Paper Questions – Ions

1. Which of the following particles contains a different number of electrons from the others?
You may wish to use the data booklet to help you.

A Cl^-

B S^{2-}

C Ar

D Na^+ (1)

2. When an atom **X** of an element in Group 1 reacts to become $\mathbf{X^+}$

A the mass number of X decreases

B the atomic number of X increases

C the charge of the nucleus increases

D the number of occupied energy levels decreases (1)

3. Which of the following elements forms an ion with a single positive charge and an electron arrangement of 2,8?

A Sodium

B Magnesium

C Fluorine

D Neon (1)

4. Which of the following is a positively charged ion?

	Protons	Neutrons	Electrons
A	9	10	10
B	10	9	10
C	11	12	11
D	12	13	10

(1)

5. The table shows information about some particles.

	Number of		
Particle	*protons*	*neutrons*	*electrons*
A	9	10	10
B	11	12	11
C	15	16	15
D	19	20	18

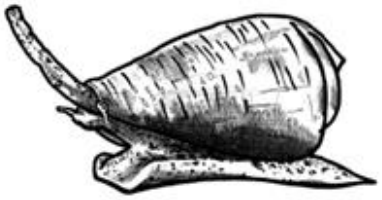
Identify the particle which is a negative ion. (1)

6. When chlorine reacts with sodium the ionic compound sodium chloride is formed.
2017

A chloride ion has a stable electron arrangement.
Describe how a chlorine atom achieves this stable electron arrangement. (1)

8.

Migraine, a type of headache, is caused when calcium ions promote the release of a chemical called CGRP in the nervous tissues. Scientists are using cone snails to develop a treatment for migraine. Cone snails produce a chemical which can be used to prevent the release of CGRP.



What is the electron arrangement for a calcium ion, Ca^{2+}? (1)

9. Titanium is extracted from its ore in the Kroll process. One step in this process involves the displacement of titanium chloride by sodium metal.

The equation is shown.

$$4Na + TiCl_4 \rightarrow 4NaCl + Ti$$

During the displacement, sodium atoms, Na, form sodium ions, Na^+.

Write the ion-electron equation for this change. (1)

Total: 8 marks