HIGH SCHOOL CHEMISTRY

CHAPTER 2

Set 2: Atomic Structure

Free Sample

Sample pages from the full Atomic Structure study set. Try them, then get the whole set.

Try it, then get the whole set

7	5	★	✓
files in the full set	sample sections	Honors kept separate	answers included

- Sample pages from the notes, revision sheets, traps, practice, flashcards and lab skills
- Answers included for every sample question
- Honors material clearly marked so Regular students can skip it

For high school chemistry, Regular and Honors. Chapter 2: Atoms and Isotopes.

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FREE SAMPLE · SET 2 OF 3

Try Atomic Structure before you buy

This free sampler shows pages from six of the seven files in the full **Atomic Structure** study set. If you like how these pages teach, the full set gives you the whole topic, start to finish.

7	5	★	✓
files in the full set	sample sections	Honors kept separate	answers for everything

What's in the full Atomic Structure set

File	What it does for you
1 · Complete Study Notes	Five lessons that teach the whole topic in plain words, with worked examples and quick checks.
2 · Quick Revision Sheets	The topic on a few pages: tables, flowcharts, memory tricks and a one-page cheat sheet.
3 · Exam Traps and Common Mistakes	The mistakes that cost students points, and how to dodge each one.
4 · Practice Question Bank	Questions by lesson, easy to hard, with full worked answers and a separate Honors section.
5 · Quizzes and Unit Test	Quizzes and a full unit test with a fully explained answer key.
6 · Glossary and Flashcards	Every key term defined, plus cut-out flashcards.
7 · Lab Skills for Tests	What tests ask about atom labs: models, data and sources of error, with test-style questions and answers.

NOTE | Regular or Honors?

Honors material sits in blue boxes marked ★ HONORS . Regular students can skip every one of them and still master the topic.

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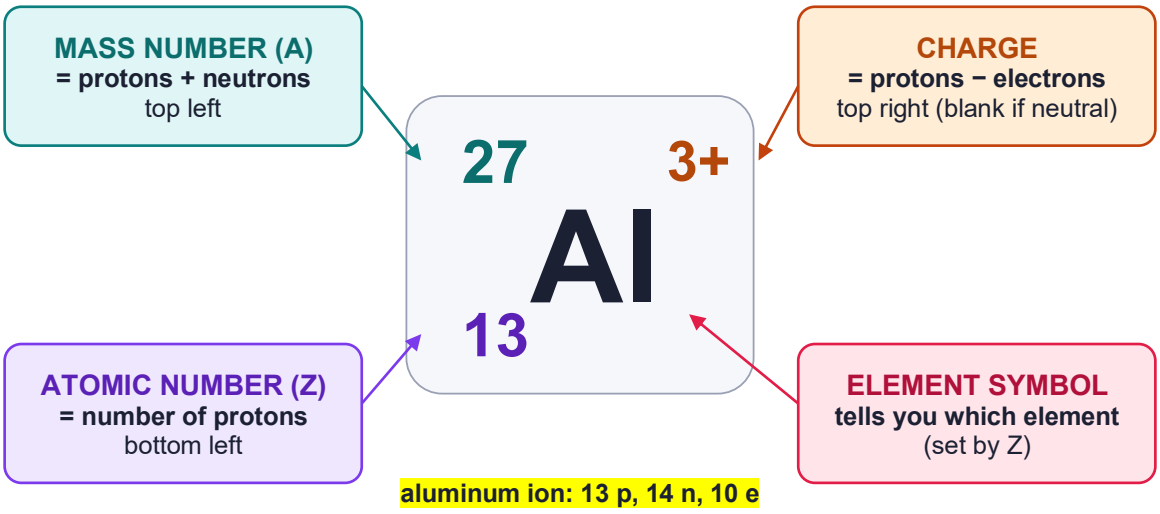
SAMPLE 1 From the Complete Study Notes

SAMPLE PAGE | FREE SAMPLE

This page is adapted from **Complete Study Notes**, one of the seven files in the full Atomic Structure set.

Reading a nuclear symbol

A **nuclear symbol** packs everything about an atom's nucleus (and its charge) into one small label. **Each corner has its own job.**



WORKED EXAMPLE | Read $^{56}_{26}\mathrm{Fe}$

Step 1. Protons	$Z = 26$
Step 2. Neutrons	$56 - 26 = 30$
Step 3. Charge?	None written, so it is neutral: electrons = **26**
Answer	**26 p, 30 n, 26 e**

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EXAM TRAP | Never use the electrons to find the element

Only **protons** decide the element. Electrons change when an atom becomes an ion, so a particle with 26 protons is **iron** whether it has 26, 24 or 23 electrons.

SAMPLE 2 From the Quick Revision Sheets

SAMPLE PAGE | FREE SAMPLE

This page shows the kind of practice you get in **Quick Revision Sheets**, one of the seven files in the full Atomic Structure set.

The three subatomic particles at a glance

Particle	Symbol	Charge	Mass (amu)	Where it is
Proton	p^+	**+1**	about 1	nucleus
Neutron	n^0	**0**	about 1	nucleus
Electron	e^-	**−1**	about 0.00055	electron cloud

Three equations that do most of the work

You want	Use
Neutrons	neutrons = A − Z
Electrons in an ion	electrons = protons − charge
Mass of an atom	about (protons + neutrons) amu

MEMORY TRICK

Proton = **P**ositive. **N**eutron = **N**eutral. **E**lectron = the **E**xtra-light one, outside the nucleus.

Cats have **paws**, so **ca**tions are **paws-itive** (+). An **an**ion is **a n**egative **ion** (−).

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SAMPLE 3 From Exam Traps and Common Mistakes

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This page shows the kind of practice you get in **Exam Traps and Common Mistakes**, one of the seven files in the full Atomic Structure set.

EXAM TRAP 1 | The neutron is negative

✗ WHAT STUDENTS WRITE	✓ WHAT EARNS THE POINTS
"The atom has three particles: protons are positive, neutrons are negative and electrons are neutral."	Protons are **positive (+1)**, **neutrons have no charge (0)** and **electrons are negative (−1)**.

Why it's wrong: "Neutron" and "negative" both start with N-E, so students swap them. The name comes from **neutral**.

MEMORY TRICK **Neutron = Neutral. The only negative particle is the electron.**

EXAM TRAP 6 | Counting electrons as 1 amu each

✗ WHAT STUDENTS WRITE	✓ WHAT EARNS THE POINTS
"A sulfur atom has 16 protons, 16 neutrons and 16 electrons, so its mass is about 16 + 16 + 16 = 48 amu."	Add only **protons + neutrons**: 16 + 16 ≈ **32 amu**. The 16 electrons add only about 0.009 amu.

Why it's wrong: Each electron is about 0.00055 amu, not 1 amu. Counting them as 1 each makes the answer far too big.

MEMORY TRICK **One nucleon ≈ one amu. Electrons ≈ zero.**

EXAM TRAP 20 | Losing electrons makes a negative ion

✗ WHAT STUDENTS WRITE	✓ WHAT EARNS THE POINTS
"Aluminum loses three electrons, so it becomes Al^{3-}."	Losing three negative electrons leaves **three more protons than electrons**, so it becomes **Al^{3+}**.

Why it's wrong: Taking away negatives leaves the particle more positive. The charge goes up, not down.

MEMORY TRICK **Lose a negative, gain a plus.**

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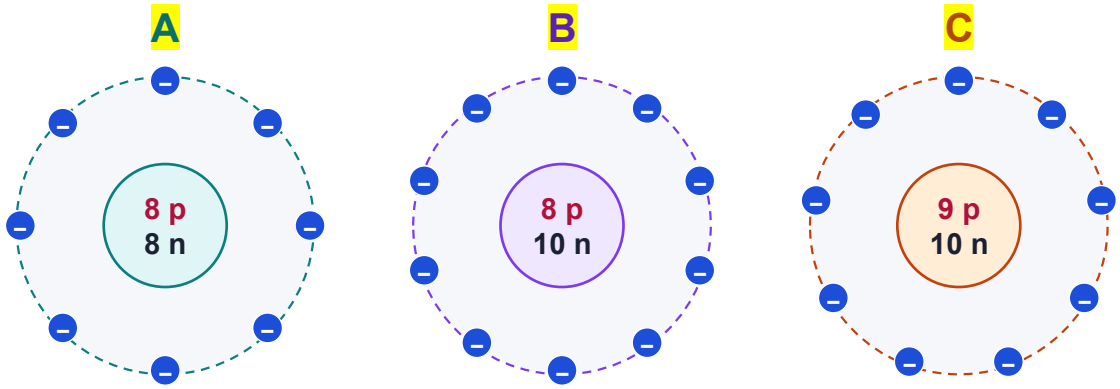
SAMPLE 4 From the Practice Question Bank

SAMPLE PAGE | FREE SAMPLE

This page shows the kind of practice you get in **Practice Question Bank**, one of the seven files in the full Atomic Structure set.

Q36 The diagram shows three particles, A, B and C. (a) Which two are the same element? Explain. (b) Which particle is an ion, and what is its charge? (c) Give the mass number of each particle.



Blue dots with − are electrons. Count them!

ANSWER KEY | Answers

Q36 **(a) A and B (b) B, charge 2− (c) A = 16, B = 18, C = 19**

(a) A and B both have 8 protons, so both are oxygen. The different neutron counts do not matter. (b) B has 8 protons and 10 electrons: 8 − 10 = −2. A and C have equal protons and electrons, so they are neutral. (c) A: 8 + 8 = 16. B: 8 + 10 = 18. C: 9 + 10 = 19 (C is fluorine).

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SAMPLE 5 Flashcards and Lab Skills

SAMPLE PAGE | FREE SAMPLE

This page shows the kind of practice you get in **Glossary and Flashcards**, one of the seven files in the full Atomic Structure set.

Front	Back
Atomic number (Z)	The number of protons in the nucleus. It decides which element an atom is.
Mass number (A)	The total number of protons and neutrons in the nucleus. Always a whole number.
Cation	A positive ion. It forms when an atom loses electrons, so it has fewer electrons than protons.
Atomic mass unit (amu)	Exactly 1/12 of the mass of a carbon atom with 6 protons and 6 neutrons.

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SAMPLE PAGE | FREE SAMPLE

This page shows the kind of practice you get in **Lab Skills for Tests**, one of the seven files in the full Atomic Structure set.

Data set: bead models of four particles

A class built models of particles with beads: **red** beads for protons, **gray** beads for neutrons and **blue** beads for electrons. Each group counted its beads and recorded them.

Model	Red (p)	Gray (n)	Blue (e)	Charge
1	6	6	6	?
2	12	13	10	?
3	16	18	18	?
4	13	14	10	?

ANSWER KEY | What the data show

Model 1: 6 protons is carbon; 6 − 6 = **0**, a neutral atom with mass number 12.

Model 2: 12 protons is magnesium; 12 − 10 = +2, the cation Mg^{2+}.

Model 3: 16 protons is sulfur; 16 − 18 = −2, the anion S^{2-}.

Model 4: 13 protons is aluminum; 13 − 10 = +3, the cation Al^{3+}.

The full file has more data sets like this one, plus how to read models and data, sources of error and test-style lab questions, all with answers.

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Get the Full Atomic Structure Set

You've seen a few pages. The full set covers **all of Atomic Structure**, start to finish.

- ✓ **Complete Study Notes:** five lessons, worked examples and quick checks.
- ✓ **Quick Revision Sheets:** tables, flowcharts, memory tricks and a one-page cheat sheet.
- ✓ **Exam Traps and Common Mistakes:** the mistakes that cost points, fixed.
- ✓ **Practice Question Bank:** questions by lesson with full worked answers.
- ✓ **Quizzes and Unit Test:** check you're ready, with an answer key.
- ✓ **Glossary and Flashcards:** every key term, ready to cut out.
- ✓ **Lab Skills for Tests:** models, data and sources of error, with test-style questions and answers.

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Also in this series: Set 1, Atomic Theory, and Set 3, Isotopes and Atomic Mass. Each set works on its own.

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