

**GRADE 9**

**NS**

**Atoms Exercise**

**QUESTIONS:**

1. What does the atomic number tell us about the atoms of an element?

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2. How many protons are there in oxygen atoms?

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3. In most oxygen atoms, how many neutrons are there?

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4. In a neutral oxygen atom, how many electrons will there be?

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5. What is the charge on protons and electrons?

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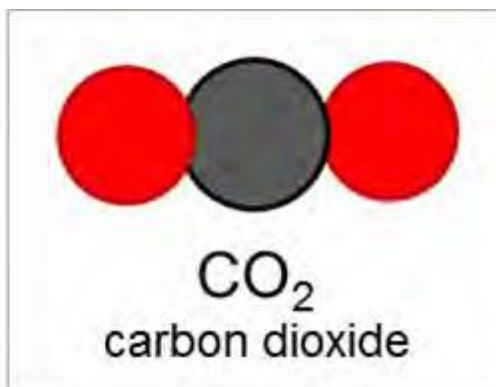
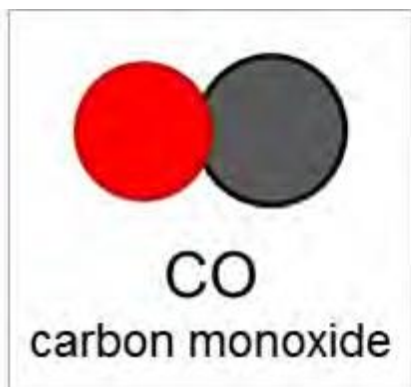
6. How are the protons, neutrons and electrons (the sub-atomic particles) arranged in an atom?

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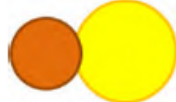


## Names of Compounds

Each compound has a unique name



### Type 1: Compounds that contain a metal and a non-metal

For compounds of this type, the rule is simple. The metal comes first and the non-metal second. The name of the non-metal changes slightly: the suffix *-ide* replaces the ending of the name.

Formula	Consists of	Name	Picture of one formula unit of the compound
NaCl	Sodium and chlorine	Sodium chloride	
FeS	Iron and sulfur	Iron sulfide	
MgO	Magnesium and oxygen	Magnesium oxide	
LiF	Lithium and fluorine	Lithium fluoride	

### Type 2: Compounds that contain only non-metals

#### Rule 1:

The name of the element further to the left on the Periodic Table comes first, followed by the name of the element further to the right on the table. The name of the second element changes slightly: the suffix *-ide* replaces the ending of the name.

For example:

- oxygen becomes *oxide*
- fluorine becomes *fluoride*
- chlorine become *chloride*
- nitrogen becomes *nitride*

**Rule 2:**

When two or more compounds have different numbers of the same elements (like CO and CO<sub>2</sub> in our example above), we must add prefixes to avoid confusion.

The first four prefixes are listed in the table below:

Number of atoms	Prefix
1	mono-
2	di-
3	tri-
4	tetra-
5	penta-

**Rule 3:**

Many compounds are not usually referred to by their systematic names. Instead, they have **common names** that are more widely known. For example, we use the name *water* for H<sub>2</sub>O, *ammonia* for NH<sub>3</sub>, and *methane* for CH<sub>4</sub>.

## SUMMARY:

### Key Concepts

#### Elements

- All the atoms in an element are of the same kind. This means that an element cannot be changed into other elements by any physical or chemical process.
- Elements can be built up of individual atoms, or as bonded pairs of atoms called diatomic molecules.
- When elements combine, they form compounds.

#### Compounds

- In a compound, atoms of two or more different kinds are chemically bonded in some fixed ratio.
- The atoms that make up a molecule are held together by special attractions called chemical bonds.
- Compounds can be formed and broken down in chemical reactions.
- A chemical reaction in which a compound is broken down into simpler compounds and even elements is called a decomposition reaction.
- Compounds cannot be separated by physical processes, but they can be separated into their elements (or simpler compounds) by chemical processes.

#### The Periodic Table

- Each element has a fixed position on the Periodic Table. The elements are arranged in order of increasing atomic number, with the lightest element (hydrogen: H) in the top left hand corner.
- An element's position on the Periodic Table tells us whether it is a metal, a non-metal or a semi-metal.
  - metals are found on the left hand side of the table;
  - non-metals are found on the far right hand side of the table; and
  - semi-metals are found in the region between the metals and non-metals.

- An element can be identified in 3 different ways:
  - each element has a unique name;
  - each element has a unique chemical symbol; and
  - each element has a unique atomic number.
- The vertical columns of the Periodic Table are called groups. The Periodic Table has 18 groups.
- The horizontal rows of the Periodic Table are called periods. There are 7 periods.
- Elements belonging to the same 'group' of the Periodic Table exhibit the same chemical behaviour, and will often have similar properties.
- Many different versions of the Periodic Table exist. Typically, the element symbol, the atomic number and the atomic mass of each element are given on the table.

#### **Names and formulae**

- Each compound has a unique name and formula.
- The formula of a compound tells us which elements are in the compound and how many atoms of each element have combined to form one molecule of that compound.
- There are rules for naming compounds that take into account how many atoms of each type are in one molecule of the compound.