

# THE FUNDAMENTALS OF ELECTRICITY

Work with your partner to find out the correct answer to the questions below.  
All the information you need is included in the boxes. But first, it would be helpful to find the meaning of the following words

1. matter = \_\_\_\_\_
3. molecule = \_\_\_\_\_
5. substance = \_\_\_\_\_
7. particle = \_\_\_\_\_

2. element = \_\_\_\_\_
4. mixture = \_\_\_\_\_
6. compound = \_\_\_\_\_

Periodic Table of the Elements

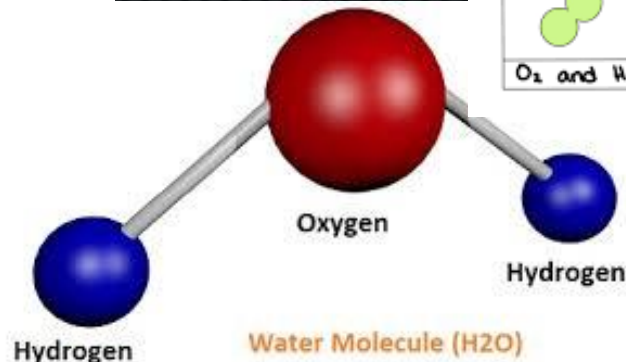
The periodic table shows elements arranged by atomic number and chemical properties. Key features include:

- Groups:** IA (Alkali metals), IIA (Alkaline earth metals), IIIA, IVA, VA, VIA, VIIA (Halogens), and VIIIA (Noble gases).
- Subgroups:** Lanthanides and Actinides are shown at the bottom.
- Element Categories:** Metals (shaded in various colors), Nonmetals (shaded in lighter colors), and Metalloids (shaded in green).
- Element Properties:** Atomic number, atomic weight, and element name are provided for each element.

1. Ύλη
2. Στοιχείο
3. Μόριο
4. Μείγμα
5. Ουσία
6. Χημική ένωση
7. Σωματίδιο



Mixture	compound
O <sub>2</sub> and H <sub>2</sub> molecules	H <sub>2</sub> O molecules



Examples of Pure Substances

 Gold Metal	 Copper Wire	 Sugar
 Salt	 Hydrogen Gas	 Diamond

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## Questions

1. Matter can be found in

a) a liquid or solid state.

b) a solid or gaseous state.

→ c) all three states: liquid, solid and gaseous.

2. Oxygen (O) and Hydrogene (H) are

→ a) elements.

b) compounds.

c) mixtures.

3. A mixture is obtained

a) by chemical means.

→ b) by physical means.

c) by both physical and chemical means.

4. A compound

a) can be separated by physical means only.

→ b) can be separated by chemical means only.

c) cannot be separated at all.

5. An element is a substance which

a) can be reduced to a simpler one.

b) can be separated by chemical means.

→ c) cannot be separated by any means.

## STATE OF MATTER



SOLID



LIQUID



GAS



COOL

WARM



6. The smallest particle of an element is the

- ➔ a) atom.
- b) molecule.
- c) matter.

7. A molecule has

- ➔ a) all the characteristics of a compound.
- b) all the characteristics of a mixture.
- c) only some characteristics of a compound.

8. The smallest particle of a chemical combination of elements is

- a) a mixture.
- ➔ b) a molecule.
- c) a compound.

9. The words “electron” and “electricity” are derived from

- a) an ancient Egyptian word.
- ➔ b) an ancient Greek word.
- c) an ancient Latin word.

10. The word “electron” means

- a) copper.
- b) current.
- ➔ c) amber.



### **MATTER**

It is everything that occupies space and has weight, e.g. air, water, our bodies.

### **ELEMENT**

It is a substance which cannot be reduced to a simpler one by either physical or chemical means, e.g. iron, oxygen, gold.

### **MOLECULE**

It is the smallest particle of a compound which has all the characteristics of the compound.

### **COMPOUND**

It is a chemical combination of elements which cannot be separated by physical means, e.g. water, table salt.

### **MIXTURE**

It is a combination of elements or compounds, not chemically combined, which can be separated by physical means, e.g. air, sea water.

### **ATOM**

It is the smallest particle of an element which has all the characteristics of the element.



# ΙΔΙΟΤΗΤΕΣ ΤΗΣ ΥΛΗΣ

Αγωγοί

## Conductors

a material that allows heat energy or electricity to pass through it easily



Μονωτές

## & Insulators

a material that does **not** let heat energy or electricity pass through it easily



Mass

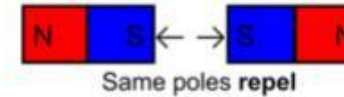
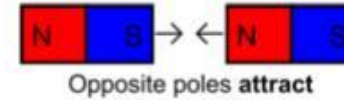
## Properties of Matter

anything that has mass and takes up space



## Magnetism

a force that pulls magnetic materials across a distance



Μαγνητισμός



## Relative Density

It determines whether one substance will sink or float in another substance

Σχετική πικνότητα

## States of Matter



Κατάσταση

Στερεά

Υγρή

Αέρια

## Solubility

the ability of one substance to dissolve into another substance



Διαλυτότητα

## The atom and charged bodies

The atoms of each element are made up of electrons, protons and, in most atoms, neutrons.

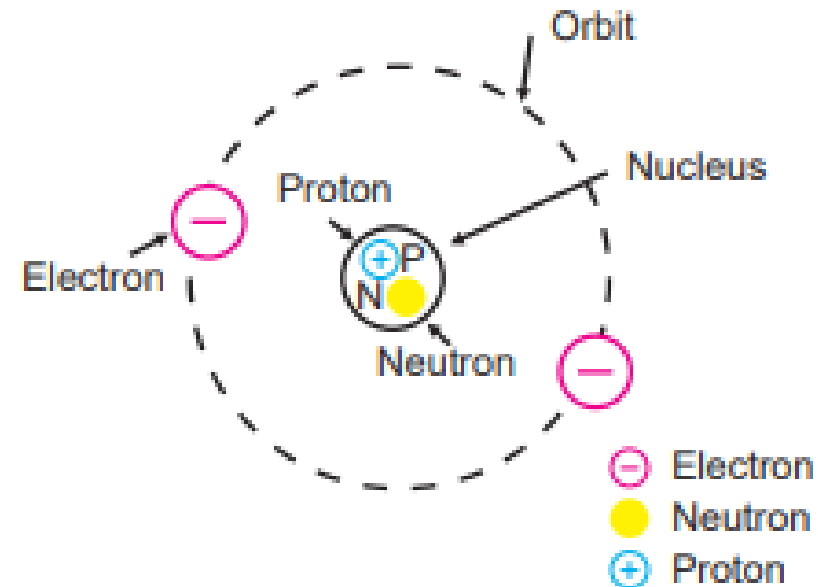
Electrons are negatively charged.

Protons have a positive electric charge, equal and opposite to the charge of electrons.

Neutrons have no electric charge.

The protons and neutrons form a heavy nucleus with a positive charge, around which the very light electrons revolve in orbit, just like the planets in our solar system.

Electrons which move close to the nucleus are tightly bound to the atom. Those moving in orbit farther from the nucleus are rather loosely bound and when influenced by an outside force, they may be drawn away from the atom. These electrons are sometimes called “free” electrons. They are not exactly free, but tend to move from one atom to another exchanging places continuously with other free electrons. Some materials, such as metals, contain many more of these so called “free” electrons than others, such as rubber and glass.



## **The potential difference and electric current**

If two differently charged bodies come into contact, or are connected with a wire, free electrons will move from the body which has an excess of electrons to the one which has a deficiency of them. The movement of electrons is explained by the theory that an electrical pressure exists between any two bodies when one of them has a charge of greater intensity than the other. The difference in electrical pressure caused by these charges is called "potential difference" and is measured in Volts (V). The greater the potential difference, the greater the movement of electrons along a wire (conductor). This movement of electrons between two differently charged bodies is what we call "electric current". The symbol used to represent electric current is (I), which means intensity of current flow. Current is measured in Amperes (A).