

# LESSON | What are the parts of an

## 10 | atom?

People once thought that the atom was the smallest particle of matter in the universe. However, scientists now know that atoms are made up of even smaller parts. There are three different kinds of particles. They are: **protons** [PRO-tahnz], **neutrons** [NEW-trahnz], and **electrons** [i-LEK-trahnz].

Most of the mass of an atom is found in the central part of the atom, called the **nucleus** [new-KLEE-us]. The nucleus of an atom is made up of protons and neutrons. These particles are packed very tightly together in the nucleus.

Electrons are found outside the nucleus. They circle the nucleus very, very quickly. Electrons are very small and have almost no mass. The number of electrons in an atom is always equal to the number of protons in the nucleus of that atom.

Scientists have discovered that protons, electrons, and neutrons have different **charges**. You probably know that the word "charge" has something to do with electricity.

There are two kinds of charges. There are positive (plus) charges and negative (minus) charges. By studying atoms, scientists have learned that:

- PROTONS have positive (+) charges.
- ELECTRONS have negative (-) charges.
- NEUTRONS have no charges. They are neutral.

Since atoms have the same number of protons and electrons, the number of positive charges equals the number of negative charges. The opposite charges cancel each other out. Therefore, **THE WHOLE ATOM HAS NO OVERALL CHARGE.**

## ATOMIC DIAGRAMS

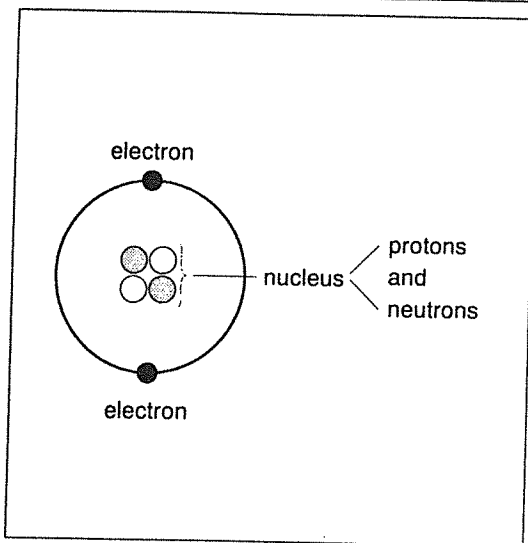


Figure A

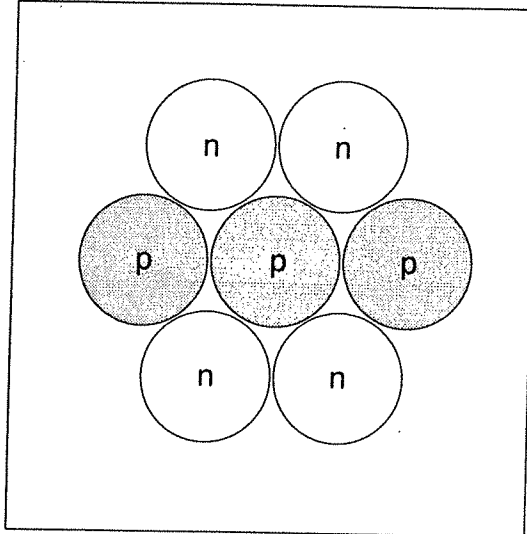


Figure B

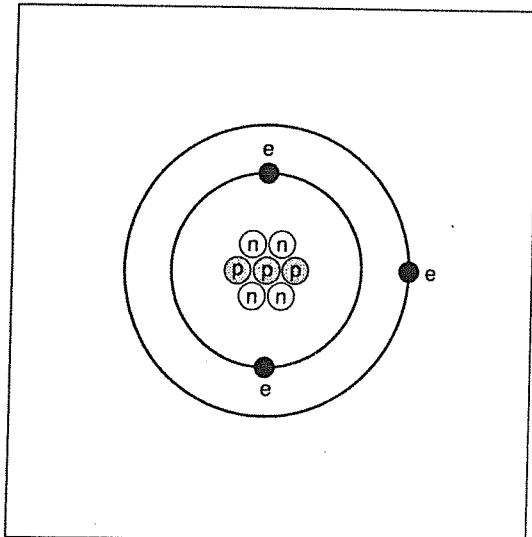


Figure C

The table below tells where the parts of the atom are found and what the charge of each part is.

Name of part	Where it is found	Charge
proton	inside the nucleus	+
neutron	inside the nucleus	0
electron	outside the nucleus	-

Figure B shows the center of a lithium atom. The center of an atom is called its nucleus.

1. Name the parts that make up a nucleus.

\_\_\_\_\_

2. In the diagram, each "p" stands for

\_\_\_\_\_ ; each "n" stands for

a \_\_\_\_\_.

3. How many protons are in a lithium nucleus?

\_\_\_\_\_

4. How many neutrons are in a lithium

nucleus? \_\_\_\_\_

Figure C shows a full lithium atom.

5. Label the nucleus on the diagram.

6. Draw in a small "e" next to each electron.

7. How many electrons does a lithium atom

have? \_\_\_\_\_

8. How many positive charges are in the atom?

\_\_\_\_\_

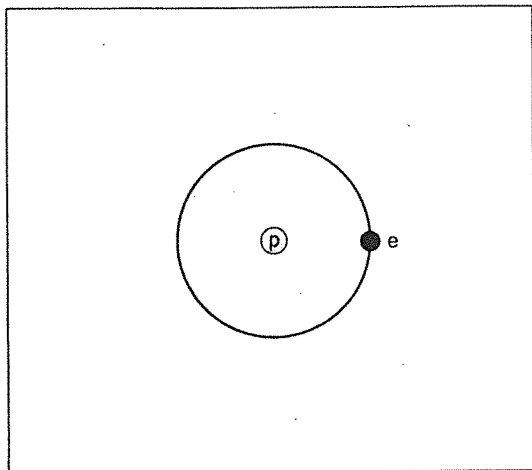
9. How many negative charges are in the atom?

\_\_\_\_\_

10. What is the overall charge of the atom? \_\_\_\_\_

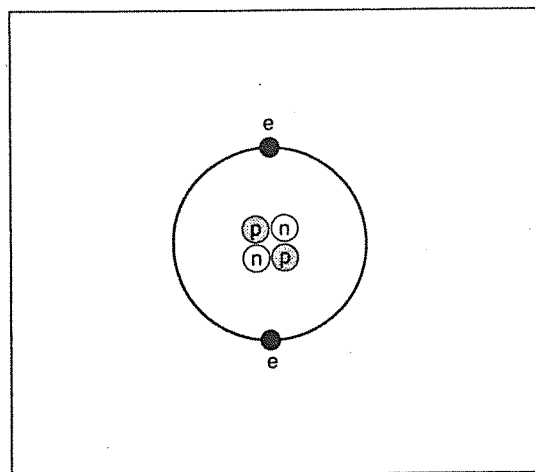
## INTERPRETING ATOMIC DIAGRAMS

Below and on the following page are diagrams of six different atoms. In the spaces provided to the right of each diagram, fill in the number of protons, neutrons, electrons, positive charges, negative charges, and the overall charge of each atom.



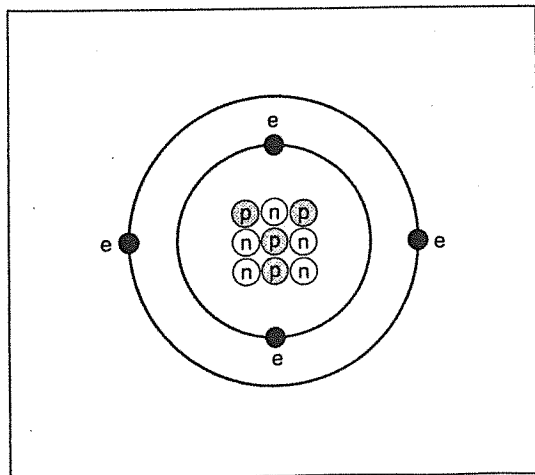
Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

Figure D *Hydrogen*



Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

Figure E *Helium*



Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

Figure F *Beryllium*

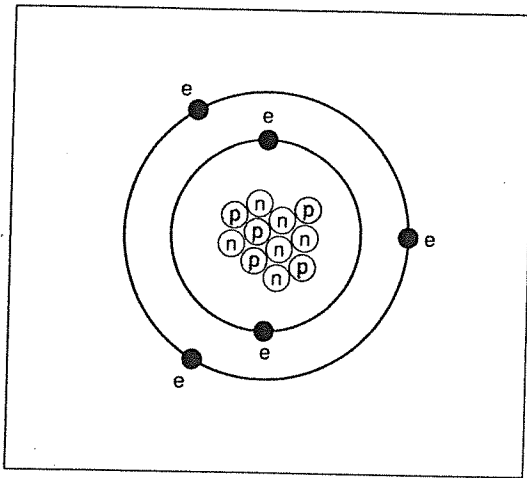


Figure G Boron

Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

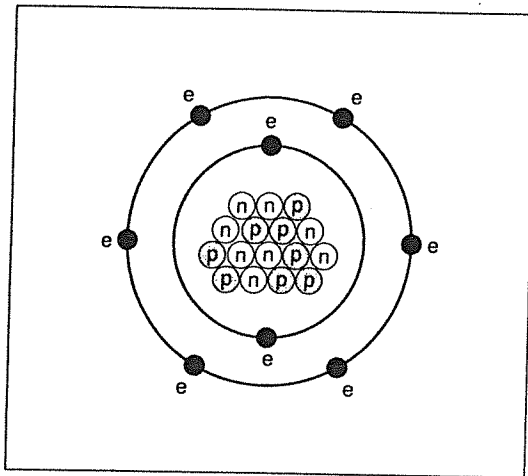


Figure H Oxygen

Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

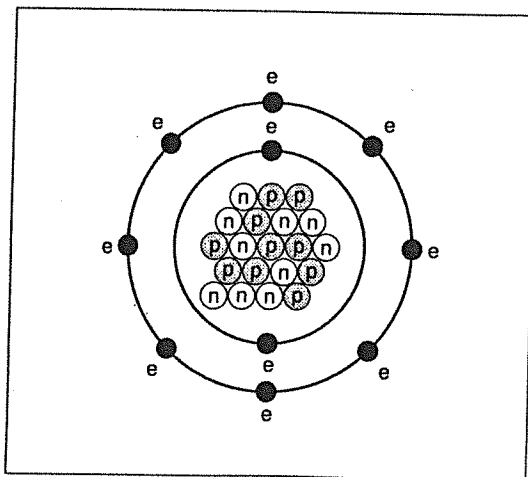


Figure I Neon

Protons \_\_\_\_\_  
 Neutrons \_\_\_\_\_  
 Electrons \_\_\_\_\_  
 Positive charge \_\_\_\_\_  
 Negative charge \_\_\_\_\_  
 Overall charge \_\_\_\_\_

## FILL IN THE BLANK

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Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some answers may be used more than once.

outside  
protons  
nucleus

neutrons  
atoms  
smaller

same  
negative  
no

cancel out  
electrons  
positive

1. All matter is made of tiny parts called \_\_\_\_\_.
2. The center part of an atom is called the \_\_\_\_\_.
3. A nucleus is made up of \_\_\_\_\_ and \_\_\_\_\_.
4. Electrons are found \_\_\_\_\_ the nucleus.
5. Electrons are \_\_\_\_\_ than protons or neutrons.
6. The main parts of an atom are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
7. Since protons have a \_\_\_\_\_ charge, and neutrons have \_\_\_\_\_ charge, the nucleus will have a \_\_\_\_\_ charge.
8. Electrons have a \_\_\_\_\_ charge.
9. An atom has the \_\_\_\_\_ number of protons and electrons.
10. The plus and minus charges of an atom \_\_\_\_\_ each other.

## TRUE OR FALSE

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In the space provided, write "true" if the sentence is true. Write "false" if the sentence is false.

- \_\_\_\_\_ 1. A proton is found outside the nucleus.
- \_\_\_\_\_ 2. A proton has a negative charge.
- \_\_\_\_\_ 3. A neutron has a positive charge.
- \_\_\_\_\_ 4. An electron has a negative charge.
- \_\_\_\_\_ 5. An electron is found inside the nucleus.

