

AIM | What are the parts of an 23 | atom?

As you learned, an atom can be divided into smaller parts. That is because an atom is made up of parts. There are three main parts of an atom: *protons* [PROE tonz], *neutrons* [NEW tronz], and *electrons* [ih LECK tronz].

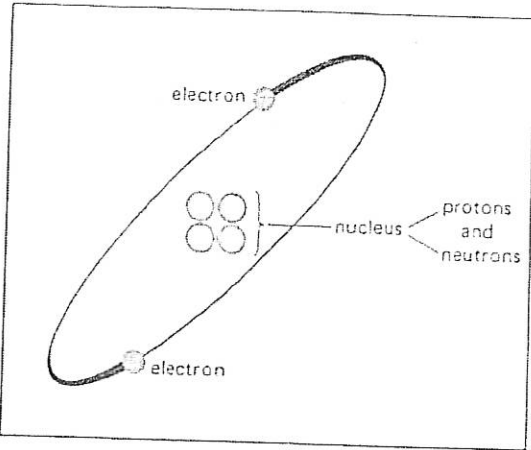
Protons and neutrons make up the middle part of the atom. The middle part is called the *nucleus* [NEW klee us]. The nucleus is very tightly packed.

The electrons are outside the nucleus of the atom. They spin around the nucleus at very great speed. The electrons are not tightly packed. There is space between electrons. Electrons are smaller than protons or neutrons.

Pages 184 and 185 show the Periodic Table, which you studied in Aim 11. Look at the enlarged square for copper (Cu). At the top of the square is the number 29. This is called the **ATOMIC NUMBER** of copper.

This atomic number tells us that copper has 29 protons in its nucleus. You have just learned that an atom has as many electrons as protons. Therefore, you can see that copper must have 29 electrons (2 + 8 + 18 + 1). Within an atom there are three things that are equal: protons, electrons, and atomic number.

P rotons =
E lectrons =
N umber (atomic)



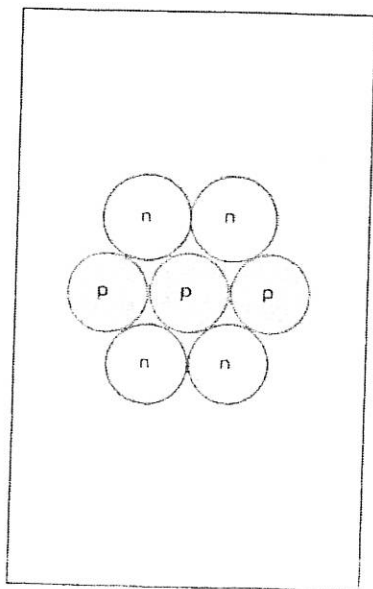
A.

The table below tells where the parts of the atom are found.

Name of part	Where it is found
proton	inside the nucleus
neutron	inside the nucleus
electron	outside the nucleus

MORE ABOUT ATOMS

Each diagram below tells something about atoms. Study each diagram. Then do the exercises.



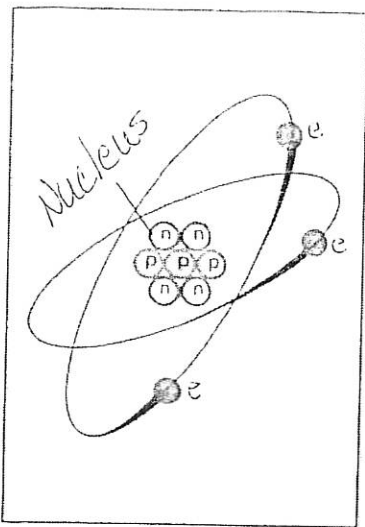
B.

I. This diagram shows the center of a *lithium* atom. The center of an atom is called its nucleus.

- Name the parts that make up a nucleus.

- In the diagram, each "p" stands for a _____,
each "n" stands for a _____.
- How many protons are in a lithium nucleus?

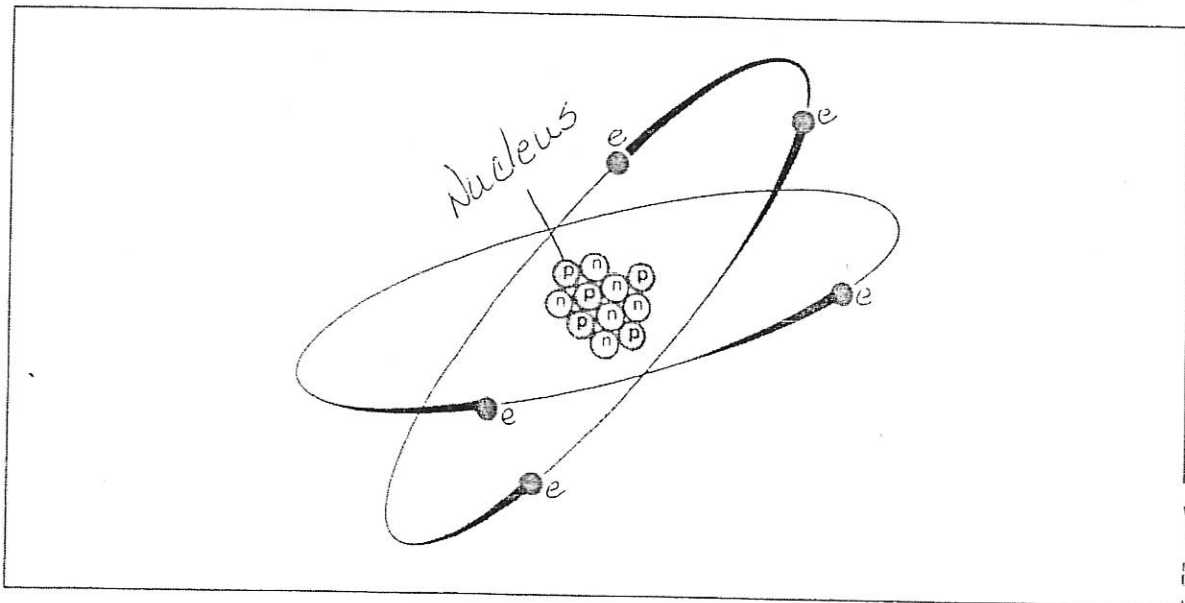
- How many neutrons are in a lithium nucleus?



This diagram 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?

C.

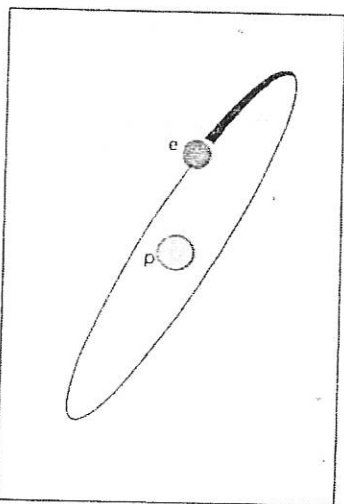


II. This is a diagram of a different atom. This is a *boron* atom.

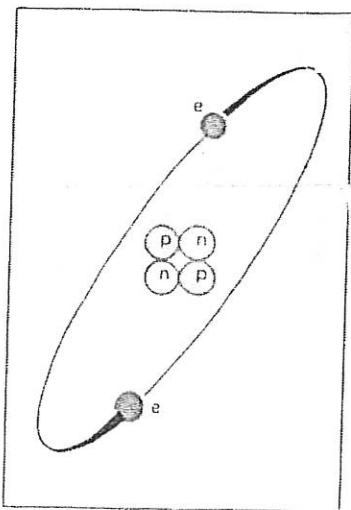
1. Label the nucleus on the diagram.
2. Draw in a small "e" next to each electron.
3. How many protons does a boron atom have? _____
4. How many neutrons does a boron atom have? _____
5. How many electrons does a boron atom have? _____
6. The number of protons and electrons in a boron atom is _____
the same, different

7. a) Do the lithium atom and the boron atom have the same *kinds* of parts?

- b) Do they have the same *amounts* of these parts? _____
8. a) A boron atom has _____ protons than a lithium atom.
more, fewer
- b) A boron atom has _____ neutrons than a lithium atom.
more, fewer
- c) A boron atom has _____ electrons than a lithium atom.
fewer
9. Boron has a _____ atomic number than lithium. (Check your
Periodic Table on page 184.)
higher, lower
10. Different kinds of atoms have _____ amounts of protons, neutrons,
and electrons.
the same, different



A.



B.

III. The atomic number of hydrogen is 1. Hydrogen is the lightest and most simple atom.

A hydrogen atom has one proton and one electron. A hydrogen atom has no neutrons.

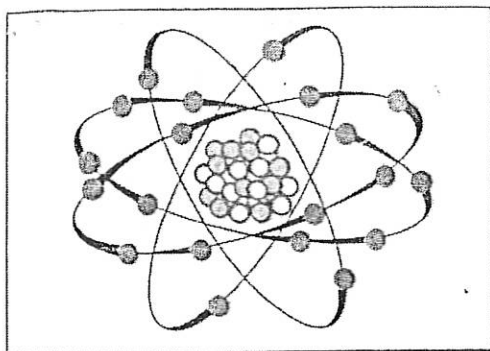
Hydrogen is the only atom that has no neutrons.

1. The number of protons and electrons in a hydrogen atom is _____
the same, different

The atomic number of helium is 2. It is the second lightest element.

A helium atom has 2 protons and 2 neutrons in the nucleus.

2. How many electrons spin around a helium nucleus? _____
3. The number of protons and electrons in a helium atom is _____
different, the same



C.

This is a diagram of a calcium atom. Its atomic number is 20.

Compare the atoms of hydrogen and helium with a calcium atom.

4. Which atom has more parts: hydrogen, helium, or calcium? _____
5. An atom of atomic number 106 has even _____ parts.
fewer, more

COMPLETING SENTENCES

Complete the sentences with the words below. Three of these words may be used twice.

outside
protons
larger

empty space
tightly
nucleus

neutrons
atoms
electrons
smaller

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. A nucleus is _____ packed.
5. Electrons are found _____ the nucleus.
6. Electrons spin around the _____.
7. There is mostly _____ between electrons.
8. Protons and neutrons are _____ than electrons.
9. Electrons are _____ than protons or neutrons.
10. Different kinds of atoms have different amounts of _____
_____ and _____.

