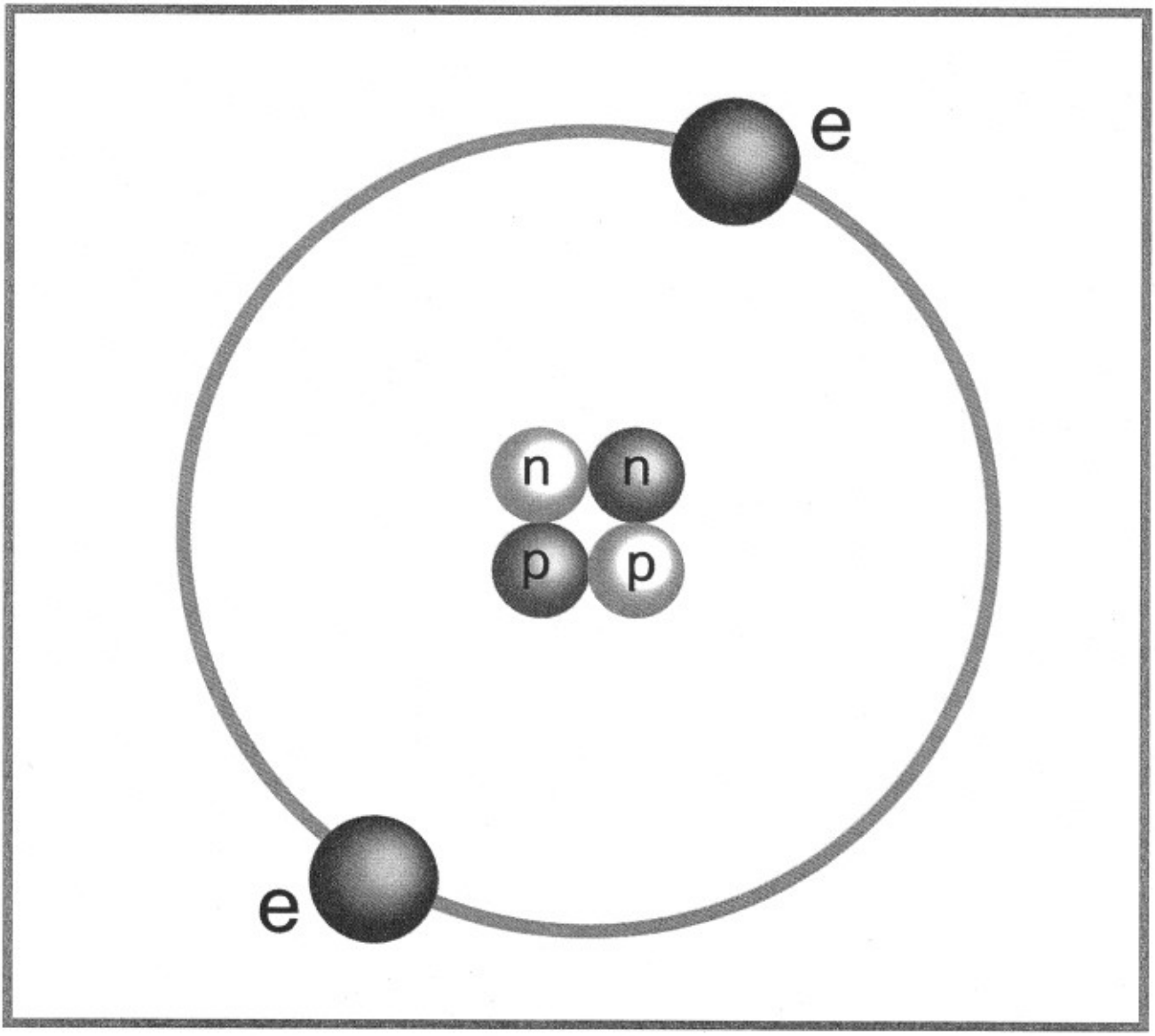
Lesson 10

What are the parts of an atom?



KEY TERMS

proton: a part of the atom that has a positive charge; is found in the nucleus

neutron: a part of the atom that has neither a positive or negative charge; is found in the nucleus

electron: a part of the atom that has a negative electrical charge; orbits the nucleus

nucleus: central part of an atom, which contains neutrons and protons

LESSON 10 | What are the parts of an 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.

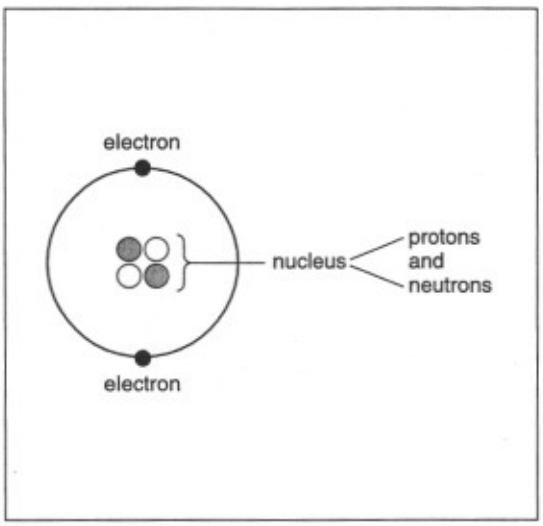


Figure A

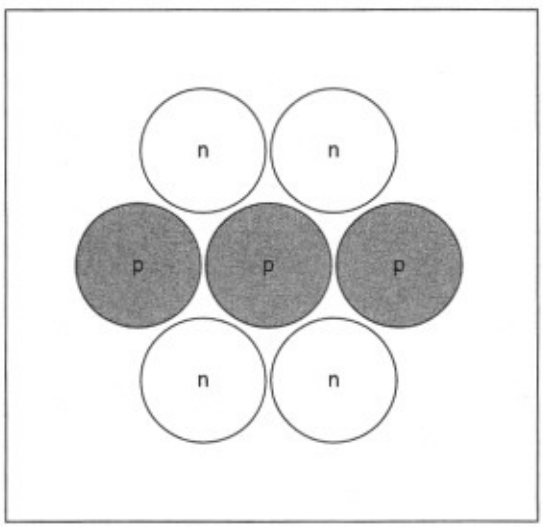


Figure B

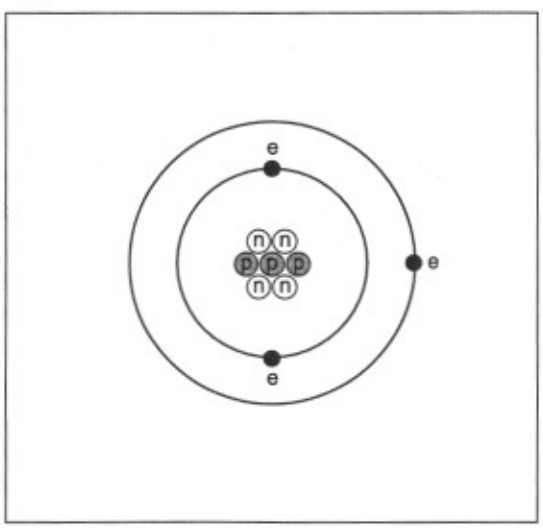


Figure C

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.

   _____

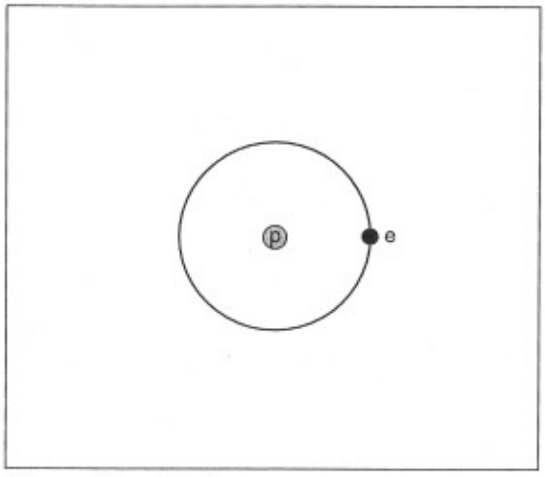
2. In the diagram, each "p" stands for _____; each "n" stands for a _____.
3. How many protons are in a lithium nucleus? _____
4. How many neutrons are in a lithium nucleus? _____

Figure C shows a full lithium atom.

5. How many electrons does a lithium atom have? _____
6. How many positive charges are in the atom? _____
7. How many negative charges are in the atom? _____
8. What is the overall charge of the atom?

   _____

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 _____

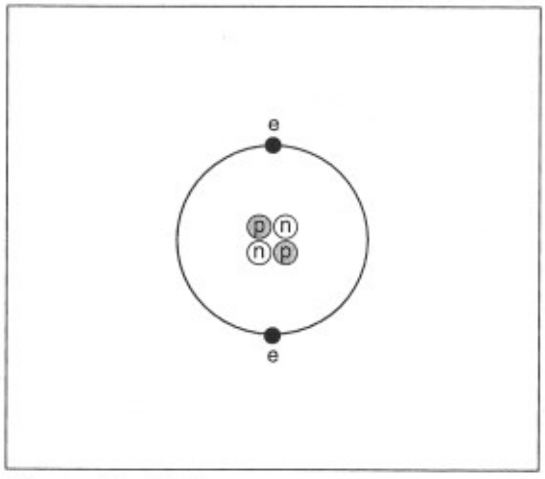
Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure D *Hydrogen*



Protons _____

Neutrons _____

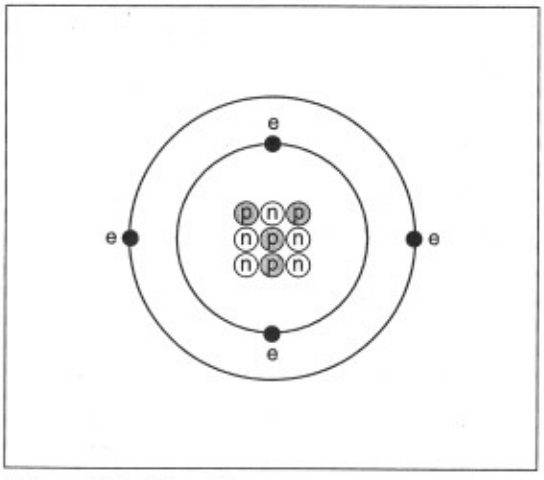
Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure E *Helium*



Protons _____

Neutrons _____

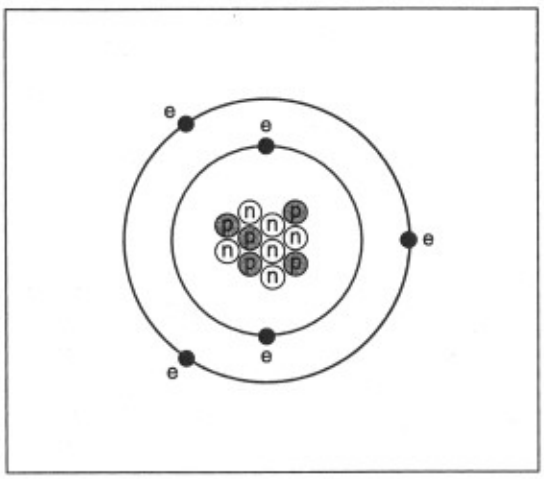
Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure F *Beryllium*



Protons _____

Neutrons _____

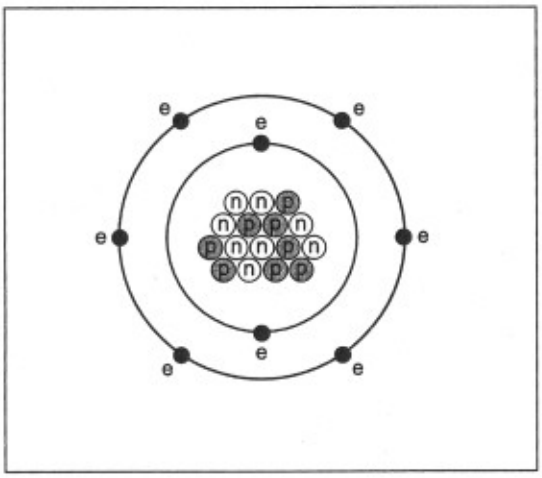
Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure G *Boron*



Protons _____

Neutrons _____

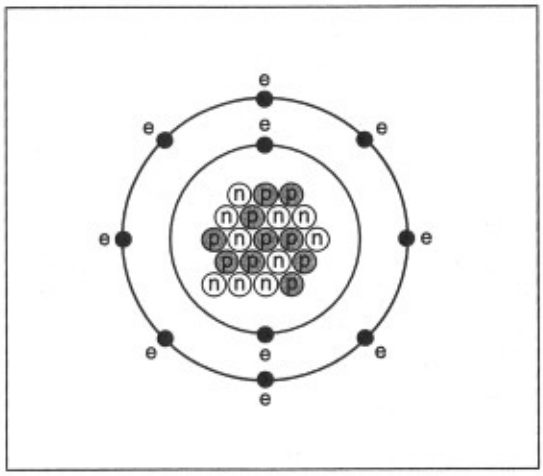
Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure H *Oxygen*



Protons _____

Neutrons _____

Electrons _____

Positive charge _____

Negative charge _____

Overall charge _____

Figure I *Neon*

FILL IN THE BLANK

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

outside	neutrons	same	cancel out
protons	atoms	negative	electrons
nucleus	smaller	no	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

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.