

3 | atom?

It is hard to believe how tiny an atom is. Yet, the tiny atom is made up of even smaller parts. Can you imagine how small these parts are?

An atom has three main parts: protons, neutrons, and electrons.

Protons and neutrons make up the center of an atom. The center part of an atom is called the nucleus.

The electrons are outside the nucleus. They spin around the nucleus at very great speeds. Electrons are much smaller than protons or neutrons.

Protons and electrons have electrical charges.

- Each proton has a positive (+) charge.

- Each electron has a negative (-) charge.

A neutron is neutral. It has no charge.

An atom has the same number of protons as electrons.

PROTONS = ELECTRONS

This means that the number of plus charges equals the number of minus charges. They balance each other. Because of this, the entire atom has no charge.

The atomic number is also the same as the number of protons.

PROTONS = ATOMIC NUMBER

Three things, then, are equal: the number of protons, the number of electrons, and the atomic number.

Protons =

Electrons =

Number (atomic)

Remember this. If you know any one of these numbers, you know the number of the other two. They are the same!

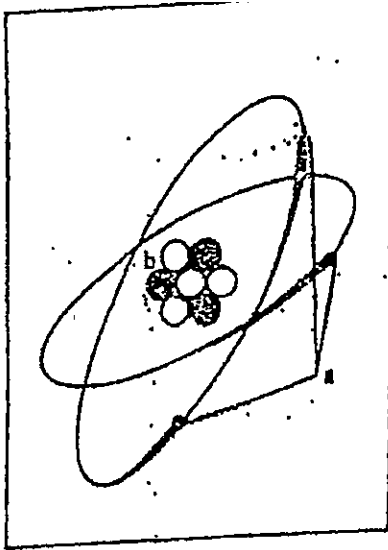


Figure A

- LOOK at Figure A
- The nucleus is labeled _____
a, b
 - The electrons are labeled _____
a, b
 - Name the parts that make up a nucleus.

 - A proton is _____ than an electron.
larger, smaller
 - An electron is _____ than a neutron.
larger, smaller
 - A proton has _____ charge.
a positive, a negative, no
 - An electron has _____ charge.
a positive, a negative, no
 - A neutron has _____ charge.
a positive, a negative, no
 - An entire atom has _____ charge.
a positive, a negative, no

COMPLETE THE CHART

You will need your Periodic Table to fill in some spaces. (See pages 168-169.)

REMEMBER, **PEN.**

	Name of Element	Symbol	Atomic Number	Number of Protons	Number of Electrons
1.	Oxygen				
2.			20		
3.				53	
4.					11
5.				47	
6.	Sulfur				
7.			80		
8.					26

Now fill in the chart.

	Name of Element	Symbol	Number of Protons	Number of Neutrons	Atomic Weight
5.	Neon		10		20
6.	Cobalt		27		59
7.	Gold		79	118	
8.	Chlorine			18	35
9.	Thorium		90	142	
10.	Lead			125	207
11.	Nickel		28		59
12.	Chromium			28	52
13.	Silicon		14		28
14.	Tungsten		74	110	

ROUNDING OFF ATOMIC WEIGHTS

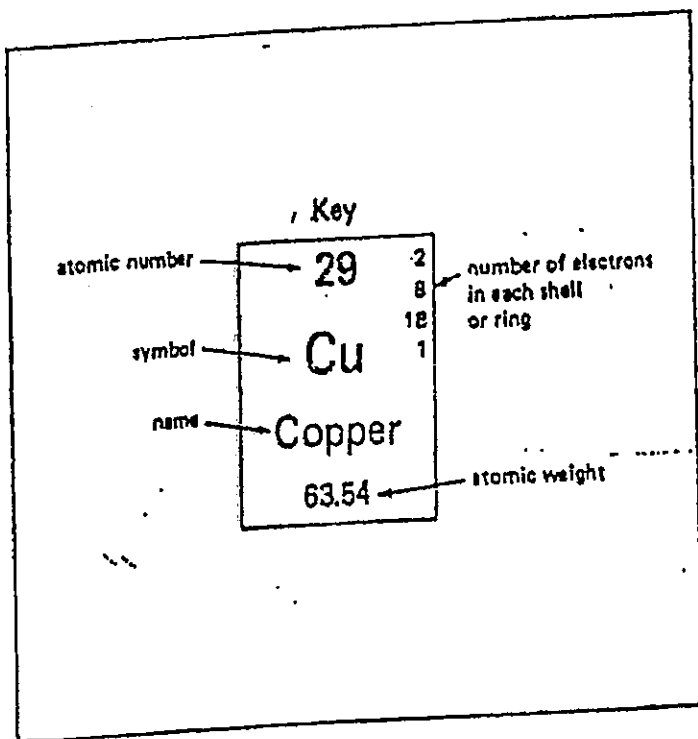


Figure C

This is the "key" to reading the full Periodic Table on pages 168-169.

Copper has been chosen. Any other element could have been chosen.

Notice that the atomic weight of copper is 63.54. This is a whole number followed by two decimals. Most atomic weights have decimals.

In the classroom, we do not use decimals. We round off the decimal to its nearest whole number. If the decimal is .5 or greater we round off to the next higher number. If the decimal is less than .5 we round down.

Every atom has weight. The weight of an atom is called its atomic weight. The atomic weight is not an exact scale reading of weight—like grams or ounces. It is a way of comparing the weight of one atom against the weight of another atom.

The weight of an atom is the weight of its nucleus. A nucleus contains protons and neutrons. Therefore the number of protons plus the number of neutrons gives us the atomic weight of an atom. Electrons are so light, that they are not counted in the atomic weight.

- Each proton is given a weight of one.
- Each neutron is given a weight of one.

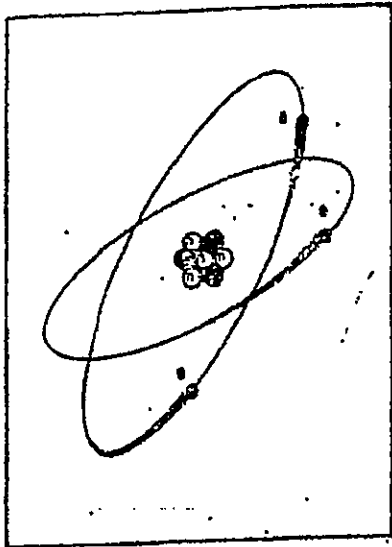


Figure B

For example, a lithium atom has 3 protons and 4 neutrons. The atomic weight of a lithium atom is 7 ($3 + 4 = 7$).

- Each different kind of atom has its own number of protons.
- Each different kind of atom has its own atomic weight.

Answer these questions.

1. What is the center part of the atom called? _____
2. What parts make up the nucleus? _____
3. The weight of an atom is the weight of its _____ and _____.
4. Fill in the blanks. ATOMIC WEIGHT = _____ + _____.

	Element	Listed Atomic Weight	Rounded-off Atomic Weight
1.	Copper	63.54	64
2.	Calcium	40.08	40
3.	Fluorine	18.99	
4.	Strontium	87.62	
5.	Barium	137.34	
6.	Titanium	47.90	
7.	Magnesium	24.31	
8.	Argon	39.94	
9.	Erbium	167.26	
10.	Zirconium	91.22	

WHAT DO THE PICTURES SHOW?

Figures D and E show atoms. Study each figure and answer the questions about each.

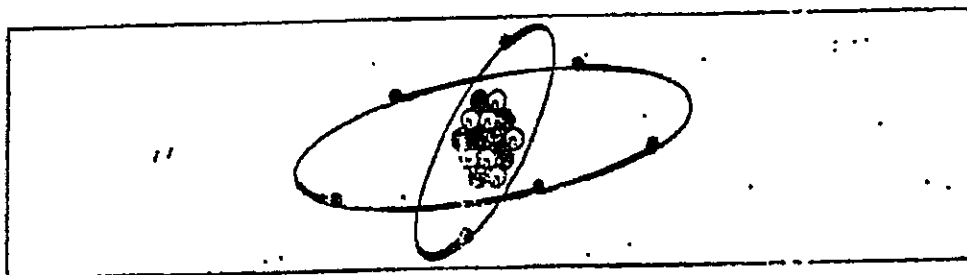


Figure D

- How many protons does the atom in Figure D have? _____
- How many neutrons? _____
- How many electrons? _____
- What is the atomic weight of this atom? _____
- What is the name and symbol of this atom? Name _____
Symbol _____

(Check with your Periodic Table.)

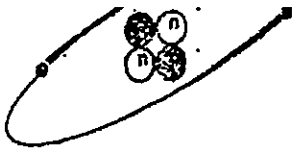


Figure E

6. How many protons does the atom in Figure E have? _____
7. How many neutrons? _____
8. How many electrons? _____
9. What is the atomic weight of this atom? _____
10. What is the name and symbol of this atom? Name _____
Symbol _____

COMPLETING SENTENCES

Complete the sentences with the choices below. Two of these may be used twice. Two of these may be used three times.

- | | | |
|---------------|-----------|----------|
| plus | no | neutrons |
| atomic number | atoms | 1 |
| circle | electrons | minus |
| protons | | |

1. All matter is made up of tiny _____.
2. The three main parts of an atom are _____, and _____.
3. A nucleus is made up of _____ and _____.
4. Electrons _____ the nucleus.
5. A proton has a _____ charge; an electron has a _____ charge; a neutron has _____ charge.
6. An entire atom has _____ charge.
7. Protons = electrons = _____.
8. The atomic weight of an atom is the weight of its _____ and _____.
9. Each proton or neutron is given a weight of _____.
10. In figuring atomic weight, we do not count the weight of an atom's _____.