

LESSON

12

What is the difference between atomic mass and atomic number?

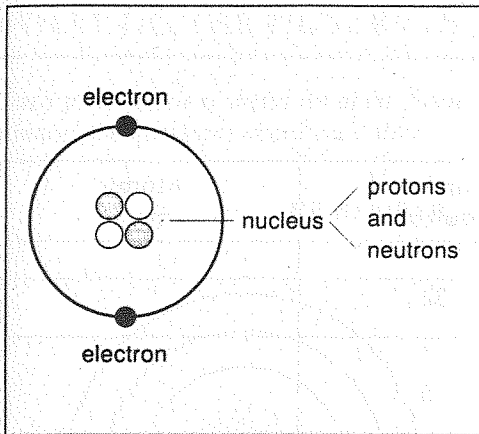
Atoms of different kinds of matter have different numbers of protons and electrons. When scientists talk about different kinds of matter, they often refer to the matter by its atomic number. The **atomic number** of an atom is the number of protons (and usually, the number of electrons) in the atom.

Scientists also describe atoms by their atomic mass. Scientists do not measure the mass of atoms in grams or ounces. They measure the mass of atoms in **atomic mass units (a.m.u.)**. You can figure out the atomic mass of an atom by using the following information:

- Each proton has a mass of 1 a.m.u.
- Each neutron has a mass of 1 a.m.u.
- The **atomic mass** of an atom is the total number of protons and neutrons in the nucleus of the atom.

What about the electrons? Don't they count? Electrons are very light. Their mass is not counted in the atomic mass.

Sometimes two atoms of the same kind of matter do not have the same atomic mass. How is this possible? They have a different number of neutrons. All atoms of the same kind of matter always have the same number of protons. Thus, they all have the same atomic number. Atoms of the same kind of matter that have different numbers of neutrons are called **isotopes** [Y-suh-tohps].



NUCLEUS
 {
 PROTONS + NEUTRONS = ATOMIC MASS

Each proton has a value of one.

Each neutron has a value of one.

Figure A

ATOMIC MASS, PLEASE

The diagrams below show six different atoms. Look at each one closely. Find the atomic mass of each atom. Write your answer in the space below the diagram.

Remember: atomic mass = protons + neutrons

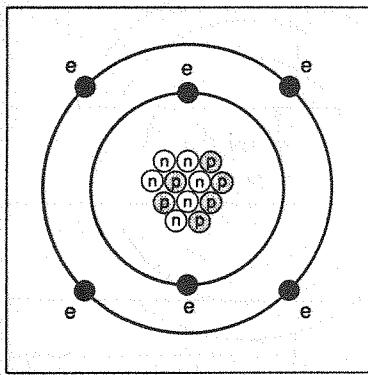


Figure B

Atomic Mass _____

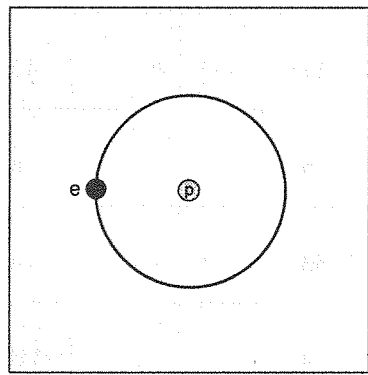


Figure C

Atomic Mass _____

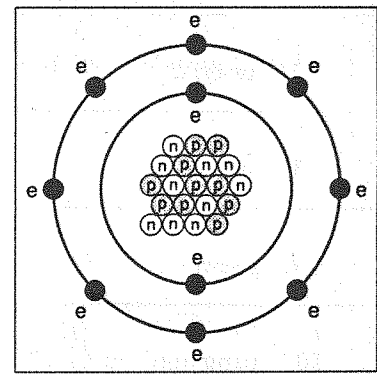


Figure D

Atomic Mass _____

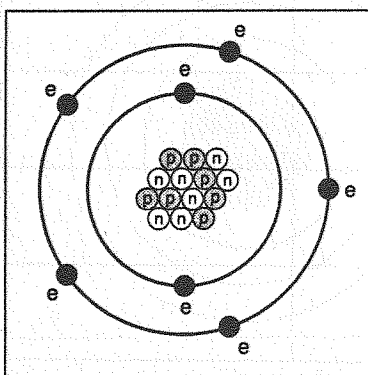


Figure E

Atomic Mass _____

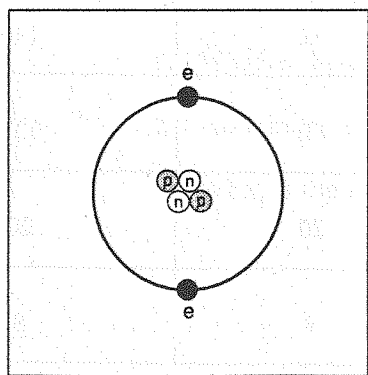


Figure F

Atomic Mass _____

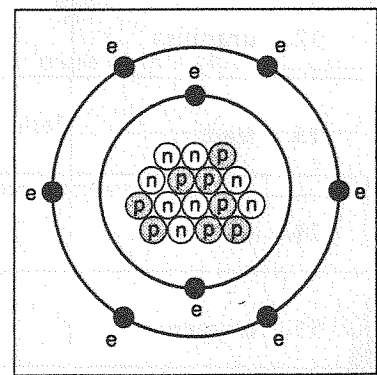


Figure G

Atomic Mass _____

COMPLETE THE CHART

Complete the chart by filling in the missing information.

Name of element	Number of protons	Number of neutrons	Atomic mass
1. cobalt	27	32	
2. zinc	30	35	
3. krypton	36	48	
4. hydrogen	1	0	
5. potassium	19	20	
6. gold	79	118	
7. arsenic	33	42	
8. sulfur	16	16	
9. iodine	53	74	
10. tungsten	74	110	
11. silver	47	61	
12. uranium	92	146	
13. lead	82	125	
14. calcium	20	20	
15. oxygen	8	8	

WHAT DO THE PICTURES SHOW?

Each picture below shows an atom. Some information is given about each atom. Use this information to answer the questions about each atom.

REMEMBER, protons + neutrons = atomic mass

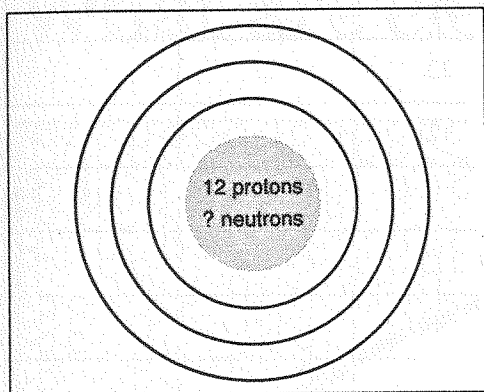


Figure H Atomic mass = 24

1. How many neutrons does this atom have?

2. How many electrons? _____

3. What is the atomic number? _____

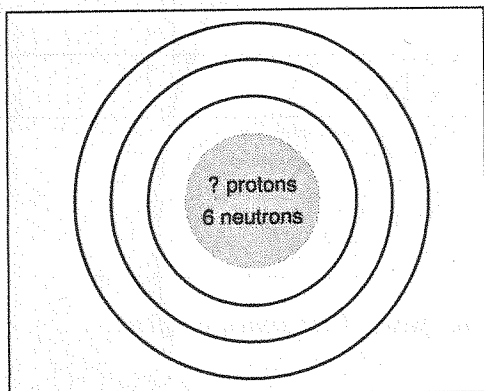


Figure I Atomic mass = 11

1. How many protons does this atom have?

2. How many electrons? _____

3. What is the atomic number? _____

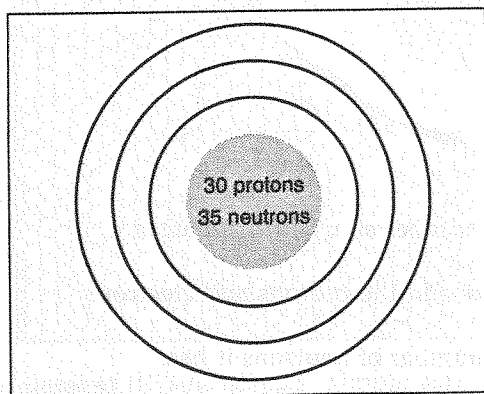


Figure J Atomic mass = ?

1. What is the atomic mass of this atom? _____

2. How many electrons? _____

3. What is the atomic number? _____

COMPLETE THE CHART

Complete the chart by filling in the missing information.

	Kind of Matter	Protons	Neutrons	Atomic Mass	Electrons	Atomic Number
1.	Oxygen	8		16	8	8
2.	Sodium			23	11	
3.	Carbon		6	12		
4.	Phosphorus		16			15
5.	Potassium	19	20			
6.	Iron	26		56		
7.	Copper	29	35	64		
8.	Chlorine			35		17
9.	Boron	5	6			
10.	Aluminum		14	27		

TRUE OR FALSE

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

- _____ 1. An atom has no mass.
- _____ 2. An electron is the largest part of an atom.
- _____ 3. All atoms have the same mass.
- _____ 4. All protons have the same mass.
- _____ 5. All oxygen atoms have the same mass.
- _____ 6. An oxygen atom has the same atomic number as a hydrogen atom.
- _____ 7. To find the atomic mass of an atom, we add the protons and electrons.
- _____ 8. The atomic number of an atom is the number of neutrons it has.
- _____ 9. Atoms of the same kind that have different numbers of neutrons are called isotopes.
- _____ 10. Atomic number = atomic mass.