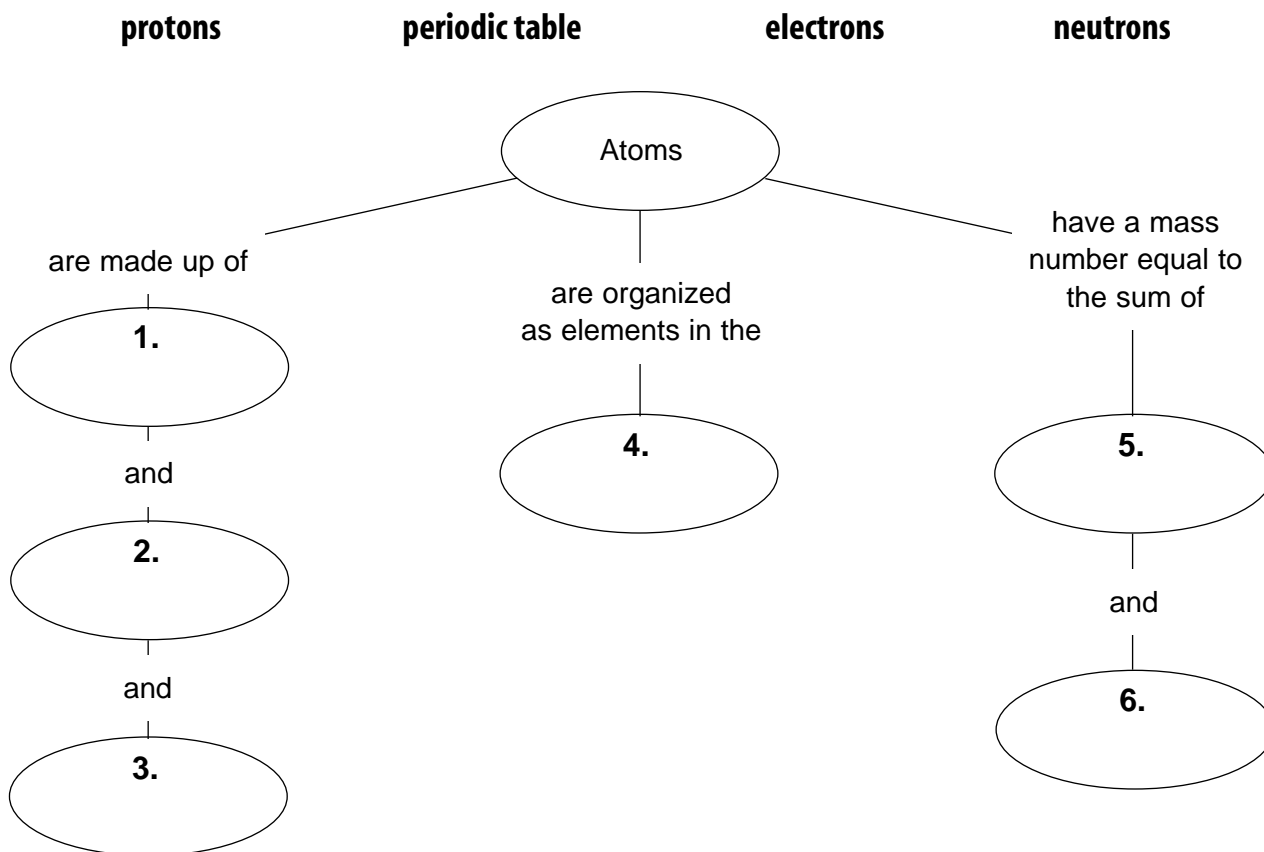




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# Overview Properties of Atoms and the Periodic Table

**Directions:** Complete the concept map using the terms in the list below. Terms can be used more than once.



**Directions:** complete the following sentences by underlining the correct words in parentheses.

7. An element is matter that is composed of one type of (atom/quark).
8. The unit of measurement used for atomic particles is the (atom size/atomic mass unit).
9. Atoms of the same element that have different numbers of neutrons are called (isotopes/electron clouds).
10. In the periodic table, elements are arranged by increasing atomic (power/number).
11. An electron dot diagram uses the symbol of an element and dots to represent the (quarks/electrons) in the outer energy level.



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## Section 1 ■ Structure of the Atom

## Section 2 ■ Masses of Atoms

**Directions:** Use the terms below to complete the following paragraphs about atoms, atomic mass, and isotopes. Terms may be used more than once.

**six**                      **number**                      **electrons**                      **isotopes**                      **electron cloud**  
**neutron(s)**                      **proton(s)**                      **mass**                      **quarks**                      **six protons**

The electron has very little mass compared to the 1. \_\_\_\_\_ or 2. \_\_\_\_\_. The mass of the atom depends on the nucleus and how many 3. \_\_\_\_\_ and 4. \_\_\_\_\_ it has. The sum of the protons and neutrons is the mass 5. \_\_\_\_\_ of an atom. The number of neutrons in an atom can be found by subtracting the atomic number from the 6. \_\_\_\_\_ number. The mass of the atom is so small that there is a measure called the atomic 7. \_\_\_\_\_ unit designated by amu. 8. \_\_\_\_\_ and 9. \_\_\_\_\_ make up the nucleus and are made up of 10. \_\_\_\_\_. There are 11. \_\_\_\_\_ uniquely different quarks. 12. \_\_\_\_\_ are found in an area around the nucleus called the 13. \_\_\_\_\_. The nuclei of all atoms of a given element always have the same number of 14. \_\_\_\_\_. They will also have the same number of 15. \_\_\_\_\_ around the nucleus. Some atoms may have more or fewer 16. \_\_\_\_\_ than will other atoms of the same element. Atoms of the same element with different numbers of neutrons are called 17. \_\_\_\_\_. Every atom of carbon must contain 18. \_\_\_\_\_ but some contain six neutrons and others have eight neutrons.



# Directed Reading for Content Mastery

## Section 3 ■ The Periodic Table

Periodic Table of the Elements

**Key**

1—New designation

6  
C  
Carbon  
12.011

← Atomic number  
← Element's symbol  
← Element's name  
← Atomic mass

1 H Hydrogen 1.008	2 He Helium 4.003																
3 Li Lithium 6.941	4 Be Beryllium 9.0122																
11 Na Sodium 22.990	12 Mg Magnesium 24.305	3	4	5	6	7	8	9	10	11	12	13 Al Aluminum 26.98	14 Si Silicon 28.086	15 P Phosphorus 30.974	16 S Sulfur 32.06	17 Cl Chlorine 35.453	18 Ar Argon 39.948
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.956	22 Ti Titanium 47.88	23 V Vanadium 50.94	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.847	27 Co Cobalt 58.9332	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.39	31 Ga Gallium 69.72	32 Ge Germanium 72.61	33 As Arsenic 74.922	34 Se Selenium 78.96	35 Br Bromine 79.904	36 Kr Krypton 83.80
37 Rb Rubidium 85.468	38 Sr Strontium 87.62	39 Y Yttrium 88.9059	40 Zr Zirconium 91.224	41 Nb Niobium 92.91	42 Mo Molybdenum 95.94	43 Tc Technetium 97.907	44 Ru Ruthenium 101.07	45 Rh Rhodium 102.906	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.41	49 In Indium 114.82	50 Sn Tin 118.710	51 Sb Antimony 121.757	52 Te Tellurium 127.60	53 I Iodine 126.904	54 Xe Xenon 131.29
55 Cs Cesium 132.905	56 Ba Barium 137.327	57 La Lanthanum 138.906	72 Hf Hafnium 178.49	73 Ta Tantalum 180.95	74 W Tungsten 183.85	75 Re Rhenium 186.207	76 Os Osmium 190.2	77 Ir Iridium 192.22	78 Pt Platinum 195.08	79 Au Gold 196.967	80 Hg Mercury 200.59	81 Tl Thallium 204.383	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium 208.982	85 At Astatine 209.987	86 Rn Radon 222.018
87 Fr Francium 223.020	88 Ra Radium 226.025	89 Ac Actinium 227.028	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (262)	108 Hs Hassium (265)	109 Mt Meitnerium (266)	110 Uun Ununnilium (269)	111 Uuu Unununium (272)	112 Uub Unbibium (277)		114 Uuq Ununquadium (285)		116 Uuh Ununhexium (289)		118 Uuo Ununoctium (293)

**Rare-Earth Elements**

58 Ce Cerium 140.115	59 Pr Praseodymium 140.908	60 Nd Neodymium 144.24	61 Pm Promethium 144.913	62 Sm Samarium 150.36	63 Eu Europium 151.965	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.50	67 Ho Holmium 164.93	68 Er Erbium 167.26	69 Tm Thulium 168.934	70 Yb Ytterbium 173.04	71 Lu Lutetium 174.967
90 Th Thorium 232.038	91 Pa Protactinium 231.036	92 U Uranium 238.029	93 Np Neptunium 237.048	94 Pu Plutonium 244.064	95 Am Americium 243.061	96 Cm Curium 247.070	97 Bk Berkelium 247.070	98 Cf Californium 251.080	99 Es Einsteinium 252.083	100 Fm Fermium 257.095	101 Md Mendelevium 258.099	102 No Nobelium 259.101	103 Lr Lawrencium 260.105

Lanthanide Series

Actinide Series

**Directions:** Use the periodic table above to answer the following questions.

1. List two types of information that are given in each box of this periodic table.

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

b. \_\_\_\_\_

2. In this table, where are the metals located? \_\_\_\_\_

3. Where are the nonmetals located? \_\_\_\_\_

4. What are the elements in Groups 3 through 12 called? \_\_\_\_\_

5. What are the elements called that are next to the staircase-shaped line on the right side of the table? \_\_\_\_\_

6. What do we call the letter or letters that represents an element?  
\_\_\_\_\_

7. How many elements are included in the modern periodic table? \_\_\_\_\_

8. What name is given to the elements in Group 18? \_\_\_\_\_



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## Key Terms

### Properties of Atoms and the Periodic Table

**Directions:** Match the term in Column II with the definition in Column I. Write the letter of the correct term in the blank at the left.

#### Column I

- \_\_\_\_\_ 1. sum of the number of protons and neutrons in the nucleus
- \_\_\_\_\_ 2. region around the nucleus where the electrons are found
- \_\_\_\_\_ 3. positively charged center of an atom
- \_\_\_\_\_ 4. vertical column in the periodic table
- \_\_\_\_\_ 5. neutral particles in the nucleus of an atom
- \_\_\_\_\_ 6. weighted average mass of the mixture of its isotopes
- \_\_\_\_\_ 7. positively charged particles in an atom
- \_\_\_\_\_ 8. table of the elements arranged according to repeated changes in properties
- \_\_\_\_\_ 9. represents the electrons in the outer energy level of an element
- \_\_\_\_\_ 10. negatively charged particles in an atom
- \_\_\_\_\_ 11. atoms of the same element that have different numbers of neutrons
- \_\_\_\_\_ 12. number of protons in an atom's nucleus
- \_\_\_\_\_ 13. horizontal row in the periodic table
- \_\_\_\_\_ 14. smallest known particle that makes up protons and neutrons
- \_\_\_\_\_ 15. the smallest peice of matter that still retains the properties of the element
- \_\_\_\_\_ 16. developed an early periodic chart
- \_\_\_\_\_ 17. approximately  $1.67 \times 10^{-24}\text{g}$

#### Column II

- a. nucleus
- b. electrons
- c. protons
- d. neutrons
- e. quark
- f. atomic number
- g. mass number
- h. isotope
- i. average atomic mass
- j. electron cloud
- k. periodic table
- l. atom
- m. atomic mass unit
- n. group
- o. electron dot diagram
- p. period
- q. Dmitri Mendeleev