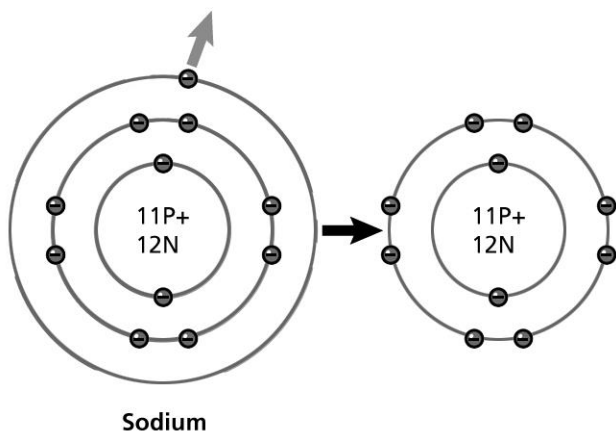


Atoms and the Periodic Table

Key Concepts

Choose the letter of the best answer.

1. When an electric current passes through water (H_2O), it can break apart into hydrogen and oxygen gases. What must be true about this chemical change?
 - A. The atoms in water are destroyed and new atoms form.
 - B. The gases formed have the same properties as the water.
 - C. Water is made up of different atoms than the ones that form hydrogen and oxygen gas.
 - D. The number of hydrogen and carbon atoms must be the same before and after the change.
2. What is the mass number of an atom that has 4 protons, 4 electrons, and 5 neutrons?
 - A. 4
 - B. 5
 - C. 9
 - D. 13
3. The diagram shows the formation of a sodium ion.



Which of the following atoms might accept the electron from sodium?

- A. carbon (C)
- B. chlorine (Cl)
- C. copper (Cu)
- D. magnesium (Mg)

Name _____ Date _____

4. Which group of the periodic table has a complete set of valence electrons?
- group 1, alkali metals
 - group 4, carbon group
 - group 7, halogens
 - group 8, noble gases
5. The segment of the periodic table below shows the elements in Groups 1 through 9.

Part of the Periodic Table

	1								
1	1 H 1.008								
2	3 Li 6.941	4 Be 9.012							
3	11 Na 22.99	12 Mg 24.31							
			3	4	5	6	7	8	9
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.86	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc (98)	44 Ru 101.1	45 Rh 102.9
6	55 Cs 132.9	56 Ba 137.3	57 La 138.9	72 Hf 178.5	73 Ta 180.9	74 W 183.9	75 Re 186.2	76 Os 190.2	77 Ir 192.2
7	87 Fr (223)	88 Ra (226)	89 Ac (227)	104 Rf (263)	105 Db (262)	106 Sg (266)	107 Bh (267)	108 Hs (277)	109 Mt (268)

What do the elements Mg, Ca, and Sr have in common?

- The have the same atomic mass.
 - They have the same mass number.
 - They have the same atomic number.
 - They have the same number of valence electrons.
6. Covalent bonds form differently than ionic bonds. How is the difference observed in the properties of covalent substances?
- Covalent substances have lower solubility in water.
 - Covalent substances have higher melting and boiling points.
 - Covalent substances are brittle and will likely shatter if dropped.
 - Covalent substances are better conductors of electric current in solution.

Name _____ Date _____

7. The current model of the atom shows electrons in a cloud surrounding the nucleus. How does the electron cloud model differ from the Bohr model?
- The electron cloud shows there is not empty space in an atom.
 - The electron cloud shows that electrons do not have a negative charge.
 - The electron cloud shows a region in which electrons are likely to be found.
 - The cloud shows that all the electrons combine together to form one mass.

8. The diagram shows a portion of the periodic table.

					18
					2
					He
13	14	15	16	17	18
5	6	7	8	9	10
B	C	N	O	F	Ne
13	14	15	16	17	18
Al	Si	P	S	Cl	Ar
31	32	33	34	35	36
Ga	Ge	As	Se	Br	Kr
49	50	51	52	53	54
In	Sn	Sb	Te	I	Xe
81	82	83	84	85	86
Tl	Pb	Bi	Po	At	Rn

What property makes some of the shaded elements useful in electronic equipment such as computers?

- They are brittle and can break into small pieces easily.
 - They are gases at room temperature, so they are light in weight.
 - They have a complete set of valence electrons and do not react.
 - They can be made to conduct electricity under certain conditions.
9. Atoms are the building blocks of all matter. Which of the following are the building blocks of atoms?
- elements
 - molecules
 - pure substances
 - subatomic particles
10. Metals are often used to make pots and pans for cooking. Which property of metals makes them useful for this purpose?
- They are shiny.
 - They are brittle.
 - They can be drawn into wires.
 - They are good conductors of thermal energy.

Name _____ Date _____

11. Metals contain free electrons. Why aren't metals negatively charged as a result?
- A. The electrons easily flow out of the metal onto other surfaces.
 - B. Metallic bonds pull the charge away from the electrons and toward the metal ions.
 - C. The negative charge of the electrons is balanced by the positive charge of the metal ions.
 - D. Electrons lose their negative charge as soon as they are separated from their metal atoms.
12. How are Bohr models of atoms useful if they do not show the true arrangement of particles?
- A. They are useful for predicting how atoms will bond.
 - B. They are useful for measuring the masses of electrons.
 - C. They are useful for showing how energy is stored in the nuclei of atoms.
 - D. They are useful for identifying the specific places in which electrons are located.

Name _____ Date _____

Critical Thinking**Answer the following questions in the space provided.**

13. The diagram below shows a portion of the periodic table.

1 H	2
3 Li	4 Be
11 Na	12 Mg
19 K	20 Ca
37 Rb	38 Sr
55 Cs	56 Ba
87 Fr	88 Ra

Based on the periodic table, how is the number of valence electrons different for potassium (K) than it is for calcium (Ca)? Explain how you know.

Use the numbers of valence electrons to explain how atoms of each element could form bonds with other atoms.

Name _____ Date _____

Extended Response**Answer the following questions in the space provided.**

14. Atoms are made up of smaller particles.

How does the structure of an atom relate to its atomic number?

How does the structure of an atom relate to its mass number?

Where is most of the mass of an atom concentrated? Explain.

Why are atoms electrically neutral if they contain charged particles?
