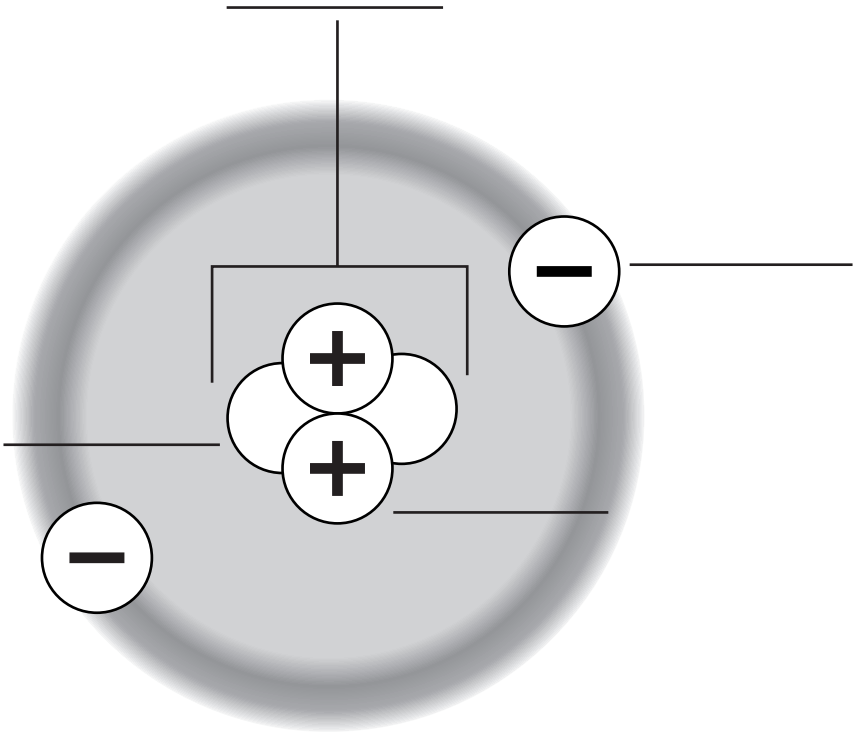
Name_____ Class_____ Date _____

Protons, Neutrons, and Electrons

The diagram shows a model of an atom. It shows the nucleus, protons, neutrons, and electrons. The diagram is not to scale.

Label a proton, *a* neutron, *an* electron, *and the* nucleus. *Then, color the protons green, the neutrons purple, and the electrons orange.*



Helium Atom

Use the diagram to answer the questions.

1. What are the negatively charged electrons attracted to?

_____

_____

2. Which of the following describes the charge of a neutron? Circle the correct answer.

positive negative no charge

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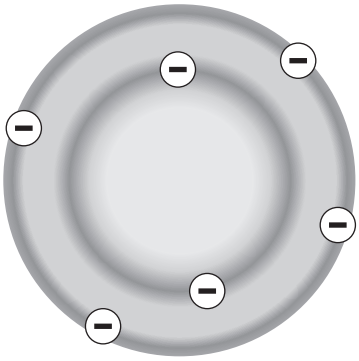
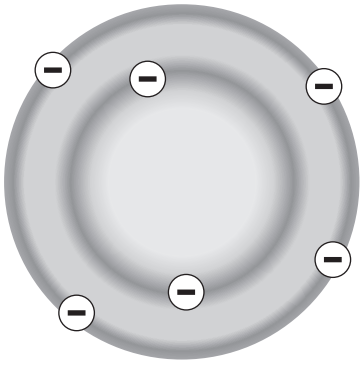
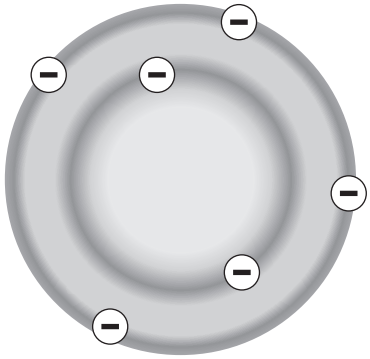
Isotopes

Isotopes are atoms of an element that have the same number of protons but a different number of neutrons. The number of protons plus the number of neutrons in an isotope is called its mass number. Carbon-12, for example, has 6 protons and 6 neutrons so its mass number is 12.

Draw the correct number of protons and neutrons for each isotope. Indicate protons with a plus sign (+). Write the number of protons and neutrons in each isotope.

Isotopes of Carbon		
Nonradioactive carbon-12	**Nonradioactive carbon-13**	**Radioactive carbon-14**
		
6 electrons	6 electrons	6 electrons
6 protons	_____ protons	_____ protons
6 neutrons	_____ neutrons	_____ neutrons

Use the diagram to answer the questions.

1. Name one difference between carbon-12 and carbon-14.

_____

_____

2. Name one way in which carbon-12 and carbon-14 are alike.

_____

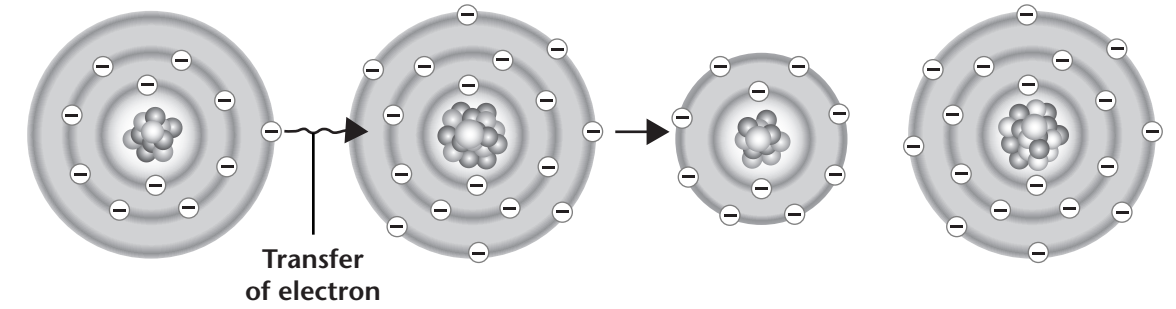
_____

Name_____ Class_____ Date _____

Ionic Bonds

In an ionic bond, one atom transfers one or more electrons to another atom. The atom that loses the electron(s) becomes a positively charged ion. The atom that gains the electron(s) becomes a negatively charged ion.

Count the electrons in each atom or ion. Write this number in the space provided. Then, determine the charge of the atom or ion.



Sodium atom (Na)		Chlorine atom (Cl)		Sodium ion (Na^+)		Chloride ion (Cl^-)	
Protons	+11	Protons	+17	Protons	+11	Protons	+17
Electrons	–11	Electrons		Electrons		Electrons	
Charge	0	Charge		Charge		Charge	

Use the diagram to answer the questions. Circle the correct answer.

1. Which of these is negatively charged?

sodium atom chloride ion

2. Which of these is positively charged?

sodium ion chlorine atom

3. The diagram above shows the formation of sodium chloride. What kind of substance is sodium chloride?

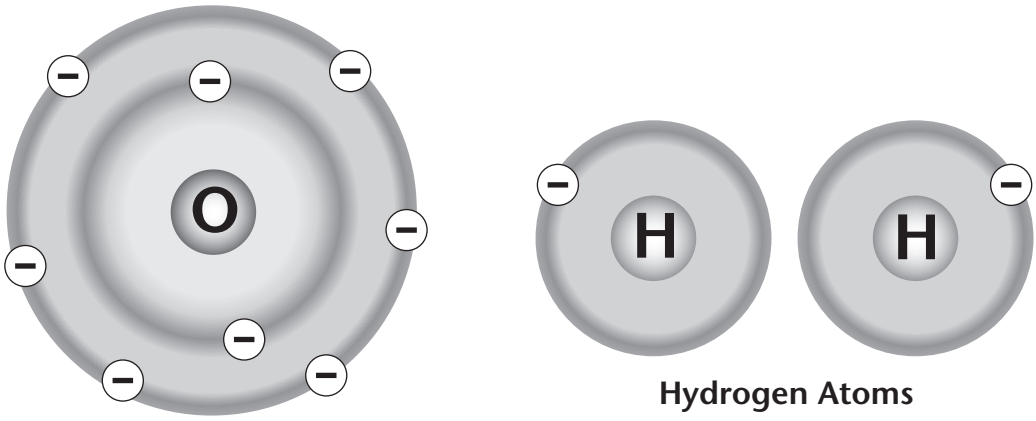
a compound an element

Name_____ Class_____ Date _____

Covalent Bonds

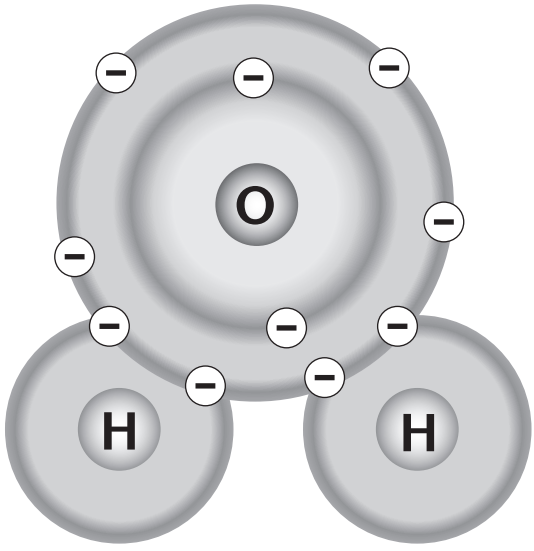
In a covalent bond, two atoms share electrons. The electrons move in the orbitals of both atoms. In a single covalent bond, they share two electrons. One oxygen atom can form single covalent bonds with two hydrogen atoms to make water.

Color the electrons in the oxygen atom orange. Use purple to fill in the electrons in both hydrogen atoms.



Hydrogen Atoms

In the water molecule circle the shared electrons.



Water

Use the illustrations to answer the question.

1. What is the name of the structure formed when atoms are joined by covalent bonds?

_____

Name_____ Class_____ Date _____

Types of Molecules

Living things need organic compounds called carbohydrates, lipids, nucleic acids, and proteins.

Fill in the missing cells in the table. Identify the function of the molecule or the main components (types of atoms) that make up the molecule. The first row has been done for you.

Type of Molecule	Components of Molecule	Function of Molecule
carbohydrate	carbon, hydrogen, and oxygen	main source of energy; structural purposes
lipid	mostly carbon and hydrogen	
nucleic acid	hydrogen, oxygen, nitrogen, carbon, and phosphorus	
protein		controls rate of reactions; transports substances into or out of cell; fights disease

Use the table to answer the question.

1. Which of the types of molecules in the table contain carbon?

_____

_____