

Name _____ **answers** _____ Date _____

IONIC BOND

Follow the instructions to go through the simulation. Respond to the questions and prompts in the orange boxes.

| | | |
|-------------------|------------|------------------|
| chemical family | ionic bond | octet rule |
| electron affinity | metal | shell |
| ion | nonmetal | valence electron |

1. Each atom consists of a central nucleus and several shells that contain electrons. The outermost electrons are called valence electrons. (Inner electrons are not shown.)

How many valence electrons does each atom have?

sodium

1

chlorine

7

2. Click Pause (). Elements can be classified as metals and nonmetals. Metals do not hold on to their valence electrons very tightly, while nonmetals hold their electrons tightly. Electron affinity is a measure of how tightly the valence electrons are held.

a. Try pulling an electron away from each atom. Based on this experiment, which atom is a metal?

sodium

which is non-metal

chlorine

b. Try moving an electron from the metal to the nonmetal. What happens?

Sodium becomes a cation, and chlorine becomes an anion

Introduction: Some of the particles that make up atoms have an electrical charge. Electrons are negatively charged, while protons are positively charged. Particles with opposite charges (+ and -) attract, while particles with the same charge (+ and + or - and -) repel.

Question: What happens when atoms gain or lose electrons?

1. Count: Electrons move around the nucleus of atoms in specific shells, shown by the rings around the atoms in the Gizmo. The first ring holds two electrons, and the second holds eight. (Electrons in the inner rings are not shown; you can assume these rings are full.)

A. Observe the sodium and chlorine atoms. Assuming that the inner rings are full of electrons, how many electrons are there total in each atom?

sodium

11 electrons

chlorine

17 electrons

B. Each atom is neutrally charged, which means that each atom has the same number of protons and electrons. Based on this, how many protons are in each atom?

sodium

11 protons

chlorine

17 protons