

**Note-taking
Worksheet****Elements and Their Properties****Section 1 Metals****A. Properties of _____**

1. _____ heat and electricity
2. _____—reflect light well
3. _____—can be hammered or rolled into sheets
4. _____—can be drawn into wires
5. _____—combine with nonmetals by losing electrons
6. _____—positively charged metallic ions are surrounded by a cloud of electrons; ions are in sliding layers and electrons are weakly held; readily form ionic bonds with nonmetals

B. The _____ Metals—softer and more reactive than other metals

1. Highly _____ with oxygen and water; don't occur naturally as elemental forms
2. Combine readily with other elements due to _____ electron in outer energy level
3. _____ uses
 - a. Human health—_____, _____, and _____ compounds
 - b. Photocells—some depend on _____ or _____
 - c. Francium—a _____ **element** which breaks down giving off particles and energy

C. The _____ Metals—not found naturally in elemental form; _____ electrons in outer energy level

1. Applications—_____ and magnesium found in fireworks; _____ in vehicles, ladders, and bats; _____ in statues and countertops
2. Human body—_____ in bones; _____ in disease diagnoses; radium formerly used in cancer treatment

D. _____ Elements—they often occur in nature as uncombined elements

1. Typically form colored compounds—_____ found in rubies and emeralds

Note-taking Worksheet (continued)

2. Iron _____—iron, cobalt, and nickel
 - a. _____—most widely used of all metals and main ingredient in _____; abundant in Earth's crust
 - b. _____ and nickel—used in some steels
 - c. _____ used to coat other metals
 3. Copper, silver, gold—_____ metals since once were commonly used in coins
 - a. _____—used in electric wiring because it is a superior electricity conductor
 - b. _____—used in photographic film and paper; jewelry
 - c. _____—used in jewelry
 4. Zinc, cadmium, mercury—group _____ on periodic table
 - a. Zinc and _____—often used to coat or plate other metals
 - b. _____—only room temperature liquid metal; used in thermometers and batteries
- E. The _____ Metals—seem disconnected from the rest of periodic tables
1. The _____—include _____, cerium, praseodymium, americium, europium, gadolinium, and terbium
 2. The _____—all are radioactive and _____; _____ is the best known.

Section 2 Nonmetals

- A. Properties of _____—usually gases or _____ solids at room temperature; are not malleable or _____; usually poor _____ of heat and electricity; usually not lustrous
1. _____ compounds—form when nonmetals gain _____ from metals and become _____ ions
 2. _____ compounds—form when nonmetals share electrons with other _____
- B. _____—most common element in universe
1. A _____—two atoms of the same element in _____ bond
 2. Highly _____ element found mostly on Earth as part of water compound
- C. The _____—include bromine, iodine, _____, _____, and astatine
1. A _____ forms when a halogen gains one electron from a metal.

Note-taking Worksheet (continued)

2. Use of halogens
 - a. _____—disinfectant and bleach
 - b. _____—dyes in cosmetics
 - c. _____—hormone regulation
3. _____—a solid changes directly into a gas without first becoming a liquid
- D. The _____—exist as isolated, stable atoms
 1. _____—used in blimps and balloons
 2. Neon, _____, and _____—used in lights

Section 3 Mixed Groups

- A. Properties of _____—form ionic and covalent bonds; have some metallic and some nonmetallic properties; partial conduction gives them _____ characteristics.
- B. The _____—named for the first element in Group 13
 1. _____—used in water softening products, antiseptics, and fuels
 2. _____—abundant in Earth's crust; used in cans, foil wrap, pans, building materials, and aircraft
- C. The _____ Group—four electrons in outer energy level
 1. _____—found in coal, oil, natural gas, and foods
 2. Silicon occurs as an **allotrope**—same element with different molecular structures
 - a. _____ found in sand, rocks, and soil
 - b. The main component in _____, which conduct electricity under certain conditions
 3. _____—also used in semiconductors
 4. _____—used to coat other metals
 5. _____—toxic, so no longer used in paint
 6. Diamonds, graphite, and buckminsterfullerene are all _____ of carbon.
- D. The _____ Group—five electrons in outer energy level; tend to form covalent bonds
 1. _____—used to make nitrates and ammonia
 2. _____—used in water softeners, fertilizers, match heads, fine china
 3. _____ and _____ used with other metals to lower their melting points

Note-taking Worksheet (continued)

- E. The _____ Group or Group 16
1. _____—makes up 20% of air, is used by living things in respiration, and provides protection from Sun's radiation
 2. _____—used to form sulfides for pigment in paint
 3. _____—used in photocopiers and multivitamins
 4. _____ and _____ are also oxygen group elements.
- F. _____ Elements—scientists create elements not usually found on _____; synthetic elements usually disintegrate quickly.
1. Uranium can be made into _____ which forms plutonium when it disintegrates.
 2. Plutonium can be changed into _____, which is used in _____ detectors.
 3. _____ **elements** have more than _____ protons and are synthetic and unstable.
 - a. The study of synthesized elements helps scientists to understand the _____ holding the _____ together.
 - b. Element 114 lasted for _____ seconds.
 - c. It combined 114 protons with _____ neutrons.
 - d. It broke apart due to enormous _____ between the protons.