

Group 14 of the periodic table is often referred to as the carbon group. It is located in column 14 of the periodic table and houses the elements carbon, silicon, germanium, tin, lead, and ununquadium (C, Si, Ge, Sn, Pb, and Uuq, respectively). Each element in this group contains four valence electrons. A unique feature of this group is that the elements can form different anions and cations. Carbon forms a 4- anion whereas silicon and germanium form 4+ cations. Tin and lead can even form 2+ cations.

## Concept Definition

Study the primary definition of this concept, broken into general, basic, and advanced English definitions. Also see the mathematical definition and any requisite background information, such as conditions or previous definitions.

### Basic

These elements are all found in column 14 of the periodic table.

## Real World Application

Discover processes or disciplines in the natural or man-made worlds that employ the concept.

### Carbon

Many molecules contain carbon. In fact, there is an entire field of chemistry that deals with carbon-containing compounds, known as organic chemistry. Pure carbon can manifest in multiple forms such as diamonds, graphite and graphene, and Bucky balls (fullerenes). When mixed with iron, steel is formed. An isotope of carbon, carbon-14, is used to date organic specimens. Carbon is also used in semiconductors and resistance heaters. Carbon is the fundamental element in all Earth-based life.

### Silicon

Silicon is used in many common objects. Silicon is a major contributor to the make up of microchips and detergents. It is also found in sand and clay. Sand is then used to make glass. Silicon, like carbon, is an ingredient of steel.

## Germanium

Germanium is a bit less useful than the two elements listed above. It is primarily used in transistors due to its semi-conductor properties. It is also often used as a catalyst to drive chemical reactions. Germanium is also used in wide-angle camera lenses.

## Tin

Many people encounter tin every day. It is the main component of tin cans. Tin is used in alloys to form bronze, pewter, and type metal.

## Lead

Lead used to be a fairly common metal. Due to the fact that it has been found to be toxic, it is used very scarcely. It is typically found in batteries and shotgun shells. Old pipe and cables may be made of lead, as well as old paint. The ancient Romans discovered that lead would preserve wine.

## Vocabulary

Learn important vocabulary for this concept, including words that might appear in assessments (tests, quizzes, homework, etc.) that indicate the use of this concept.

Important Vocabulary	Term	Context
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