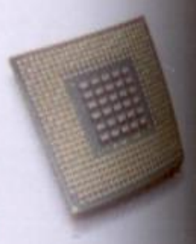
Reading 2



► You must have seen hundreds of pictures showing computer chips (like the one on the right) by now. As you know, they are made of silicon, the second most abundant element on earth. Silicon is incredibly versatile and durable. Can you explain the three underlined words in the previous sentences? They stand for the most important characteristics of silicon.

► Can you name **a)** some other electronic applications of silicon, **b)** some other everyday applications? Scan the text below to check your answers.

► Can you precisely describe where silicon is located in the periodic table? (Use expressions of location - see page 170 as well as Unit 13).

► **Activity 1: Fill in the gaps in the following table providing information about crystalline silicon. You can make use of the words listed below. Then, read the text and do the activities that follow:**

weight / symbol / pressure / period / boiling

group: 14 (carbon group)	**(1)** _____: 3
atomic number: 14	atomic **(2)** _____: 28.086
electron configuration: [Ne] $3s^2$ $3p^2$	electrons per shell: 2, 8, 4
melting point: 1,414°C	**(3)** _____point: 3,265°C
state at standard temperature & **(4)** _____: solid	density: 2.329 grams/cm^3
oxidation state: −4, +2, +4	appearance: crystalline, reflective with bluish-colored faces
(5) _____: Si	properties: hard, brittle

Silicon Basics

Introduction

Silicon is an essential part of the mineral world. It is second only to oxygen in abundance in the earth's crust, and the seventh most common element in the universe, being surpassed only by hydrogen, helium, oxygen, neon, nitrogen, and carbon. Thanks to its stable tetrahedral configuration and immense versatility, it is used in a vast array of applications, ranging from spaceships to synthetic body parts.

The name for silicon derives from the Latin *silex*, which means 'flint' or 'hard stone'. The element was discovered and described by Swedish chemist Jöns Jacob Berzelius in 1824. The most common compound of silicon, SiO_2, better known as *(beach) sand*, is the most abundant chemical compound in the earth's crust.

Properties

Silicon is a metalloid, having properties of both metals and non-metals. It is a member of group 14 in the periodic table (carbon group), with germanium, tin, lead, and flerovium below it, and carbon above it. It exists in two allotropic[3] forms. One allotrope is **crystalline silicon**, which is a hard, brittle, dark solid with a blue-gray metallic lustre and an octahedral structure similar to that of the diamond. Its atoms are fully bonded throughout, which makes it particularly strong and stable. The second allotrope, **amorphous silicon**, has no crystal structure and usually occurs as a powdery substance that is brown in color. Some of the atoms in amorphous silicon are not bonded to their maximum capacity, a fact that makes it flexible, but not especially strong.

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3. **allotrope:** any of the physical forms an element can exist in (n. **allotropy** or **allotropism**, adj. **allotropic**)