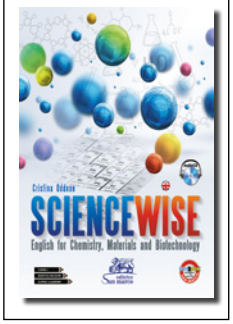
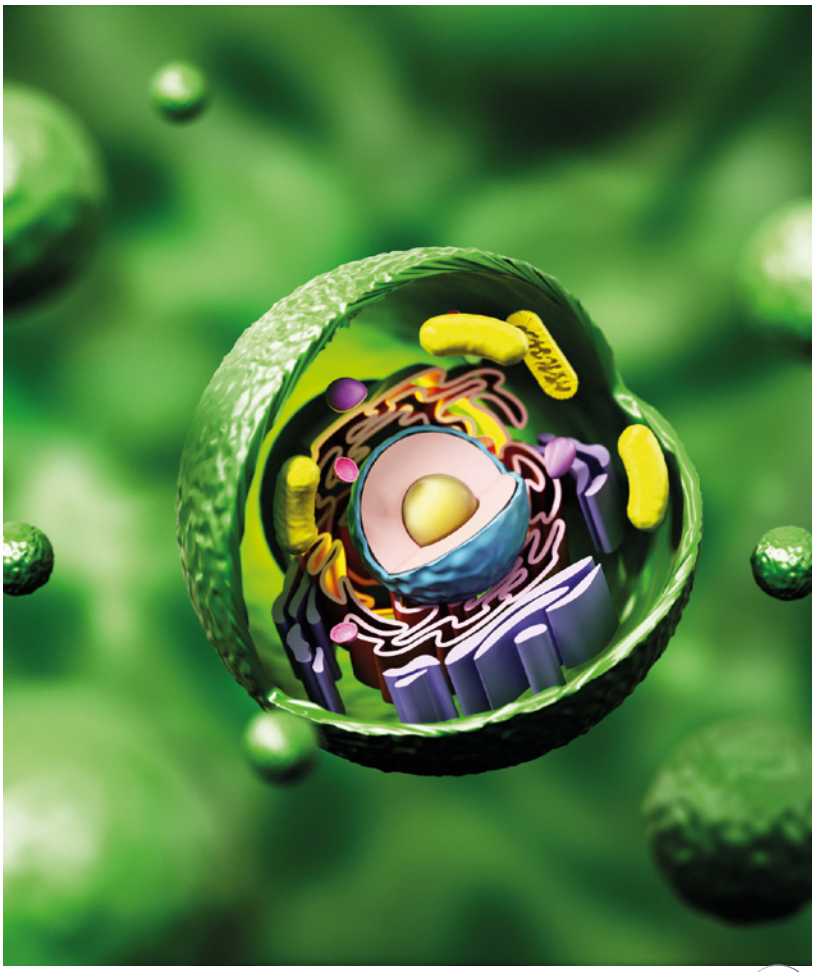
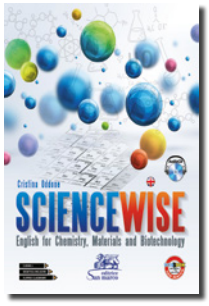


Exploring the units of life: the cell

Cells are the structural and functional units of all living organisms. Some organisms, such as bacteria, are **unicellular**, consisting of a single cell. Other organisms, such as humans, are **multicellular**, or have many cells. Each cell is an amazing world: it can take in nutrients, convert these nutrients into energy, carry out specialized functions, and reproduce as necessary. Even more amazing is that each cell stores its own set of instructions for carrying out each of these activities. There are two general categories of cells: prokaryotes and eukaryotes. The simplest of cells, and the first types of cells to evolve, were **prokaryotic cells** – organisms that lack a **nuclear membrane**, the membrane that surrounds the nucleus of a cell. **Bacteria** are the best known and most studied form of prokaryotic organisms, although the recent discovery of a second group of prokaryotes, called **archaea**, has provided evidence of a third cellular domain of life and new insights into the origin of life itself. Prokaryotic cells have three architectural regions: appendages called **flagella** and **pili** – proteins attached to the cell surface; a **cell envelope** consisting of a capsule, a **cell wall**, a **plasma membrane**, a **cytoplasmic region** that contains the **cell genome** (DNA) and ribosomes. **Eukaryotes** include fungi, animals, and plants as well as some unicellular organisms. Eukaryotic cells are about 10 times the size of a prokaryote and can be as much as 1000 times greater in volume. The major and extremely significant difference between prokaryotes and eukaryotes is that eukaryotic cells contain membrane-bound compartments in which specific metabolic activities take place. Most important among these is the presence of a nucleus, a membrane-delineated compartment that houses the DNA. It is this nucleus that gives the eukaryote its name. The outer lining of a eukaryotic cell is called the **plasma membrane**. This membrane serves to separate and protect a cell from its surrounding environment and is made mostly from a double layer of proteins and lipids, fat-like molecules. The **cytoskeleton** is an important, complex, and dynamic cell component. It acts to organize and maintain the cell shape; anchors organelles in place; helps during endocytosis, the uptake of external materials by a cell; and moves parts of the cell in processes of growth and motility. Inside the cell there is a large fluid-filled space called the **cytoplasm**. The human body contains many different organs, such as the heart, lung, and kidney, with each organ performing a different function. Cells also have a set of "little organs", called **organelles**, that are adapted and/or specialized for carrying out one or more vital functions. The nucleus is the most conspicuous organelle found in a eukaryotic cell. It houses the cell chromosomes and is the place where almost all DNA replication and RNA synthesis occur. The nucleus is spheroid in shape and separated from the cytoplasm by a membrane called the nuclear envelope.

Prokaryotes are unicellular organisms that do not develop or differentiate into multicellular forms. **Eukaryotes** are organisms whose cells contain complex structures enclosed within membranes. The name eukaryote means "true nucleus".





ACTIVITIES

1 *Complete the table with the missing information.*

	Prokaryote	Eukaryote
Organisms	Bacteria, archae	
Components		
DNA		In the nucleus
Other features		

2 *Read the text again and find questions for the following answers.*

1 .....
The functional and structural units of living organisms.

2 .....
Yes, they do.

3 .....
Prokaryotic cells.

4 .....
Three.

5 .....
No, they don't. Only eukaryotic cells have one.

6 .....
They take place in membrane-bound compartments.

7 .....
It is made up of a layer of proteins and lipids, fat-like molecules.

8 .....
It organizes and maintains the cell shape.

9 .....
A large, fluid-filled space within the cell membrane.

10 .....
They carry out one or more vital functions.

3 *Match each word to its definition.*

1	Amazing	A	Shelter, keep, or contain
2	Evolve	B	Something indicative, an outward sign
3	Lack	C	Causing wonder or astonishment
4	Evidence	D	Covering or coating
5	Insight	E	Take place
6	Appendage	F	Develop, achieve gradually
7	Lining	G	Understanding
8	Uptake	H	Be without, missing
9	House	I	Act of absorbing
10	Occur	J	Something added or attached

4 *What are the main differences between prokaryotic and eukaryotic cells? Discuss it in pairs then write a paragraph about it.*