

Information:

Date:

Life is organized on many different levels

A basic characteristic of life is a high degree of order. You can see it in the complex pattern of veins throughout a leaf or in the colourful pattern of a bird's plumage [Gefieder]. If you were to examine the vein of a leaf or the feather of a bird under a microscope, you would discover that biological order also exists at levels below what the unaided [nicht unterstützt] eye can see.

Biological organisation is based on a hierarchy of structural levels, each level building on the levels below it. Atoms, the chemical building blocks of all matter [Materie], are ordered into complex biological molecules such as proteins. The molecules of life are arranged into minute [winzig] structures called organelles, which are in turn [wiederum] the components [Bestandteil] of cells. Some organisms consist of single cells, but others, including plants and animals, are aggregates [Zusammensetzung] of many specialised types of cells. In such multicellular organisms, similar cells are grouped into tissues, and specific arrangements of different tissues form organs. For example, the nervous impulses that co-ordinate your movements are transmitted [übertragen] along specialised cells called neurones [Neuron, Nervenzelle]. The nervous tissue within your brain has billions of neurones organised into a communications network of spectacular complexity. The brain, however, is not pure nervous tissue; it is an organ built of many different tissues, including a type called connective tissue [Bindegewebe] that forms the protective [schützend] covering of the brain. The brain is itself part of the nervous system, which also includes the spinal cord [Rückenmark] and the many nerves that transmit messages between the spinal cord and other parts of the body. The nervous system is only one of several organ systems characteristic of humans and other complex animals.

In the hierarchy of biological organisation, there is something beyond the individual organism. A population is a localised group of organisms belonging to the same species [Art]; populations of species living in the same area make up a biological community; and community interactions that include nonliving features [Merkmal Charakteristikum] of the environment, such as soil and water, form an ecosystem.

Unfolding [Aufdecken, Klären] biological organisation at its many levels is fundamental to the study of life. Studying biology can follow such an organisation, beginning by looking at the chemistry of life and ending with the study of ecosystems and the biosphere, the sum of all Earth's ecosystems. However, we will also see that biological processes transcend [überschreiten] this hierarchy, with causes and effects at several organisational levels. For example, when a rattlesnake explodes from its coiled posture [Haltung, Stellung] and strikes a desert mouse, the "killer's" co-ordinated movements result from complex interactions at the molecular, cellular, tissue, and organ levels within the snake. But there are also causes and effects of this behaviour that operate on the level of the biological community where the snake and its prey [Beute] live; the feeding response is triggered [auslösen] when the snake senses and locates the nearby mouse. And such episodes of predation [Jagd, Beutezug] have an important impact [Einfluss] on the sizes of both the mouse and the rattlesnake populations. Most biologists specialise in the study of life at a particular level, but they gain broader perspective [Einsicht, Erkenntnis] when they integrate their discoveries with processes occurring at lower or higher levels. A narrow focus on a single level of biological organisation makes the fun and the power of biology less valuable.

Read the text carefully and be prepared to talk about "Life is organized on many different levels"!