

Chapter I. WILDLIFE, BIODIVERSITY AND FUNCTIONING

Theme 1. UNIFYING THE ANIMATE AND THE INANIMATE DESIGNS OF NATURE

Nature appeals, attracts and inspires simply because it is natural.

Alexander von Humboldt (1769-1859)
(outstanding German naturalist)



§ 1.1. ANIMATE NATURE

To be remembered! Animate nature has its own special beauty and amazing miracles, symbols and heroes, mind and emotions, humour and creativity. But animate nature is vulnerable. Therefore, you should know that all wildlife is interconnected with each other and with inanimate nature. This common connection is the main and only condition for the existence of nature. All living things HAVE THE RIGHT to life, freedom, and dignity.



MAIN CONTENT

Who and what makes up animate nature?

Non-cellular forms, cellular organisms, communities of different living things, and ecosystems are all living things. They are all united by a common name - **life forms**. The most diverse among them are cellular organisms or living bodies.

The inner essence of any life form is its structure and its life and behaviour. For example, a fancy orchid (see illustration) is characterised by its cellular structure, and its vital functions depend on photosynthesis.

All interactions and changes that occur in nature with the participation of living things are called **biological phenomena**. The development of leaves and flowers tucked away in plant buds for the winter, the evening or morning singing of birds, and the mysterious growth of mushrooms are just some examples of the diversity of these phenomena.

Biological phenomena differ from other phenomena in their complexity. They occur at the level of substances, cells, organisms, communities and ecosystems, i.e. at all levels of organisation of animate nature. Thus, **ANIMATE NATURE** is a part of nature, which includes various forms of life and biological phenomena.

BIOLOGY + Ecology The illustration shows orchid *Habenaria radiata*, or the Great Egret Flower, as it is called in China. Why does this plant, like all others, is of a green colour, and its strange flowers are white?



What features distinguish life forms from non-living bodies?

All life forms are called **biological systems**. Each of them has constituent elements that perform certain functions. Organisms are made up of cells, species are made up of organisms, etc. Biological systems are *open* because they constantly exchange energy, matter and information with their environment. The use of energy is what primarily distinguishes living things from non-living bodies. If sunlight falls on a stone, it will only get a little warmer, while living objects perceive free energy from the environment and convert it into their own energy for movement, growth or development. For example, a wheat seedling uses the sun's rays to carry out photosynthesis, and a lizard, having warmed up in a sunny place, actively moves and hunts.

Inanimate bodies break down over time. For example, boulders break down into smaller pieces when exposed to the sun, water or wind. But life forms can maintain the *orderliness* of their structure and processes.

BIODIVERSITY	
Life forms	Biological phenomena
I. Non-cellular life forms: Viruses	Molecular Cellular
II. Cellular organisms: Archaea. Bacteria. Eukaryotes	Organismal Population – speciesist
III. Superorganismal systems: Biological species. Ecological systems. Biosphere.	Ecosystem Biospheric

BIOLOGY

Among the many different properties of biological systems, three basic ones are called fundamental. They are self-replication, self-regulation and self-renewal.

Can a ball or a stone replicate itself? No. But a cheetah or a bacterium can give birth to their own kind and continue the existence of their species over time. Not only organisms but also most cells, their individual components and DNA molecules are capable of self-replication.

One of the most important characteristics of biosystems is regulating the flow of substances, energy and information to ensure sustainability in changing environmental conditions. Therefore, any living object can *self-regulate*. For example, a person's body temperature of +36.60C is maintained through balanced heat generation and release processes.

The next fundamental ability of the living is the ability for *self-renewal*. A leopard's wounds heal after a fight, birds renew their feathers after molting, and a lizard grows a new tail to replace its lost one. Can a ball be renewed after a football match? No, because it is an inanimate body.

Thus, the common characteristics of life forms are systemic organisation, orderliness, openness, self-regulation, self-replication and self-renewal.

BIOLOGY + Ecology *Why does a lizard drop its tail and still not die?*



Illus. Mother cheetah with her baby



What are the common features of all biological phenomena?

Despite their diversity, all biological phenomena have a number of common features. Knowing them makes understanding the changes that constantly occur in nature easier.

All biological phenomena involve living beings. "It is no exaggeration to say that the state of the planet, its ecosystems... is influenced by living things and determined by living organisms," V.I.Vernadskyi wrote. And not just organisms. Viruses influence the earth's climate, and ecosystems are responsible for soil formation, air and water purification.

All biological phenomena are diverse and complex. Transformations, changes, and processes in living nature involve molecules, cells, organisms, communities and ecosystems. However, these phenomena have a common basis - similar physical and chemical processes, the nature of which is determined at the level of molecules. For example, diffusion as a physical phenomenon determines gas exchange during respiration, absorption of substances during digestion.

All biological phenomena are interconnected. Nutrition ensures the supply of nutrients, while digestion and respiration ensure their assimilation. Reproduction of organisms is associated with the formation of cells, which begin development and growth.

All biological phenomena are interconnected with the environment. The basis of the relationship between biological systems and the environment is the flow of substances, energy and information. In the course of their life, living things are able to influence and change the conditions of existence in their environment.

BRIEF SUMMARY

- ▶ The components of animate nature are *life forms and biological phenomena*.
- ▶ The most general properties of life forms are *systemic organisation, openness, orderliness, self-replication, self-regulation and self-renewal*.
- ▶ Biological phenomena are characterised by *the participation of life forms, diversity and complexity, and interconnection with each other and the environment*.