

**Department of biology**

**Zoology**

**First stage**

**(1)**

**Introduction-Understanding the Animal World**

**By**

**Assist. Prof. Dr. Dhurgham Ali Al-Sultany**

**What is Biology?**

Biology is the natural science that studies **life** and **living organisms**, including their **physical structure**, **chemical processes**, **molecular interactions**, **physiological mechanisms**, **development** and **evolution**. Biology recognizes **the cell** as the **basic unit of life**, **genes** as the **basic unit of heredity and evolution**. Biology encompasses diverse fields, including botany, ecology, evolution, marine biology, mmycology, microbiology, and zoology.

**Zoology** is the scientific study of animals. It is a **branch of biology** that studies the members of the **animal kingdom** and animal life in general. **Zoology** is one of the broadest fields in all of science because of the immense variety of animals and the complexity of the processes occurring within animals. There are more than **1.4 million** described **species** of animals and many more (an estimated 6–7 million) that have yet to be described. There are **400,000** described species of **beetles!** It is no wonder that **zoologists** usually specialize in one or more of the subdisciplines of zoology. They may study particular functional, structural, or ecological aspects of one or more animal groups (**table 1.1**), or they may choose to specialize in a particular group of animals (**table 1.2**).

**TTabl1: Examples of specializations in zoology**

|  |  |
| --- | --- |
| **Sub discipline**  **SCRIPTION** | **Description** |
| **Anatomy** | Study of the structure of entire organisms and their parts **e** |
| **Cytology** | Study of the structure and function of cells |
| **Comparative**  **Genomics and**  **Bioinformatics** | Study of the structure, function, and evolution of the genetic composition  of groups of animals using computer-based computational methods |
| **Ecology** | Study of the interaction of organisms with their environment |
| **Embryology** | Study of the development of an animal from the fertilized egg to birth or hatching |
| **Genetics** | Study of the mechanisms of transmission of traits from parents to offspring |
| **Histology** | Study of tissues **Study of tissues** |
| **Molecular biology** | Study of subcellular details of structure and function |
| **Parasitology** | Study of animals that live in or on other organisms at the expense of the  Host |
| **Physiology** | Study of the function of organisms and their parts |
| **Systematics** | Study of the classification of, and the evolutionary interrelationships  among, animal groups |

**Table 1.2: Examples of specialization in Zoology by taxonomic categories**

|  |  |
| --- | --- |
| **Entomology** | Study of insects |
| **Herpetology** | Study of amphibians and reptiles |
| **Ichthyology** | Study of fishes |
| **Mammalogy** | Study of mammals |
| **Ornithology** | Study of birds |
| **Protozoology** | Study of protozoa |

**Zoologists** study not only the **physical** and **behavioral characteristics** of animals, but their **interactions with their environments** and all other life on the planet— including humans. Their work takes them from laboratories to zoos to wilderness, from exotic locations to suburban back yards, all in pursuit of the understanding and preservation of life on Earth.



**Why do we study Zoology?**

**Zoology is important to study because it helps us**:

1. Understand how animals work and how they fit into their ecosystems.
2. Understand the impacts humans have on animals and their habitats.
3. Develop a better understanding of how we, ourselves, function and interact with the world around us.
4. Affect change, empower better choices, and develop solutions for a stronger, healthier world.
5. Preserve important habitats and manage wildlife's adaptations to climate change.

**Characteristics of living organisms:**

An individual living thing, such as an **animal** or a plant, is called an **organism**. The term ‗**living organism’** is usually used to describe something which displays all the characteristics of living things. There are seven activities which make organisms different from **non-living things**, they are:

**1- Nutrition:** Living things take in materials from their surroundings that they use for growth or to **provide energy**. Nutrition is a process by which organisms obtain energy and raw materials from nutrients such as **proteins**, **carbohydrates** and **fats**.

**2- Respiration:** Respiration is the **release of energy** from break down food substances in all living cells to carry out the following processes.

**3- Movement:** All living things move, even plants move in various different ways. The movement may be so slow that it is very difficult to see.

**4-Excretion:** Excretion is defined as the **removal of toxic materials**, the **waste products of metabolism** and substances in excess from the body of an organism.

**5- Growth:** The permanent increase in cell number and size is called growth. It is seen in all living things. It involves using food to produce new cells.

**6– Reproduction:** All living organisms have the ability to produce offspring. ?

**7- Sensitivity:** All living things are able to **sense** and **respond** to **stimuli aroun**d them such as light, temperature, water, gravity and chemical substances.