

Unit 6:

The diversity of life



1. Classification of living beings

- 1.1. Groups of living beings
- 1.2. Species
- 1.3. Naming living beings

2. The five Kingdoms

3. Biodiversity

- 3.1. The origin of biodiversity
 - 3.2. The value of biodiversity
 - 3.3. The loss of biodiversity
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Think and answer?

- a. Can you name the living being in the photo?
Classify it into a group of animals.
- b. Name some animals of the same group.
Why are they classified into this group?
- c. Life is very diverse. Why do you think there are so many species of living things?
- d. What does it mean that a species is extinct?

UNIT OBJECTIVES

In this unit you will learn:

- To distinguish between different groups of living things.
- To classify living beings according to their characteristics.
- To define what a species is.
- To know how living beings are named by scientific criteria.
- To distinguish between the five kingdoms of living things.
- To explain the values of biodiversity.
- To identify the factors which endanger species.

1. Classification of living beings

1.1. Groups of living beings

Taxonomy is the science that orders and classifies living creatures.

The classification of living beings allows us to organise them into groups, called **taxa**, based on the characteristics that define them.

Classification criteria are the features that allow scientists group together determined living things and distinguish them from others.

Every group (taxon) can be divided into other smaller groups following other criteria.

We can continue the process making smaller and smaller groups that are contained within the previous one. This type of classification is known as *hierarchical*.

Each group or category is called **taxonomic rank**. The main taxonomic ranks are: **kingdom, phylum, class, order, family, genus** and **species**. Each kingdom includes several phyla, each phylum includes several classes, each class includes several orders, each order includes several families, each family includes several genera and each genus includes several species.

Taxonomic rank	Example
KINGDOM	ANIMALIA
PHYLUM	CHORDATA
CLASS	MAMMALIA
ORDER	CARNIVORA
FAMILY	Felidae, Canidae, Ursidae
GENUS	Felis, Panthera, Canis, Ursus
SPECIE	catus, pardalis, pardus, familiaris, lupus, arctos, horribilus

1.2. Species

The most important taxonomic rank is the **species**.

A species is a set of living beings which are physically similar and which can reproduce among them and produce fertile descendants or offspring.



Although their shape can be very different, all dog breeds belong to the same species, because they can produce fertile offspring.

1.3. Naming living beings

Binomial nomenclature is a standard convention used for naming species. This system of nomenclature was developed by **Carl Von Linnaeus**, a Swedish naturalist in the 18th century.

The scientific name helps us to identify a species without doubts because common names can vary from one place to another.

The scientific name of every species is the combination of two words: the **genus** (generic name) and the **species** (called specific name).

- The language used is the Latin.
- The generic name (always capitalised) is written first and then the specific name (never capitalised)
- It is always written italicised or underlined.
- Every species has its own binomial name (only one and exclusive)

Common name: Sparrow



The species name refers to a characteristic of the species (size, colour, etc) or to the name of its discoverer or to the place where it was discovered.

The scientific name can give us information about the evolutionary relationship between organisms: two species with the same generic name have a closer relationship than two species with different generic names.

READING ACTIVITIES

After reading the text, copy and answer the following questions into your notebook:

Remember: you must make complete sentences.

1.1. What two organisms of every one of the following groups are more closely related? (Underline them) Why?

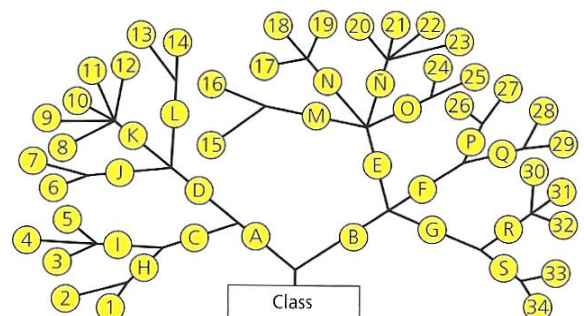
- a. *Populus alba* – *Pinus nigra* – *Populus nigra*
- b. *Equus caballus* – *Equus zebra* – *Hyla cinerea*
- c. *Lavandula officinalis* – *Valeriana officinalis* – *Lavandula angustifolia*

1.2. Imagine that you had discovered these new organisms for science, how would you call them?

- a. A very little bird of *Turdus* genus.....
- b. A plant with flowers with lots of colours, of *Peonia* genus.....
- c. A harmless spider of *Lycosa* genus.....

1.3. This sketch represents the species that are in the same class.

- a. How many **orders** exist in this class?
- b. How many **families** are included in every order?
- c. How many **genera** does each family have?
- d. How many **species** are included into this class?
- e. What genus presents the highest diversity of species?



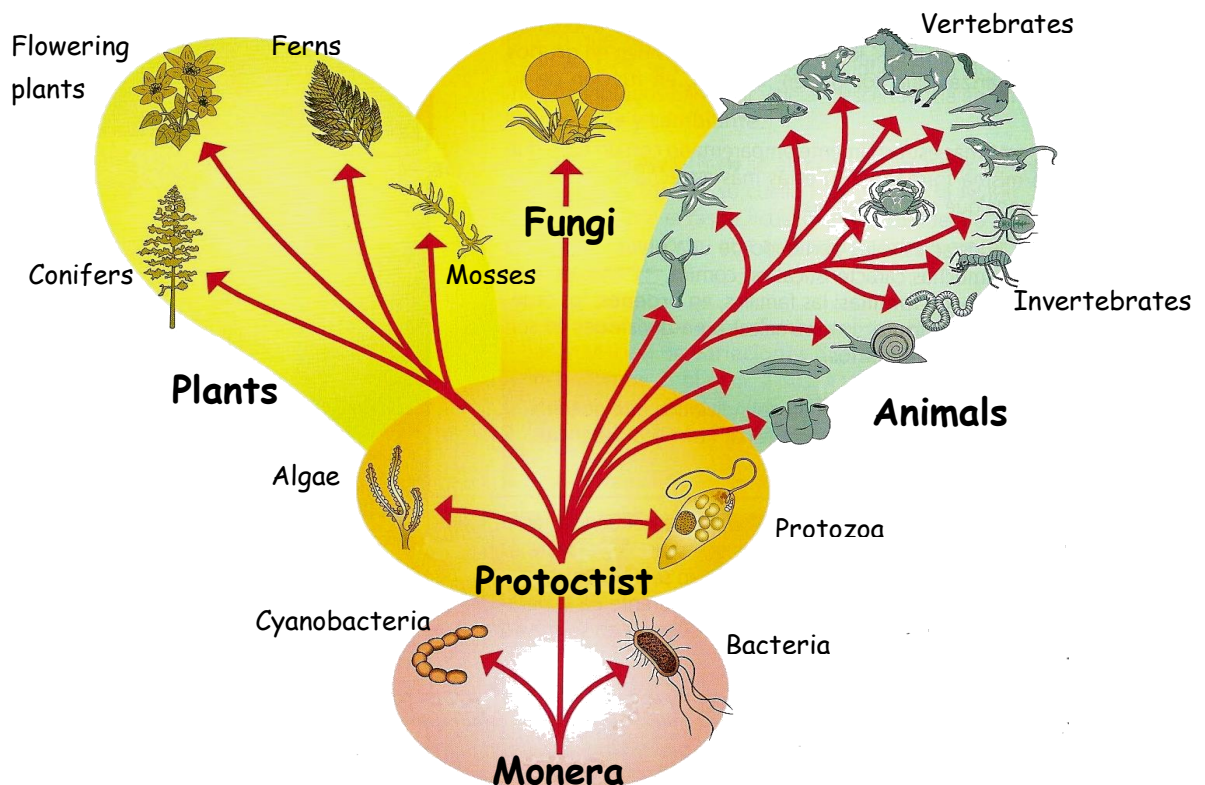
1.4. Listen to the following sentences and indicate if they are false or true.

2. The five kingdoms

The largest taxonomic rank is the **kingdom**. There are five kingdoms: Monera, Protocist, Fungi, Plants (or Plantae) and Animals (or Animalia). Living beings are included into one of them following the criteria that are summarised in this table:

KINGDOM		MONERA	PROTOCTIST	FUNGI	PLANTS	ANIMALS
Number of cells		Unicellular	Unicellular and Multicellular	Unicellular and Multicellular	Multicellular	Multicellular
Type of cells		Prokaryotic	Eukaryotic	Eukaryotic	Eukaryotic	Eukaryotic
Level of organization		Cellular	Cellular and multicellular (without real tissues)	Cellular and multicellular (without real tissues)	Multicellular (with real tissues and organs)	Multicellular (with real tissues, organs and systems)
Vital functions	Nutrition	Autotrophic and Heterotrophic	Autotrophic and Heterotrophic	Heterotrophic	Autotrophic (Photosynthesis)	Heterotrophic
	Relation	Very Simplex	Simplex	Simplex	Complex	Very complex
	Reproduction	Asexual	Asexual and Sexual	Asexual and Sexual	Asexual and Sexual	Sexual
EXAMPLES		Bacteria	Protozoa Algae	Mushrooms Moulds Yeasts	Mosses Trees Grass	Insects Amphibians Mammals

The **phlogenetic tree** is the way to represent graphically the evolutionary relationship between living beings:



READING ACTIVITIES

After reading the text, copy and answer the following questions into your notebook:
Remember: you must make complete sentences.

2.1. A scientist has to classify five unknown species. He has put all the information he has about them in the next table. Look at the table and try to help to the scientist.

	Species				
	1	2	3	4	5
With prokaryotic cells	-	-	-	+	-
With eukaryotic cells	+	+	+	-	+
Unicellular	-	+	-	+	-
Multicellular	+	-	+	-	+
With real tissues	+	-	-	-	+
Without real tissues	-	-	+	-	-
Autotroph	-	-	+	+	+
Heterotroph	+	+	-	-	-

Specie 1	Kingdom.....
Specie 2	Kingdom.....
Specie 3	Kingdom.....
Specie 4	Kingdom.....
Specie 5	Kingdom.....



2.2. Listen and identify what kingdom of living beings is described:

- a. Monera
- b. Protocists
- c. Fungi
- d. Plants
- e. Animals

3. Biodiversity

Biodiversity is the number of different species of living beings that exist on Earth.

Scientists believe there may be more than thirty million species, of which only two million species have been classified.

3.1. Origin of biodiversity

Biodiversity is the result of a slow process called **evolution**. Evolution began with the first life forms and still continues today.

Adaptation is the process of adjustment of living beings to their changing environment. The great diversity of environments that exist on the Earth provokes that living beings have to change and adapt to the different conditions to survive. This process gives as a result a great quantity and variety of species.

Biodiversity varies tremendously throughout the world. It is influenced by **climate** and **habitats**. For example, more than half the world's species live in tropical rain forests and coral reefs.

Some countries, for example Spain, have many different climate zones and habitats. As a result, they have more biological diversity.

3.2. The importance of biodiversity

Biodiversity is a natural resource that we must preserve because we depend on it. The values of biodiversity are several:

- **Economic value:** Living beings provide us with food, medicines, raw materials and energy.
- **Recreational value:** Natural environment is a source of economic incomes by tourism and satisfies our need for leisure and have beneficial effects on our health.
- **Scientific value:** Keeping biodiversity allows that the scientists know better the nature and how it works.
- **Ecological value:** Each species plays a determinate role in the ecosystem. They depend on each other and they all are important to maintain the ecological balance.
- **Genetic value:** Each species stores in their genes, the adaptations it had to develop to survive.

3.3. The loss of biodiversity

Many species become extinct or they are endangered every day for these factors:

- **Destruction of habitats** caused by deforestation (for burning or logging), construction, etc.
- **Overexploitation of resources**, such as uncontrolled hunting and fishing that put in danger many species (E. g. Iberian Lynx)
- **Pollution** of water, soil and atmosphere, caused by agriculture, industry and urban development.
- **Introduction of exotic species** that can destroy local species (E.g. River crab)

READING ACTIVITIES

After reading the text, copy and answer the following questions into your notebook:

3.1. Listen and indicate which concept is defined:

- a. Evolution
- b. Adaptation
- c. Biodiversity

3.2. Indicate why:

- a. Living beings have to adapt.
- b. It is dangerous to introduce exotic species in natural habitats.
- c. It is important to protect the endangered species.
- d. Spain has more biodiversity than other European countries.

3.3. Match each photo with a factor that reduces biodiversity:**3.4. Listen and indicate which value of biodiversity each sentence refers to:**

- a. Economic
- b. Recreational
- c. Scientific
- d. Ecological
- e. Genetic