The Tree of Life Evolves

Systems of classification adapt to new discoveries.

Linnaeus classified organisms into two kingdoms animals and plants.

The only known differences among living things were the fundamental traits that separated animals from plants.

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Five Kingdoms

Scientists realized there were enough differences among organisms to make 5 kingdoms:

- Monera
- Protista
- Fungi
- Plantae
- Animalia



Slide 2 of 28 **18-3 Kingdoms and Domains IP** The Tree of Life Evolves

Six Kingdoms

Recently, biologists recognized that Monera were composed of two distinct groups: Eubacteria and Archaebacteria. The six kingdom system now includes:

Eubacteria

Archaebacteria

Protista

Fungi

Plantae





Slide 3 of 28 **18-3 Kingdoms and Domains IF The Tree of Life Evolves**

Changing Number of Kingdoms								
Introduced	Names of Kingdoms							
1700's	Plantae				Animalia			
Late 1800's	Protista			Plantae		Animalia		
1950's	Monera		Protista	Fungi	Plantae	Animalia		
1990's	Eubacteria	Archae- bacteria	Protista	Fungi	Plantae	Animalia		



Slide 4 of 28 **18-3 Kingdoms and Domains w** The Three-Domain System

The Three-Domain System

Molecular analyses have given rise to a new taxonomic category that is now recognized by many scientists.

The **domain** is a more inclusive category than any other larger than a kingdom.

Eukarya, which is composed of protists, fungi, plants, and animals.

Bacteria, which corresponds to the kingdom Eubacteria.

<u>Archaea</u>, which corresponds to the kingdom Archaebacteria.



Slide 5 of 28 Modern classification is a rapidly changing science.

As new information is gained about organisms in the domains Bacteria and Archaea, they may be subdivided into additional kingdoms.

Domain Bacteria

Members of the domain Bacteria are unicellular prokaryotes.

Their cells have thick, rigid cell walls that surround a cell membrane.

Their cell walls contain peptidoglycan.

Slide 6 of 28 **18-3 Kingdoms and Domains Domain Bacteria**

The domain Bacteria corresponds to the kingdom **Eubacteria**.

Classification of Living Things					
DOMAIN	Bacteria				
KINGDOM	Eubacteria				
CELL TYPE	Prokaryote				
CELL STRUCTURES	Cell walls with peptidoglycan				
NUMBER OF CELLS	Unicellular				
MODE OF NUTRITION	Autotroph or heterotroph				
EXAMPLES	Streptococcus, Escherichia coli				

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Domain Archaea

Members of the domain **Archaea** are unicellular prokaryotes.

They live in extreme environments.

Their cell walls lack peptidoglycan, and their cell membranes contain unusual lipids not found in any other organism.

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18-3 Kingdoms and Domains Domain Archaea

The domain Archaea corresponds to the kingdom Archaebacteria.

Classification of Living Things					
DOMAIN	Archaea				
KINGDOM	Archaebacteria				
CELL TYPE	Prokaryote				
CELL STRUCTURES	Cell walls without peptidoglycan				
NUMBER OF CELLS	Unicellular				
MODE OF NUTRITION	Autotroph or heterotroph				
EXAMPLES	Methanogens, halophiles				



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Slide

18-3 Kingdoms and Domains Domain Eukarya

Domain Eukarya

The domain **Eukarya** consists of organisms that have a nucleus.

This domain is organized into four kingdoms:

- Protista
- Fungi
- Plantae
- Animalia



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18-3 Kingdoms and Domains Domain Eukarya

Classification of Living Things							
DOMAIN	Eukarya						
KINGDOM	Protista	Fungi	Plantae	Animalia			
CELL TYPE	Eukaryote	Eukaryote	Eukaryote	Eukaryote			
CELL STRUCTURES	Cell walls of cellulose in some; some have chloroplasts	Cell walls of chitin	Cell walls of cellulose; chloroplasts	No cell walls or chloroplasts			
NUMBER OF CELLS	Most unicellular; some colonial; some multicellular	Most multicellular; some unicellular	Multicellular	Multicellular			
MODE OF NUTRITION	Autotroph or heterotroph	Heterotroph	Autotroph	Heterotroph			
EXAMPLES	<i>Amoeba,</i> <i>Paramecium,</i> slime molds, giant kelp	Mushrooms, yeasts	Mosses, ferns, flowering plants	Sponges, worms, insects, fishes, mammals			



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Protista

The kingdom **Protista** is composed of eukaryotic organisms that cannot be classified as animals, plants, or fungi.

Its members display the greatest variety.

They can be unicellular or multicellular; photosynthetic or heterotrophic; and can share characteristics with plants, fungi, or animals.



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Fungi

Members of the kingdom Fungi are heterotrophs.

Most fungi feed on dead or decaying organic matter by secreting digestive enzymes into it and absorbing small food molecules into their bodies.

They can be either multicellular (mushrooms) or unicellular (yeasts).



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Plantae

Members of the kingdom **Plantae** are multicellular, photosynthetic autotrophs.

Plants are nonmotile—they cannot move from place to place.

Plants have cell walls that contain cellulose.

The plant kingdom includes cone-bearing and flowering plants as well as mosses and ferns.



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Animalia

Members of the kingdom **Animalia** are multicellular and heterotrophic.

The cells of animals do not have cell walls.

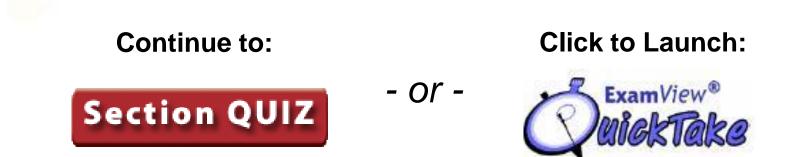
Most animals can move about.

There is great diversity within the animal kingdom, and many species exist in nearly every part of the planet.

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18-3 Section QUIZ





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- Organisms whose cell walls contain peptidoglycan belong in the kingdom
 - a. Fungi.
 - b. Eubacteria.
 - c. Plantae.
 - d. Archaebacteria.



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- 2 Multicellular organisms with no cell walls or chloroplasts are members of the kingdom
 - a. Animalia.
 - b. Protista.
 - c. Plantae.
 - d. Fungi.



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- Organisms that have cell walls containing cellulose are found in
 - a. Eubacteria and Plantae.
 - b. Fungi and Plantae.
 - c. Plantae and Protista.
 - d. Plantae only.



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- 4 Molecular analyses have given rise to a new taxonomic classification that includes
 - a. three domains.
 - b. seven kingdoms.
 - c. two domains.
 - d. five kingdoms.



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- 5 Which of the following contain more than one kingdom?
 - a. only Archaea
 - b. only Bacteria
 - c. only Eukarya
 - d. both Eukarya and Archaea



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