

CLASS 9 SCIENCE — CHAPTER 12

PATTERNS IN LIFE: DIVERSITY AND CLASSIFICATION

 New NCERT *Exploration* Textbook | 2026–27

Chapter 12 is “**Patterns in Life: Diversity and Classification**”, the 12th of the 13 chapters in the new *Exploration* textbook. It deals with biodiversity, classification of living organisms, the five-kingdom system, plant and animal classification, scientific naming, fossils and biodiversity conservation. ([AglaSem Schools](#))

1. INTRODUCTION — THE DIVERSITY OF LIFE

Our planet contains an enormous variety of living organisms. 

We see:

-  Trees
-  Flowers
-  Butterflies
-  Fish
-  Birds
-  Elephants
-  Fungi
-  Microorganisms

All these organisms differ in:

- Size 
- Shape 
- Structure 
- Habitat 
- Nutrition 

- Reproduction 🌱
- Behaviour 🐾

This variety of life is called:

🌟 Biodiversity

🌿 2. WHAT IS BIODIVERSITY?

📌 Definition

Biodiversity means the variety of living organisms found in a particular region or on Earth as a whole.

Biodiversity includes:

- 🦠 Microorganisms
- 🌱 Plants
- 🍄 Fungi
- 🐝 Insects
- 🐟 Animals
- 👥 Humans

★ **Biodiversity is not limited to the number of species.**

It also includes differences within species and differences among ecosystems.

🇮🇳 3. INDIA — A COUNTRY RICH IN BIODIVERSITY

India has a great variety of:

- 🌳 Forests
- 🏔 Mountains
- 🌵 Deserts
- 🌊 Coastal regions
- 🏝 Islands



Because of this geographical diversity, India supports a large variety of organisms.

Some organisms are found only in particular regions.

Such organisms are called:

Endemic species

Examples mentioned in the chapter include:

-  Nilgiri tahr
-  Lion-tailed macaque
-  Nepenthes khasiana
-  Neelakurinji

([Tiwari Academy](#))

4. WHAT IS AN ENDEMIC SPECIES?

Definition

An endemic species is a species naturally restricted to a particular geographical region and not naturally found elsewhere.

Example:

 **Nilgiri tahr**

It is associated with the Western Ghats of India.

5. WHY IS CLASSIFICATION NEEDED?

Imagine entering a library containing:

 10,000 books

with no arrangement.

Finding one particular book would be difficult!

Similarly, studying millions of organisms without classification would be extremely difficult.

Classification helps scientists:

- ◆ Identify organisms
 - ◆ Study similarities and differences
 - ◆ Organise information
 - ◆ Understand relationships
 - ◆ Give organisms universal names
 - ◆ Study evolutionary relationships
-

6. CLASSIFICATION

Definition

Classification is the systematic arrangement of organisms into groups based on their similarities and differences.

The science of identifying, naming and classifying organisms is called:

Taxonomy

7. HISTORY OF CLASSIFICATION

Scientists developed different classification systems over time.

The chapter traces classification from:

Aristotle

to:

Two-kingdom classification

then:

 **Three kingdoms**

then:

 **Four kingdoms**

and finally:

 **Five kingdoms**

The five-kingdom system was proposed by:

 **Robert H. Whittaker**

in:

1969

([Tiwari Academy](#))

8. ARISTOTLE'S CLASSIFICATION

Aristotle classified organisms mainly according to observable characteristics and habitat.

Animals were broadly grouped based on features such as:

 Aquatic organisms

 Terrestrial organisms

and other observable characteristics.

Limitation

Modern biology requires classification based on much more detailed information, including:

 Cell structure

 Nutrition



Body organisation

Evolutionary relationships



9. TWO-KINGDOM CLASSIFICATION

Early classification divided organisms into:



Plantae

and



Animalia

But this system had major limitations.

For example:



Bacteria



Fungi



Amoeba

did not fit neatly into these two groups.



10. WHY DID CLASSIFICATION SYSTEMS CHANGE?

As scientific knowledge increased, scientists discovered:



Microscopes



Microorganisms



Cell differences



Prokaryotic and eukaryotic cells

 Different modes of nutrition

 Different levels of body organisation

Therefore, classification systems became more detailed.

11. FIVE-KINGDOM CLASSIFICATION

Robert Whittaker proposed the:

FIVE-KINGDOM CLASSIFICATION

The five kingdoms are:

- 1 **Monera** 
- 2 **Protista** 
- 3 **Fungi** 
- 4 **Plantae** 
- 5 **Animalia** 

([Tiwari Academy](#))

12. BASIS OF FIVE-KINGDOM CLASSIFICATION

Organisms are grouped using important characteristics such as:

 **Cell type**

Is the organism:

- Prokaryotic?
- Eukaryotic?

 **Number of cells**

- Unicellular
- Multicellular

Mode of nutrition

- Autotrophic
- Heterotrophic

Body organisation

How complex is the organism?

Reproduction

How does it reproduce?

Evolutionary relationships

How are organisms related to one another?

13. KINGDOM MONERA

Monera includes:

Unicellular prokaryotic organisms

Examples:

 Bacteria

Some members are adapted to unusual environments.

14. CHARACTERISTICS OF MONERA

Cell type

Prokaryotic

Organisation

Mostly unicellular

Nucleus

No true membrane-bound nucleus

Organelles

Membrane-bound organelles are absent.

Nutrition

May be:

 Autotrophic

or

 Heterotrophic

15. BACTERIA

Bacteria are microscopic organisms.

They occur in:

 Soil

 Water

 Air

 Bodies of organisms

 Extreme environments

Some bacteria are useful.

Examples of useful roles:

 Decomposition

 Nutrient cycling

 Food production

Other bacteria can cause diseases.



16. KINGDOM PROTISTA

Protista mainly includes:

Unicellular eukaryotic organisms

Examples include:



Amoeba



Euglena



Paramecium



17. CHARACTERISTICS OF PROTISTA



Cell type

Eukaryotic



Organisation

Mostly unicellular



Nucleus

True nucleus present



Nutrition

Some are:



Autotrophic

Others:

 Heterotrophic

18. AMOEBA

Amoeba is a unicellular organism.

It changes its shape continuously.

It uses temporary projections called:

Pseudopodia

for:

 Movement

 Capturing food

19. EUGLENA

Euglena has characteristics associated with both plant-like and animal-like nutrition.

It can perform:

 Photosynthesis

when suitable conditions are available.

It can also obtain nutrients heterotrophically.

20. KINGDOM FUNGI

Fungi include organisms such as:

 Mushrooms

 Yeast

 Moulds

Fungi are:

Eukaryotic

and may be:

Unicellular or multicellular

21. CHARACTERISTICS OF FUNGI

 **Cell type**

Eukaryotic

 **Organisation**

Mostly multicellular

 **Nutrition**

Heterotrophic

 **Cell wall**

Usually contains:

Chitin

22. HOW DO FUNGI OBTAIN FOOD?

Fungi generally cannot make their own food through photosynthesis.

They obtain nutrients from:

 Dead organic matter

 Living organisms

Other organic materials

They release digestive enzymes outside their bodies and absorb the simpler substances.

This is called:

Saprotrophic nutrition

23. FUNGI AS DECOMPOSERS

Fungi play a major role in decomposition.

 Dead leaves

 Dead plants

 Dead organisms

are broken down by decomposers.

This returns nutrients to the environment.

★ **Therefore:**

Fungi → Decomposition → Nutrient recycling → Ecosystem balance

24. YEAST

Yeast is a:

 **Unicellular fungus**

It is widely used in:

 Bread making

Some fermentation processes

Yeast reproduces commonly by:

Budding

25. KINGDOM PLANTAE

Kingdom Plantae includes:

Multicellular plants

Plants are generally:

 Multicellular

 Eukaryotic

 Photosynthetic

They generally contain:

Chlorophyll

and produce food through:

Photosynthesis

26. AUTOTROPHIC NUTRITION

Plants are generally:

Autotrophs

because they can prepare their own food.

They use:

 Sunlight

 Water

 Carbon dioxide

to produce food through photosynthesis.

27. MAJOR PLANT GROUPS

The chapter presents plant groups in an evolutionary sequence:

 **Thallophyta**



 **Bryophyta**



 **Pteridophyta**



 **Gymnosperms**



 **Angiosperms**

([Tiwari Academy](#))

28. THALLOPHYTA

Thallophytes have a relatively simple body organisation.

The plant body is not differentiated into true:

 Roots

 Stems

 Leaves

as seen in higher plants.

Examples traditionally included:

 Algae

29. BRYOPHYTA

Bryophytes are simple land plants.

Examples:

 Mosses

They generally lack well-developed vascular tissues.

★ **Important point:**

Bryophytes are often called:

Amphibians of the plant kingdom

because they live on land but depend on water for sexual reproduction.

30. PTERIDOPHYTA

Pteridophytes are vascular plants.

They have:

 Roots

 Stems

 Leaves

and vascular tissues.

Examples:

 Ferns

They reproduce through:

Spores

rather than seeds.

31. GYMNOSPERMS

Gymnosperms are seed-producing plants in which seeds are:

Not enclosed within fruits

The word gymnosperm means:

Naked seed

Examples:

 Pine

 Cycas

32. ANGIOSPERMS

Angiosperms are:

Flowering plants

Their seeds are enclosed within:

Fruits

Examples:

 Sunflower

 Wheat

 Mango

 Rose

 Apple

33. PLANT GROUPS — QUICK COMPARISON

Group	Main feature
 Thallophyta	Simple plant body
 Bryophyta	Simple land plants; water important for reproduction
 Pteridophyta	Vascular plants; reproduce by spores
 Gymnosperms	Naked seeds
 Angiosperms	Flowers and seeds enclosed in fruits

34. KINGDOM ANIMALIA

Kingdom Animalia includes:

Multicellular heterotrophic organisms

Animals:

 Are eukaryotic

 Are multicellular

 Obtain food from other organisms

 Usually show movement at some stage of life

35. ANIMAL CLASSIFICATION

Animals are classified according to features such as:

 **Body organisation**

 **Symmetry**

 **Germ layers**

 **Body cavity**

 **Presence or absence of backbone**

 **Developmental characteristics**

36. PORIFERA

Porifera includes:

 **Sponges**

They are among the simpler animals.

Important features:

- ♦ Body has many pores
 - ♦ Mostly aquatic
 - ♦ Usually attached to surfaces
 - ♦ Simple level of organisation
-

37. PLATYHELMINTHES

These are commonly called:

Flatworms

Their bodies are:

→ Flattened

They show a higher level of organisation than sponges.

38. NEMATODA

Nematodes are:

Roundworms

Their bodies are:

- ♦ Cylindrical
- ♦ Unsegmented

Some are free-living while others are parasites.

39. ANNELIDA

Annelids are:

Segmented worms

Examples:

 Earthworm

 Leech

Their bodies show segmentation.

40. MOLLUSCA

Molluscs generally have:

 Soft bodies

Many have shells.

Examples:

 Snail

 Oyster

 Octopus

41. ARTHROPODA

Arthropods are one of the largest animal groups.

Their important features include:

 Jointed appendages

 Exoskeleton

 Segmented body

Examples:

 Butterfly

 Ant

 Spider

 Crab

★ 42. WHY ARE ARTHROPODS SO SUCCESSFUL?

Their:

 Exoskeleton

 Jointed appendages

 Segmentation

and diverse body structures allow them to live in many habitats.

★ 43. ECHINODERMATA

Echinoderms are marine animals.

Examples:

★ Starfish

 Sea cucumber

Important features include:

 Marine habitat

★ Spiny body surface in many members

44. CHORDATA

Chordates possess characteristic structures such as a:

Notochord

at least during some stage of development.

The group includes many familiar animals.

45. VERTEBRATES

Vertebrates are animals having a:

Vertebral column / backbone

Major vertebrate groups include:

 Fishes

 Amphibians

 Reptiles

 Birds

 Mammals

46. FISHES

Fishes are generally:

 Aquatic

 Use gills for respiration

 Adapted for swimming

Most have fins.

47. AMPHIBIANS

Amphibians can live:

 In water

and

 On land

Examples:

 Frog

 Toad

They often depend on water for reproduction.

48. REPTILES

Reptiles generally have:

 Dry, scaly skin

They are adapted mainly to life on land.

Examples:

 Snake

 Lizard

 Crocodile

 Turtle

49. BIRDS

Birds have:

 Feathers

 Wings

 Efficient respiratory system

They lay eggs.

Examples:

 Sparrow

 Eagle

 Peacock



50. MAMMALS

Mammals generally:

 Have hair

 Produce milk for young ones

 Breathe using lungs

Most give birth to young ones.

Examples:

 Elephant

 Cow

 Dog

 Human



51. FIVE KINGDOMS — QUICK REVISION TABLE

Kingdom	Cell type	Organisation	Nutrition
 Monera	Prokaryotic	Mostly unicellular	Auto/Heterotrophic
 Protista	Eukaryotic	Mostly unicellular	Auto/Heterotrophic
 Fungi	Eukaryotic	Uni/Multi	Heterotrophic
 Plantae	Eukaryotic	Multicellular	Mainly autotrophic
 Animalia	Eukaryotic	Multicellular	Heterotrophic



52. PROKARYOTIC VS EUKARYOTIC

Prokaryotic cells

Have:

✗ No true membrane-bound nucleus

✗ No membrane-bound organelles

Example:

 Bacteria

Eukaryotic cells

Have:

✓ True nucleus

✓ Membrane-bound organelles

Examples:

 Plants

 Animals

 Fungi

 Protists



53. PROKARYOTIC VS EUKARYOTIC

Prokaryotic 

Eukaryotic 

No true nucleus

True nucleus

Simpler organisation

More complex organisation

Bacteria

Plants, animals, fungi, protists

Usually unicellular

Unicellular or multicellular



54. AUTOTROPHIC VS HETEROTROPHIC

 **Autotrophic**

Organisms make their own food.

Example:

 Green plants

 **Heterotrophic**

Organisms obtain food from other organisms or organic material.

Examples:

 Animals

 Fungi



55. SCIENTIFIC NAMING

Common names can create confusion.

For example, an organism may have different names in different:

 Countries

 Languages

Regions

Therefore, scientists use:

Scientific names



56. BINOMIAL NOMENCLATURE

 Definition

Binomial nomenclature is the scientific system of naming organisms using two words.

The system is associated with:

 **Carolus Linnaeus**

([Collegedunia](#))



57. TWO PARTS OF A SCIENTIFIC NAME

A scientific name consists of:

1 **Genus**

2 **Species**

Example:

Panthera tigris

 Tiger

Panthera → **Genus**

tigris → **Species**



58. RULES OF BINOMIAL NOMENCLATURE

 **Rule 1**

Genus begins with a:

Capital letter

 **Rule 2**

Species begins with:

Small letter

 **Rule 3**

Scientific names are generally written in:

Italics

when typed.

When handwritten, genus and species are:

Underlined separately



59. TAXONOMIC HIERARCHY

Classification is arranged in levels.

From broadest to narrowest:



Kingdom



Phylum



Class



Order



Family



Genus



Species



Memory trick:

K P C O F G S

King Philip Came Over For Good Soup 🍲



60. SPECIES



Definition

A species is a group of closely related organisms that share important characteristics and, in the biological sense, can generally reproduce with one another to produce fertile offspring.



Species is one of the most specific major taxonomic ranks.



61. FOSSILS

Fossils are preserved remains, impressions or traces of organisms that lived in the past.

Examples:



Bones



Shells



Leaf impressions



Footprints



62. IMPORTANCE OF FOSSILS

Fossils provide evidence about:



Past life



Evolution

 Extinct organisms

 Past environments

They help scientists understand how life has changed over geological time.

63. FOSSILS AND EVOLUTION

The fossil record shows that:

 **Life has changed over time.**

Some organisms that once lived on Earth:

 No longer exist.

These are called:

Extinct organisms

Fossils provide clues about these organisms.

64. BIODIVERSITY AND EVOLUTION

Classification is not simply about putting organisms into boxes.

It also helps scientists understand:

 **Relationships among organisms**

 **Common characteristics**

 **Evolutionary patterns**

Organisms sharing more characteristics may have a closer evolutionary relationship.

65. INDIAN KNOWLEDGE AND CLASSIFICATION

The chapter also connects modern classification with India's scientific and cultural heritage.

It discusses examples such as:

 Sangam Tinai classification

 Rigveda

 Brihat Samhita

 Hortus Malabaricus

This shows that observation and classification of nature have a long history in India. ([Tiwari Academy](#))

66. INDIAN SCIENTIFIC CONTRIBUTIONS

The chapter highlights Indian contributions related to:

 Plant science

 Palaeontology

 Biodiversity

 Biogas research

Examples include:

 **Birbal Sahni**

Known for important work in:

Palaeobotany

The study of fossil plants.

67. RAM BUX SINGH

The chapter connects Indian scientific work with:

Biogas

Biogas technology converts organic waste into useful fuel.

This connects biology with:

 Waste management

 Energy

 Sustainable development

68. PURPLE FROG

India's biodiversity includes unusual species such as the:

Purple frog

It is an example of India's unique biodiversity and the importance of protecting species with restricted habitats.

69. BIODIVERSITY HOTSPOTS

Some regions of Earth contain:

 Very high biodiversity

and

 Significant threats to their natural habitats.

Such areas are known as:

Biodiversity hotspots

India contains regions recognised for exceptional biodiversity.

70. THREATS TO BIODIVERSITY

Biodiversity can be threatened by:

 Deforestation

 Pollution

 Habitat destruction

 Climate change

 Overexploitation

 Invasive species

 Forest fires

71. WHY SHOULD BIODIVERSITY BE PROTECTED?

Biodiversity provides:

 Food

 Medicines

 Genetic resources

 Ecosystem services

 Clean air

 Nutrient cycling

 **Every species has a role in an ecosystem.**

72. CONSERVATION OF BIODIVERSITY

Biodiversity can be protected through:

 Afforestation

 Wildlife protection

 National parks

 Wildlife sanctuaries

 Habitat conservation

 Preventing illegal hunting

 Sustainable use of resources

73. WHY CLASSIFICATION IS IMPORTANT — EXAM ANSWER

Classification helps us:

- ① Organise the enormous diversity of organisms.
 - ② Identify organisms easily.
 - ③ Study their similarities and differences.
 - ④ Understand evolutionary relationships.
 - ⑤ Give organisms universally accepted scientific names.
-



74. MONERA VS PROTISTA

Monera

Prokaryotic

No true nucleus

Mostly unicellular

Simpler cell structure

Protista

Eukaryotic

True nucleus

Mostly unicellular

More complex cell structure



75. FUNGI VS PLANTAE

Fungi

Heterotrophic

No chlorophyll

Cell wall contains chitin

Absorptive nutrition

Yeast, mushroom

Plantae

Mainly autotrophic

Usually chlorophyll present

Cell wall mainly cellulose

Photosynthesis in green plants

Fern, pine, mango



76. PLANTS VS ANIMALS

Plants

Generally autotrophic

Cell wall present

Chlorophyll in green plants

Usually fixed in one place

Animals

Heterotrophic

Cell wall absent

Chlorophyll absent

Usually capable of movement

Store food mainly as
starch

Store food mainly as glycogen

77. PLANT EVOLUTION — MEMORY CHAIN

Remember:

T → B → P → G → A

 **Thallophyta**



 **Bryophyta**



 **Pteridophyta**



 **Gymnosperms**



 **Angiosperms**

78. ANIMAL CLASSIFICATION — MEMORY CHAIN

A simplified progression to remember:

 **Porifera**



 Platyhelminthes



 Nematoda



 Annelida



 Mollusca



 Arthropoda



 Echinodermata



 Chordata



79. IMPORTANT DEFINITIONS



Biodiversity

Variety of living organisms in a region or on Earth.



Classification

Systematic grouping of organisms according to similarities and differences.



Taxonomy

Science of identification, naming and classification of organisms.



Prokaryote

Organism whose cell lacks a true membrane-bound nucleus.

Eukaryote

Organism whose cell contains a true nucleus.

Autotroph

Organism capable of producing its own food.

Heterotroph

Organism that obtains food from other sources.

Decomposer

Organism that breaks down dead organic matter.

Binomial nomenclature

Two-word scientific naming system.

Fossil

Preserved remains, impressions or traces of ancient organisms.

Endemic species

Species naturally restricted to a particular geographical area.

80. IMPORTANT EXAM QUESTIONS

Q1. What is biodiversity?

Biodiversity is the variety of living organisms found in a particular region or on Earth.

Q2. Why is classification necessary?

Classification helps organise organisms, identify them, study their similarities and differences and understand their relationships.

Q3. Who proposed the five-kingdom classification?

Robert H. Whittaker in 1969.

Q4. Name the five kingdoms.

Monera, Protista, Fungi, Plantae and Animalia.

Q5. What is the major difference between Monera and Protista?

Monerans are prokaryotic, while protists are eukaryotic.

Q6. Why are fungi called heterotrophs?

They cannot generally make their own food and obtain nutrients from organic matter.

Q7. What are bryophytes?

They are simple land plants that generally lack well-developed vascular tissues and depend on water for sexual reproduction.

Q8. What are gymnosperms?

Plants that produce seeds not enclosed within fruits.

Q9. What are angiosperms?

Flowering plants whose seeds are enclosed within fruits.

Q10. What is binomial nomenclature?

A scientific naming system in which each organism receives a two-part name consisting of genus and species.

Q11. What is an endemic species?

A species naturally restricted to a particular geographical region.

Q12. What is the importance of fossils?

Fossils provide evidence about ancient life, extinct organisms and evolutionary changes.



81. COMPETENCY-BASED QUESTION

A student finds a microscopic organism with:

 One cell

 A true nucleus

What kingdom is it more likely to belong to?

 **Answer: Protista**

Because protists are generally unicellular eukaryotic organisms.

82. COMPETENCY-BASED QUESTION

An organism is:

 Unicellular

 Has no true nucleus

Which kingdom does it belong to?

 **Answer: Monera**

Because Monerans are prokaryotic organisms.

83. COMPETENCY-BASED QUESTION

A plant has:

 Vascular tissues

 Roots

 Stems

 Leaves

but reproduces using spores rather than seeds.

Which group is it likely to belong to?

✓ **Pteridophyta** 🌿

84. COMPETENCY-BASED QUESTION

A plant produces seeds, but the seeds are not enclosed inside fruits.

Which group does it belong to?

✓ **Gymnosperms** 🌲

85. COMPETENCY-BASED QUESTION

A plant produces flowers and its seeds are enclosed in fruits.

✓ **Answer: Angiosperms** 🌸

86. COMPETENCY-BASED QUESTION

Why is a scientific name better than a common name?

Because common names differ between:

🌍 Regions

🗣️ Languages

Countries

A scientific name provides a universally accepted naming system.

87. COMPETENCY-BASED QUESTION

Why are fungi important to ecosystems?

Because fungi act as decomposers.

They break down dead organic matter and help return nutrients to ecosystems.

88. COMPETENCY-BASED QUESTION

Why should endemic species receive special protection?

Because they naturally occur only in a limited geographical region.

If their habitat is destroyed, their entire population may be seriously threatened.

89. COMMON MISTAKES TO AVOID

Mistake 1

Calling bacteria eukaryotic.

 **Correct:**

Bacteria are prokaryotic.

Mistake 2

Calling fungi plants.

 **Correct:**

Fungi form a separate kingdom.

Mistake 3

Saying gymnosperms have fruits.

✅ **Correct:**

Gymnosperm seeds are **not enclosed in fruits**.

❌ **Mistake 4**

Saying all plants reproduce through seeds.

✅ **Correct:**

Some plants such as ferns reproduce through spores.

❌ **Mistake 5**

Confusing genus and species.

✅ **Remember:**

Genus → **Capital**

Species → **Small letter**

Example:

Panthera tigris

⚡ **90. QUICK REVISION**

🌍 Biodiversity → Variety of life

🔬 Classification → Systematic grouping

🦠 Monera → Prokaryotic

🧫 Protista → Mostly unicellular eukaryotic

🍄 Fungi → Heterotrophic decomposers

 Plantae → Multicellular mainly autotrophic

 Animalia → Multicellular heterotrophic

 Whittaker → Five kingdoms

 1969 → Five-kingdom classification

 Bryophyta → Simple land plants

 Pteridophyta → Vascular plants + spores

 Gymnosperms → Naked seeds

 Angiosperms → Flowers + fruits

 Porifera → Sponges

 Annelida → Segmented worms

 Arthropoda → Jointed appendages

 Echinodermata → Marine animals

 Chordata → Notochord

 Vertebrates → Backbone

 Binomial nomenclature → Two-word scientific name

 Linnaeus → Associated with binomial nomenclature

 Fossils → Evidence of past life

 Endemic → Restricted geographical distribution

91. MEMORY MAP

LIFE



BIODIVERSITY



CLASSIFICATION



 MONERA

 PROTISTA

 FUNGI

 PLANTAE

 ANIMALIA

92. PLANT KINGDOM MEMORY MAP

 Simple body

Thallophyta



 Land plants

Bryophyta



 Vascular + spores

Pteridophyta



 Naked seeds

Gymnosperms



 **Flowers + fruits**

Angiosperms

93. ANIMAL KINGDOM MEMORY MAP

 **Simple animals**

Porifera



 **Flatworms**

Platyhelminthes



 **Roundworms**

Nematoda



 **Segmented worms**

Annelida



 **Soft-bodied animals**

Mollusca



 **Jointed appendages**

Arthropoda



★ Spiny marine animals

Echinodermata



🐟 Chordates

Chordata



94. TAXONOMIC HIERARCHY



KINGDOM



PHYLUM



CLASS



ORDER



FAMILY



GENUS





SPECIES

★ K → P → C → O → F → G → S



95. CHAPTER 12 — FINAL TAKEAWAY

The enormous variety of organisms on Earth makes systematic classification essential. 🌍🧬

★ Remember these five kingdoms:

Monera → Protista → Fungi → Plantae → Animalia



Plant progression:

Thallophyta → Bryophyta → Pteridophyta → Gymnosperms → Angiosperms



Important animal groups:

Porifera → Platyhelminthes → Nematoda → Annelida → Mollusca → Arthropoda → Echinodermata → Chordata



Scientific naming:

Genus + Species



Fossils:

Provide evidence about **past life and evolutionary history**.



Biodiversity:

Must be protected because every ecosystem depends on interactions among organisms.



Diversity makes life on Earth rich, classification helps us understand that diversity, and conservation helps us protect it.