



# OGUN STATE DIGITIZED LESSON PLAN

## SUBJECT: BIOLOGY



<b>Class: SS1</b>	<b>Term:</b>
<b>Topic: STRUCTURE AND CHARACTERISTICS OF LIVING ORGANISM (kingdom Plantae and Animalia)</b>	<b>Week: 5</b>
<b>General Expected Learning Objectives:</b> Students should be able to <ol style="list-style-type: none"><li>1. mention the division of plant kingdom and give examples of plants in each division</li><li>2. mention the 9 phyla in the plant kingdom and also state the characteristic features of each animal in each phylum.</li><li>3. correctly categorize animal and plant into the appropriate categories.</li></ol>	<b>Number of Lessons/Days:</b> <b>Lesson1:</b> Kingdom Plantae: Divisions, characteristic features and examples <b>Lesson2:</b> Kingdom Animalia (invertebrates) phylum, characteristic features and examples <b>Lesson 3:</b> Kingdom Animalia (chordates) classes, characteristic features and examples
<b>Background/Previous Learning/Starter:</b> The student can state the differences between plant and animals	
<b>Ice Breaker</b> Ask the student to standup, the first person to mention the name of a carnivorous animal will sit down.	
<b>Creative Approach</b>	
<b>Methodologies</b> The students in groups discuss the similarities, differences and characteristics feature of the plant and animal in the phyla and division. Students to collect toads, frogs, cockroaches e.t.c bring them to the laboratory for them to observe & record their observations	<b>Instructional Technologies and Resources:</b> <ul style="list-style-type: none"><li>• Mature maize plant, mushroom, two-week-old chicks, lizard, toad, frog.</li><li>• Lesson slides with multimedia resources.</li><li>• A comprehensive chart of the five kingdoms.</li></ul>
<b>Presentation</b>	
<b>Lesson 1:</b> <b>Step1:</b> The students form groups and then given (maize plant and palm frond) and (potatoes leaves and cowpea leaves) to observe. <b>Step2:</b> The students are guided by the teacher to write the observable features of the plants <b>Step3:</b> The students come together and give the differences between the two sets of leaves. <b>Lesson 2:</b> <b>Step1:</b> The students maintaining their groups examines (cockroach, tape worm, snail, prawn and housefly). <b>Step2:</b> The students discuss the characteristic features of the of each invertebrate they have with them <b>Step3:</b> The teacher states the phylum which the invertebrate is divided into and explains the characteristics features of each phylum with example in each phylum.	



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### Lesson 3:

**Step1:** The students are motivated to mention various animals with back bones

**Step2:** The students discuss the classes, characteristic features of Animals with back bone (vertebrates)

**Step3:** The teacher with the students classifies the animals into their different classes and gives examples of animal in each class.

### Evaluation

#### Class Activities:

Students group the following into the groups they belong after observation. (cassava plants, a grown mature maize plant, mushroom, two weeks old chicks, lizard).

1. State 3 characteristics of Bryophyta
2. Tabulate 4 differences between angiosperm and gymnosperm
3. List all the phyla in the animal kingdom

#### Home Exercises:

The teacher gives the worksheet "The Five Kingdoms of Life" to students to complete. Students will fill in their worksheet as each section is described. From this activity, the students will learn the names of the Five Kingdoms of Life, the key characteristics of organisms in each kingdom as well as examples of the organisms.

#### Links and Resources:

<https://www.elementaryschoolscience.com/animal-lesson-five-kingdoms-of-life>

[https://www.ck12.org/book/cbse\\_biology\\_book\\_class\\_9/section/4.9/](https://www.ck12.org/book/cbse_biology_book_class_9/section/4.9/)

### CONTENTS/NOTES

#### KINGDOM PLANTAE

The plant kingdom is divided into several major groups which are referred to as division, they are non-motile multicellular organisms whose cells have cell wall and chloroplast. Kingdom plantae is divided into

- (a) Bryophyta
- (b) Lycophyta
- (c) Pteridophyta
- (d) Gymnosperma
- (e) Angiosperma

#### DIVISION BRYOPHYTA (CHARACTERISTICS)

- I. They are one of the earliest plant to move from aquatic environment to land
- II. Their cell are differentiated into tissues
- III. They are complex multicellular green plant
- IV. They have no true root, stem and leaves
- V. They reproduce asexually by spore formation and sexually by gamete formation. Hence they show alternation of generation

Example: mosses and liverwort.

#### DIVISION LYCOPHYTA (CHARACTERISTICS)

- I. They are commonly known as club mosses
- II. They do not have seeds
- III. They have a true root, stem and leaves
- IV. They have developed vascular system for the transports of water and mechanical support
- V. They reproduce sexually and they need water for reproduction

Examples: club mosses

#### DIVISION PTERIDOPHYTA (CHARACTERISTICS)

- I. They are known as fern
- II. They multicellular and vascular green plant
- III. They are non flowering plant and non seed producing plant
- IV. They have true roots, stem and leaves



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V. They reproduce sexually by spore formation

Examples: ferns, felima

### DIVISION GYMNASPERMA (CHARACTERISTICS)

- I. They are seed bearing plant that do not produce flowers
- II. They have true root, stem and leaves
- III. The seeds are borne on special structure called cones
- IV. They have needle like and scaly leaves
- V. They are vascular green plant

Examples: palm-like cycads, ginkgoes and coniferous trees such as pines, spruces and firs

### DIVISION ANGIOSPERMA (CHARACTERISTICS)

- I. They are mostly complex green flowering plants
- II. They are the largest group of animal kingdom
- III. They highly adapted to live on land
- IV. They have well developed vascular system (xylem and phloem)
- V. They produce seeds which are enclosed in the fruits
- VI. They produce flowers which bears male and female gametophyte

They are further divided into : monocotyledon and dicotyledon

MONOCOTYLEDON	DICOTYLEDON
Bear seed which has one seed leaves or cotyledon	Bear seed which have two seed leaves or cotyledon
Fibrous root system	Tap root system
Vascular bundles of stem are scattered	Vascular bundles of stem are arranged
Floral parts exist in groups of 3 or multiple of 3	Floral parts exist in group of 4 and 5
Exhibit hypogeal germination e.g: maize, oil palm, carpet grass, guinea grass etc.	Exhibits epigeal germination Hibiscus, sweet potatoes, yam, cowpea etc.

### KINGDOM ANIMALIA

Animals are divided into two main groups/ phyla:

1. Animals with back bone (vertebrates)
2. Animals without back bone (invertebrates)

The first eight phyla of animals belongs to the sub phylum invertebrata while the phylum chordata belongs to sub-phylum vertebrata . The nine phyla in the animal kingdom are:

- (a) Phylum Porifera
- (b) Phylum Coelenterata (cnidaria)
- (c) Phylum Platyhelminthes (flatworm)
- (d) Phylum Nematoda (round worm)
- (e) Phylum Annelida (ringed worm)
- (f) Phylum Mollusca
- (g) Phylum Echinodermata
- (h) Phylum Arthropoda
- (i) Phylum Chordata

### PHYLUM PORIFERA (CHARACTERISTICS)

- i. They are simple aquatic invertebrates
- ii. They do not move around but attached to the rock
- iii. They live in colonies
- iv. They are primitive multicellular animal with asymmetrical body

Examples : sponges

### PHYLUM COELENTERATA (CNIDARIA)

- I. They are multicellular organisms
- II. They have single gastrovascular cavity that serves the mouth, digestive cavity anus



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- III. They possess tentacles for capturing their prey
- IV. They have two types of body structure (medusa and polyp)
- V. They reproduce asexually by budding

Example: jelly fish, hydra, sea anemone

### PHYLUM PLATHELMINTHES

- i. They are multicellular flat worm
- ii. They are bilateral symmetrical and are unsegmented
- iii. They do not have body cavity or lumen (acoelomates)
- iv. Their body is made of three layers (endoderm, mesoderm and ectoderm) i.e triploblastic animals
- v. Some are free living while others are parasitic

Example: liver fluke, tape worm, blood fluke

### PHYLUM NEMATODA

- i. They are round thread-like cylindrical worm
- ii. Their body is not segmented and they bilateral symmetrical
- iii. They have false body cavity (pseudocoelomates)
- iv. They are mostly parasite
- v. Their alimentary canal has two openings (mouth and anus)

Examples: round worm, hook worm, pin worm, filarial worm

### PHYLUM ANNELIDA

- i. They worms with segmented body both internally and externally (metameric segmented)
- ii. They possess true body cavity (coelomates)
- iii. They reproduce sexually and many are hermaphrodites
- iv. They possess circulatory system which makes them more developed than nematodes

Examples: earth worm, lug worm, leeches, rag worm

### PHYLUM MOLLUSCA

- I. They soft and non-segmented body
- II. Their body is divided into head, visceral mass and foot.
- III. They have tentacles on their head
- IV. They body is covered by a soft tissue called mantle
- V. Some has outer shell. (Eg : snail ,oyster, clams, periwinkle, mussels). Some has internal shell. ( Eg octopus, squid, cuttle fish )or no shell( slugs)

### PHYLUM ECHINODERMATA

- i. They possess tough spiny skin
- ii. They are mainly marine
- iii. Their body is radially symmetrical and star shaped
- iv. They possess tube feet for movement

Examples: star fish, sea urchin, sea anemone, brittle star, sea cucumber, sand dollar

### PHYLUM ARTHROPODA

This is the largest phylum in the animal kingdom

- i. Their bodies are covered with hard exoskeleton or chitin
- ii. They have joined appendages
- iii. The body is divided into three regions (head, thorax and abdomen)
- iv. They undergo molting or ecdysis.

The classes in this phylum are:

- (a) Insecta e.g grasshopper, cockroach, housefly, mosquito etc.
- (b) Arachnida e.g: spider, scorpion, ticks, mites, tarantula
- (c) Crustacea eg: crab, crayfish, shrimps, prawns, lobster
- (d) Chilopoda e.g: centipede
- (e) Dilopoda e.g: millipede

### PHYLUM CHORDATA

These are animals with back bones (vertebrates), they are divided into six classes





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- (a) Class Chondrichthyes (cartilaginous fishes)
- (b) Class Osteichthyes (bony fishes)
- (c) Class Amphibia
- (d) Class Reptilia
- (e) Class Aves (birds)
- (f) Class Mammalia

### Class Chondrichthyes

- I. Skeleton is made up cartilage instead of bone
- II. They possess gills for gaseous exchange
- III. The gills are not covered with opercula
- IV. They are poikilothermic (unable to control their body temperature)
- V. Some of these fishes lay eggs (oviparous), some retain the eggs within until they are ready to hatch (ovoviviparous), some give birth to live young ones (viviparous)

Examples: shark, rays, dog fish

### Class Osteichthyes

- i. They possess gills for gaseous exchange
- ii. Gills is covered with opercula
- iii. They lay eggs which are usually fertilized out the body
- iv. They are poikilothermic

Examples: tilapia, carp fish, salmon, mackerel, sardine

### Class amphibia

- i. They are poikilothermic animals
- ii. They have 2pairs of limbs (forelimbs and hind limbs)
- iii. They carry out gaseous exchange by gills, lungs, skin and mouth
- iv. They exhibit dual life (they can live on both land and water)
- v. They have poisonous glands on their skin for defense

Examples: toad, frog, salamander

### Class Reptilia

- i. They are poikilothermic animals
- ii. They have 2 pairs of limbs except snakes
- iii. They have dry skin covered with scale or bony plates
- iv. They reproduce sexually and fertilization is internal
- v. Most members are oviparous (female lay fertilized egg), while others are ovoviviparous (female retain eggs in their body until hatching)

Examples: lizard, wall geckos, tortoises, snake, crocodiles

### Class Aves(birds)

- i. They are homoiothermic animals (can regulate body temperature)
- ii. Their body is covered with feather except their legs and which is covered with scale
- iii. Their fore limbs are modified as wings for flight
- iv. They have beak which is for feeding. They lay hard shelled egg

Examples: pigeon, domestic fowl, duck, eagle, sparrow, hawk

### Class Mammalian

- i. They are homoiothermic animals
- ii. Their body is covered with hairs of furs
- iii. They have heterodont dentition
- iv. Their skin contains sweat gland
- v. They are viviparous animals (they give to their young ones alive)
- vi. They have mammary gland which produce milk to feed their young ones.

Examples: man, rabbit, whales, dolphin, monkey, bat, elephant

### Biological Classification - Part I

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#### Introduction to Biological Classification

#### Biological Classification

Arrangement of organisms in hierarchical series based on similarities & dissimilarities

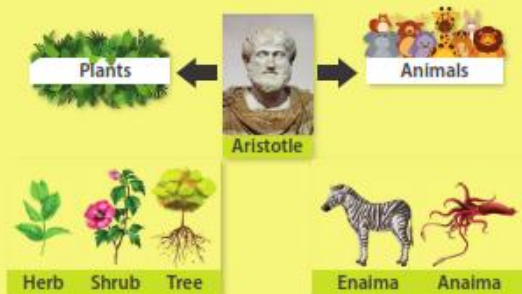
#### Need for Biological Classification

- Study of 1 or 2 organisms is not enough to know vital features of a group.
- All kinds of organisms do not occur in one locality.
- Helps in knowing the relationship between the different groups of organisms.
- Helps in knowing the evolutionary relationship between organisms.

#### Levels of Classification



#### First Attempt of Classification



#### Biological Classification



Viruses & viroids don't fit in any category

#### Key Features of Systems

#### Types of Classification System

Classified organisms into 2 kingdoms

2 Kingdom

Given by Linnaeus in 1758

- Plantae
- Animalia

Added Protists: Lacked capability of tissue differentiation

3 Kingdom

Given by Ernst & Haeckel in 1866

- Protista
- Plantae
- Animalia

Added Monera: EM studies showed prokaryotes possess different nuclear structure

4 Kingdom

Given by Copeland in 1956

- Monera
- Protista
- Plantae
- Animalia

Separate group of Fungi. Classified on the basis of 5 criteria.

5 Kingdom

Given by RH Whittaker in 1969

- Monera
- Protista
- Fungi
- Plantae
- Animalia

3 domains divided into 6 kingdoms

6 Kingdom

Given by Carl Woese in 1990





### Biological Classification - Part II

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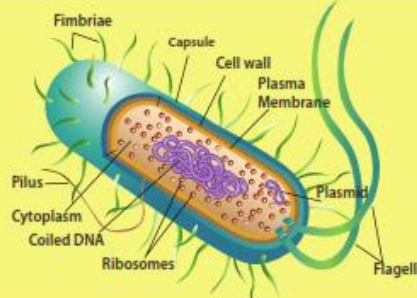
#### Monera, Protista, Fungi, Virus, Viroid & Lichen

#### Monera (Monos – single) Includes prokaryotes

##### Features of Kingdom Monera

- Unicellular organisms (except 1 mycelial group)
- **Genetic material:** Naked coiled DNA
- Nucleus & cytoplasmic organelles absent
- Cytoplasmic organelles: Both types of ribosome, simple chromatophores
- Gas vacuole may be present instead of sap vacuole
- **Mode of nutrition:** Absorptive, photosynthetic & chemosynthetic
- **Motility:** Non-motile, simple flagellar or gliding

##### Structure of Bacterial Cell



##### Shapes



##### Bacterial Nutrition

- Types**
- Autotrophic
  - Heterotrophic

#### Protista Single-celled eukaryotes

##### Features of Kingdom Protista

- Unicellular organisms
- Primarily aquatic
- Link between plants, animals & fungi
- Well defined nucleus & membrane-bound organelles
- Reproduction: Asexual & sexual
- Mode of nutrition: Photosynthetic, holotrophic & mixotrophic

##### Grouping of Protists

Prokaryotic	Consumer	Protozoan
<ul style="list-style-type: none"> <li>• Dinoflagellate</li> <li>• Diatoms</li> <li>• Euglenoids</li> </ul>	<ul style="list-style-type: none"> <li>• Slime moulds</li> <li>• Myxomycetes</li> </ul>	<ul style="list-style-type: none"> <li>• Slime moulds</li> <li>• Myxomycetes</li> </ul>

##### Major Protist Groups



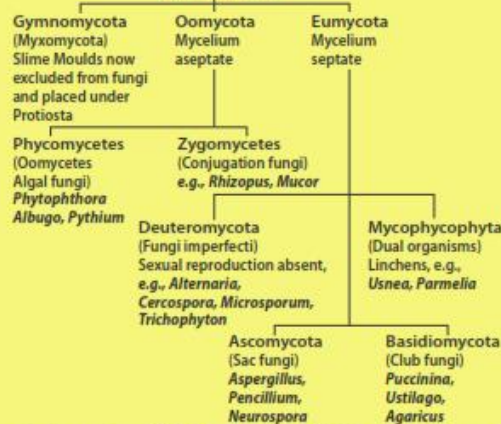
#### Fungi Thallus is the plant body of true fungi

##### Features of Kingdom Fungi

- **Thallus organisation:** Mycelial, non-mycelial
- **Cell organisation:** Made of chitin & cellulose
- **Cell-wall:** Cellulose-glycogen, cellulose-chitin or polygalactosamine-galactan
- **Nutrition:** Parasitic, saprophytic, symbiotic
- **Reproduction:**
  - **Vegetative:** fragmentation, budding & fission
  - **Asexual:** Sporangiospores, zoospores & conidia
  - **Sexual:** In all fungi (except Deuteromycotina)
- **Classification:** Phycomycetes (Rhizopus/mucor, Albugo), Ascomycetes (Yeast), Basidiomycetes, Deuteromycetes

##### Kingdom Fungi

##### Sub-kingdom



##### Virus: Not truly living species

- Genetic material: DNA or RNA
- Nucleoprotein & genetic material
- Capsid protects nucleic acid

##### Viroids: Lack protein coat

- Smaller than virus
- RNA has low molecular weight

##### Lichens: Symbiotic associations

- Symbiosis between algae & fungi
- Algal component: Phycobiont
- Fungal component: Mycobiont

**Biological Classification - Part III**

**Plantae & Animalia**

**Plantae** Consists of green, brown and red algae, liverworts, mosses, ferns and seed plants

**Features of Kingdom Plantae**

- Walled, multicellular & frequently vacuolated
- Plastids (photosynthetic pigment) present
- Motility: Non-motile & live, anchored to a substrate
- Reproduction:
  - Asexual & sexual
  - Form multicellular embryo
  - Algae lack embryo stage
- Life cycle: Show alternation of generation

**Varieties in Kingdom Plantae**

Algae

Mosses

Ferns

Conifers

Flowering plants

**Classification in Kingdom Plantae**

**Classification System**

**Animalia** Consists of multicellular eukaryotic animals.

**Basis of Classification in Kingdom Animalia**

- Body symmetry: Asymmetrical, radial symmetry, bilateral symmetry
- Nature of coelom: Coelomate, acoelomate
- Arrangement of cells of embryonic layers: Diploblastic & triploblastic
- Notochord: Chordate, non-chordate
- Patterns of organ systems: Digestive system (incomplete & complete framework), circulatory system (open & closed type), reproductive system framework
- Segmentation: External & internal segments with serial repetition of some organs
- Levels of organization: Cellular level, tissue level, organ level & organ framework level

**Animalia**

**Attributes & Hierarchy Patterns of Kingdom Animalia**

**Classification System**

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**OGUN STATE DIGITIZED LESSON PLAN**  
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**The Five Kingdoms of Life Worksheet**



Kingdom	Characteristics & Important Information	Examples
<b>Moneran</b>	<ul style="list-style-type: none"><li>- One-celled/unicellular</li><li>- Do not have a nucleus</li><li>- Have been on Earth for 3.8 billion years</li><li>- Separated into two groups: bacteria and cyanobacteria</li></ul>	<ul style="list-style-type: none"><li>- Lactobacillus (found in yogurt)</li><li>- Staphylococcus pneumoniae (bacteria that causes pneumonia)</li></ul>
<b>Protist</b>	<ul style="list-style-type: none"><li>- One-celled/unicellular</li><li>- Have a nucleus</li><li>- Can move around within their environment and make their own food</li></ul>	<ul style="list-style-type: none"><li>- Amoeba</li><li>- Algae</li></ul>
<b>Fungi</b>	<ul style="list-style-type: none"><li>- Can be one-celled or multi-cellular</li><li>- Do not make their own food</li><li>- Decomposers</li><li>- Use enzymes to absorb nutrients</li></ul>	<ul style="list-style-type: none"><li>- Mushrooms</li><li>- Yeast</li></ul>
<b>Plantae</b>	<ul style="list-style-type: none"><li>- Multi-cellular</li><li>- Cells contain chlorophyll (green pigment)</li><li>- Take in energy from the sun through a process called photosynthesis</li><li>- Oldest plant fossil is 4 million</li></ul>	<ul style="list-style-type: none"><li>- Trees</li><li>- Tulips</li></ul>
<b>Animalia</b>	<ul style="list-style-type: none"><li>- Multi-cellular</li><li>- Have complex systems</li><li>- Do not make their own food</li><li>- Largest of all five kingdoms</li><li>- Separated into two groups:</li></ul>	<ul style="list-style-type: none"><li>- Humans</li><li>- Whales</li></ul>



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Kingdom	Characteristics & Important Information	Examples
Moneran		<ul style="list-style-type: none"><li>- Lactobacillus (found in yogurt)</li><li>- Staphylococcus pneumoniae (bacteria that causes pneumonia)</li></ul>
Protist		
Fungi		
Plantae		
Animalia		