

Pre-content/Content/ Post-Content	Learning Outcome/Objectives	
	General	Specific
Pre-Content Meaning of Classification Content Two Kingdom Classification, Five-Kingdom Classification, Kingdom Monera, Protista & Fungi Viruses, Viroids , Lichens Post-Content To Study the other kingdoms: Plant Kingdom & Animal kingdom	Students will be able to: -learn appropriate use of internet -develop the habit of using encyclopedia and other reference material -increase their understanding & knowledge about various organisms under different kingdoms -discuss the need for 5-kingdom classification -understand the need for change in classification - learn how the Scientific Method can help in developing Scientific temperament -appreciate the contribution and observation skills of scientists	Students will be able to: - Compare two kingdom and five kingdom classification - Differentiate between the 5 kingdoms on the basis of various criteria - Identify the types of bacteria - Identify types of protists - Identify types of fungi on the basis of their features - Draw diagram to show binary fission in <i>E coli</i> - Explain life cycle of fungi - Tabulate the differences between phycomycetes, ascomycetes, basidiomycetes and deuteromycetes. - experience how viruses were discovered - Discuss the role of viruses and lichens in nature.

Homework and Assignments:

To answer questions at the end of the chapter

Draw diagram of a dividing bacterium

Draw diagrams of organisms belonging to Kingdom Monera, Protista, Fungi, and write comments in Practical file

Teacher's Activity	Student's Activity	Teacher's Observation And Remedial
Teacher will- Arrange for Activity based Learning on Two Kingdom Vs Five Kingdom Classification (Annexure 1) ; Criteria for five kingdom classification will be discussed -Draw different shapes of Bacteria to be drawn on the board -Show Slides of cyanobacteria, <i>Euglena</i>, <i>Paramoecium</i>, <i>Amoeba</i> to be in lab & diagrams drawn -Make a Table to differentiate between 4 types of fungi: Phycomycetes, Ascomycetes, Basidiomycetes & Deuteromycetes -Show Slide of yeast to be in the lab; other species of fungi through internet Activity based Learning on how viruses were discovered (Annexure 2) . Structure of T2 phage to be drawn on the board, Structure of viruses discussed. Quiz organised -Show Lichens growing on trees /rocks through the internet	Students will- -Participate in the activity -See images of Bacteria, Cyanobacteria, protistans & a variety of fungi & study them. Try and give answers using correct terminology -Observe the slides and make a sketch. Will draw in practical file. -Give inputs & note in tabular form in their registers -Observe & ask questions & discuss about them. -Will draw diagrams and write comments in file. -They will participate in the activity -Prepare and participate in the quiz on viruses -Observe keenly and note	The 5 kingdom Vs 2 kingdom classification was discussed wherein students gave their responses to the questions asked; hints were given if unable to answer & finally the correct terms/ points written on the board. Students were able to give a few examples of Monerans, Protistans and Members of Kingdom Fungi, as well as of viruses. Students understood the differences between four groups of fungi and the subject matter was converted into points in tabular form on the Board. Students were interested when discovery & role of viruses was discussed during the activity. Students prepared well & enthusiastically participated in the quiz. Answered questions-What are Lichens? What is the role of the 2 components of Lichens?

Teaching Aids : Slides, microscope, LCD projector, Screen, Computer with internet connectivity, smart board

Methodology/Innovative Methods: Discussion, Lecture cum demonstration, Laboratory Method, Computer Aided Instruction, Scientific Method, Activity based Learning

Interdisciplinary Links: Biotechnology-Growth/ multiplication of Bacteria/fungi in the Lab, using appropriate nutrient media

Vice-Principal

Principal

ANNEXURE 1

Activity – Two Kingdom Vs Five Kingdom Classification

Subject	Biology
Class	XI
Chapter	Biological Classification
Topic	Classification of Organisms
Duration	2 periods
Nature of the Activity	Group Activity

What will we learn? (Learning Outcome) –

understand the importance of classification, the need for change in the two kingdom classification,

recall the basis of five-kingdom classification

Skills- Remembering, Analysing, Classifying

What we have to do? –

Study the need of five kingdom classification through a group activity

What do we require?

Two sets of placards of at least 20 different organisms (if number of students in the class is 40), like *Amoeba*, yeast, bacteria, cyanobacteria, *Spirogyra*, fern, pine, tiger, rose, mushroom, crab, *Euglena*, *Paramecium*, moss, *Plasmodium* and so on; set of placards of two kingdoms (plant and animal), placards of the five kingdoms.

What do we need to know?

-Classification is done to make the study of organisms easy. It can be changed upon discovery of new properties/ features/ behavior of organisms, using different systems of classification.

-Characteristic features of organisms belonging to different groups/ categories, with examples

-Whittaker's 5 kingdom classification

➤ **Teacher's activity-** Teacher will give the instructions along with the steps of how to undertake this activity (Student's activity), by dividing the students into two groups.

How will we proceed?

➤ **Student's activity**

1. The class will be divided into two groups- Group A-Two kingdoms and Group B-Five kingdoms.
2. The placards of the different kingdoms will be placed on different desks in two different rows.

3. All the (20) students of group A will pick a card (from the set of twenty, with names of different organisms) and place it against either of the two kingdoms
4. All the (20) students of group B will pick a card (from the set of twenty, with names of different organisms) and place it against the five kingdoms
5. The organisms which belong to the other 3 kingdoms, other than plant and animal will be listed
6. The reason why the given organism was placed in a different kingdom (other than plant or animal kingdom) will be written alongside.

What have we observed?

Organisms	Kingdom as per 2 kingdom classification	Kingdom as per 5 kingdom classification	Reason for changing the kingdom
Bacteria	Plantae	Monera	No nucleus

What have we learnt?

Organisms having distinct features (like presence/absence of nucleus, photosynthetic/ non-photosynthetic, cell wall made up of different compounds, unicellular/ multicellular, chlorophyllous/ achlorophyllous), cannot be categorized together in the same kingdom

What would we like to know ?

Why a variety of autotrophic and heterotrophic organisms, been categorized under Kingdom Protista ?

Let me Evaluate myself-

1. What are the three domains of life?

2. Write two terms each, that completely describe Kingdom Monera and Protista.
3. What is Chemotaxonomy? Give an example to explain.
4. Search the net and cite an example where classification was changed due to cytological studies.
5. If you were to change the five-kingdom classification, which other kingdom would you add and why?

ANNEXURE 2

Activity – How were Viruses discovered?

Subject	Biology
Class	XI
Chapter	Biological Classification
Topic	Discovery of Viruses
Duration	45 min
Nature of the Activity	In pairs

What will I learn? (Learning Outcome)- to find out how viruses must have been discovered; learn the steps of scientific method

Skills- Observing, Critical thinking, Inferring

What we have to do?

Study how Viruses were Discovered through Use of Analogy

What do we require?

- potato
- tea leaves
- water
- 2 beakers
- funnel and filter paper /sieve
- stirrer
- Iodine solution (alternatively- tincture iodine)

What do we need to know?

What is filtration?

Test for starch

What is analogy?

- **Teacher's activity-** Teacher will prepare potato extract having thin consistency and make small proportions to distribute among all the students. Then give the instructions along with the protocol (Student's activity) and a table for reference:

Materials/ Experiment	Analogous to-
Tea leaves	Bacteria
Starch (in potato extract)	Viruses
Sieve/ filter paper and funnel	Bacteria filter
Potato extract	Extract of infected leaves of tobacco plant
Iodine test done before the beginning of the experiment	Infected Tobacco plant
Iodine test done after the filtration	Virulence

How will we proceed?

➤ **Student's activity**

1. Each student to perform test for starch using 5drops of extract and 2drops of iodine solution (Test I)
2. Students observe and note in observation table
3. To take a beaker and mix $\frac{1}{2}$ tsp of tea leaves in 20ml of extract given
4. Stir it for a minute
5. Pour the mixture and let it pass through the sieve/ filter paper & funnel, to be collected (as filtrate) in another beaker (kept below it)
6. Perform test for starch again, using the filtrate (Test II)

What do we observe?

Test for Starch	Observation (Colour)	Positive/ Negative
Test I	---	---
Test II	---	---

What have we learnt?

- The filtrate (filtered potato extract) also gives positive test
- Viruses are smaller than bacteria
- Virulence of viruses is retained even after passing through the filters ;
- When the infectious fluid was applied on leaves of healthy tobacco plant, it caught the disease.

What would I like to know ?

What is the size of viruses? What is the range?

Let me Evaluate myself-

1. How can viruses be crystallised?
2. While working with extremely virulent strains of viruses, what kind of laminar flow is used?
3. Compare virions, viroids and prions.
4. Why is it difficult to make vaccines against viruses?
5. Why have the small pox viruses been stored in two foreign labs, inspite of the fact that the disease is eradicated?