

LESSON PLAN [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

Managed By *Darbari Lal Foundation*

Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-1	October	Diversity in living organisms	Introduction to the concept of diversity.
Expected Learning Outcome: Students will be able to- *Define the terms- biodiversity, classification and acknowledge their importance.						
Expected skill development: * Reading skills while comprehending the question asked. *Comprehension of the text while asking questions and writing answers. . * Communication with scientific vocabulary						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction-

Students would be asked a few questions to review their previous knowledge about the term diversity through some questions as-[5 min]

Q1. What do you mean by the term - diversity, classification?

Q2. What is the importance of classifying organisms?

Content

- Write keywords on the black board and frame Definitions of biodiversity, classification and taxonomy with discussion in the class.

The students would be asked to think and share- How can they classify the children of their class? [5 min]

Students will come up with some parameters of classification and with this we will introduce the term “characteristics” used for classifying living organisms.

- Importance of classification to be discussed .[5 min]

.Thinkline- Can you think of other examples where classification of objects has been done and has been useful.

Teaching methodology- discussion through examples from life , Question answer through open ended situations.

Closure-The concept would be summarized asking students to-

Q. Define biodiversity and classification.

Q. Why is classification important?

Proposed Questions [5 min] Q1. What is the importance of classification of living organisms?(c.w) Q2. What do you mean by biodiversity? Q3. What do you think should be the basis of classification?	
Evaluation/Assessment: Asking questions to be answered with value points.	
Learners on the way *Individual attention within the class. Q. What do you understand the term classification?	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Should Taxonomy be included as a branch of Biology?
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: Biodiversity is always discussed in context with a biosphere reserve or forest. Biodiversity refers to diversity in plants and animals only.	Addressing the misconceptions: While discussing clarify that wherever there is variety of living organisms biodiversity exists. Forests are biodiversity hotspots.

- Home Assignments: [5 min]
Q. Define- Biodiversity, classification, taxonomy.
Q. What do you mean by the term characteristics?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-2	October	Diversity in living organisms	Characteristics of classification

Expected Learning Outcome:

Students will be able to-

*Identify the basis of classification-concrete examples of characteristics used for hierarchical classification.

*Classify organisms in 2-kingdom and 5-kingdoms on the basis of concrete characteristics.

Expected skill development:

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

*Critical thinking through open- ended questions .

Communication with scientific vocabulary, Critical thinking , global citizenship

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -. Students would be asked a few questions to review their knowledge about the concept discussed through some questions as-[5 min]

Q1. Define biodiversity, classification?

Q2. What is the importance of classifying organisms?

Can you identify some characteristics used for classification?

Thinkline-Can we use habitat as a basis of classification?

Content

The students will deduce the possible characteristics which can be universally applied to all living organisms. [15 min]

Eukaryotic/Prokaryotic

Unicellular/ multicellular

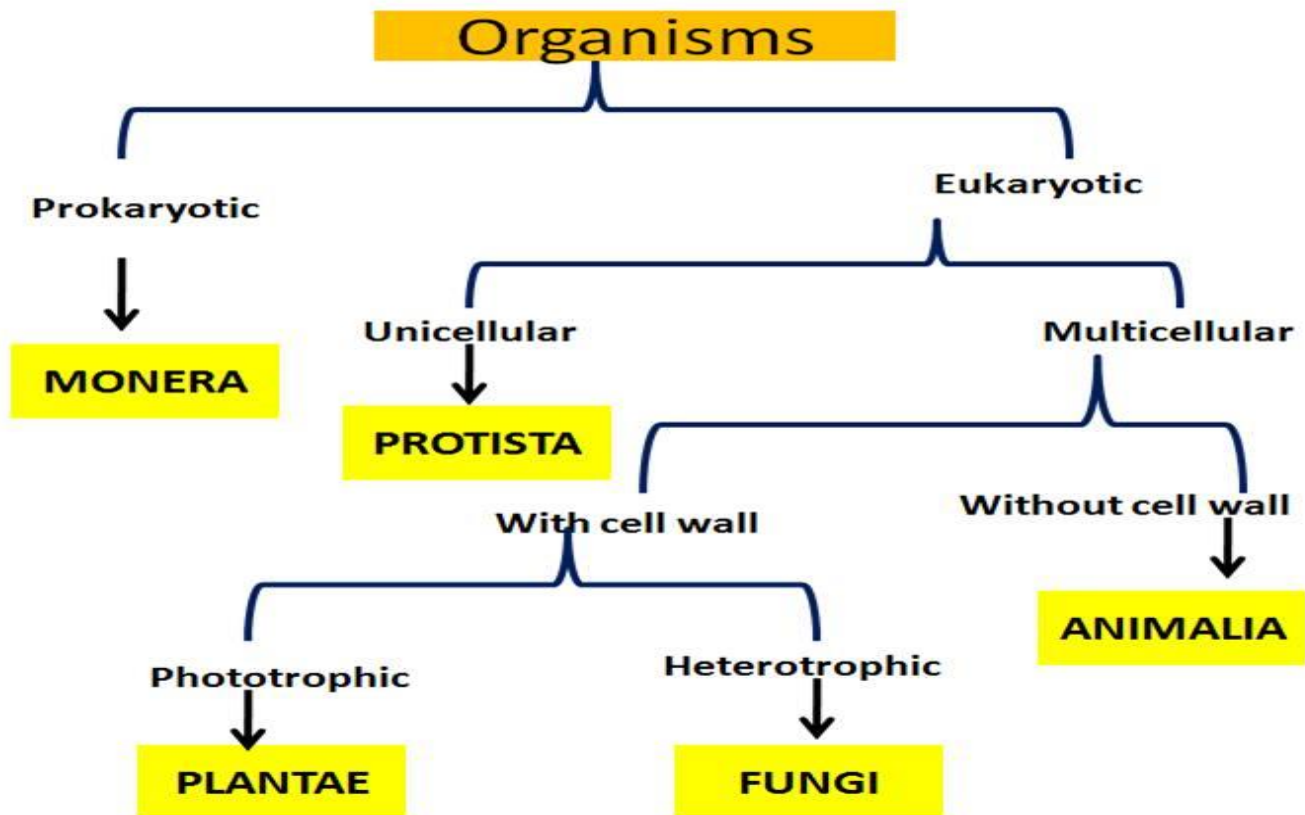
Autotrophic/heterotrophic

With cell wall/Without cell wall

With the help of these characteristics we will introduce the five kingdom classification given by Whittaker

*Two kingdom classification also to be mentioned as given by Aristotle.

Robert H. Whittaker (1969)



Thinkline- Blue green algae can photosynthesize yet it is classified under kingdom Monera. Why ?

Pg 97- Q2- How would you choose between two characteristics to be used for developing a hierarchy in classification?(C.w)

Teaching methodology- discussion through examples from life, Question answer through open ended situations

Closure-The concept would be summarized asking students to answer these questions-[5min]

Q1. Who proposed the five kingdom classification?

Q2. Prokaryotes are classified under which kingdom?

Q3. Protista consist of which type of organisms?

Proposed Questions Q1. Classify living organisms on the basis of characteristics using a flowchart .(c.w) Q2. Who proposed the five kingdom classification? Q3.What is the fundamental basis of 5 kingdom classification?	
Evaluation/Assessment: Asking to summarize the 5 kingdom classification at the end through a flowchart.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Draw flowchart to show five kingdom classification on the board.	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Find out about other attempts made to classify organisms by other taxonomists.
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: Eukaryotes are always multicellular in nature. Characteristics to be studied in any sequence.	Addressing the misconceptions: By Giving examples of Amoeba and Paramecium it can be clarified that eukaryotes can be unicellular or multicellular. sequential learning of characteristics will ensure correct classification order and course of evolution.

- Home Assignments: [5 min]
NCERT pg no 82-Q.1- Which do you think is a more basic characteristic for classifying organisms?a) The place where they live b) the kind of cells they are made of. Why?
2- Q. what is the primary characteristic on which the first division of organisms is made?
3-Q. On what bases are the plants and animals put into different categories?.

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-3	October	Diversity in living organisms	Classification and evolution, hierarchy of classification
Expected Learning Outcome: Students will be able to- *Correlate the concept of classification with evolution-primitive/advanced, simple/complex, lower/higher forms. *identify the various levels in the hierarchical classification and acknowledge the concept of species. Expected skill development: * Reading skills while comprehending the question asked. *Comprehension of the text while asking questions and writing answers. *Critical thinking through open ended questions . Communication with scientific vocabulary, global citizenship						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -. Students would be asked a few questions to review their knowledge about the concept discussed in the previous class through some questions as-[5 min]

Q1 What do you mean by characteristics?

Q2. Can we put bacteria and amoeba in the same group?

Q3.Which group consist of unicellular eukaryotic organisms?

Content

Students will be asked to differentiate between the terms- [15 min]

- primitive/advanced organisms.
- simple/complex organisms.
- lower/ higher forms.

Correlate them with evolution and their role in classification.

Students would be discussing the hierarchy of classification within their family and then apply it to organisms as-

Kingdom----phylum/division-----order-----family-----genus-----SPECIES

Correlate it with their previous knowledge of diversity of living organisms.

And define each of them.

Species- Group of organisms who can interbreed among themselves to produce new organisms of their own kind.

Thinkline- Can two different species interbreed with each other?[5min]

How would we define the term species with respect to unicellular organisms?

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-The concept would be summarized asking students to answer these questions-

Q. Differentiate between – a) advanced and primitive organisms b) Simple and complex forms

Proposed Questions [5min] Q1. Define the term species. Q2. What are complex organisms? Q3 . If you compare Bacteria with humans, who is more advanced? Justify your answer.	
Evaluation/Assessment: Oral recapitulation of the topics discussed in the previous class. Asking questions to answer with value points to be written on board.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Compare simple and complex organisms?	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Explore and research on breeding interspecific, intergeneric and intervarietal.
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: Simple is always primitive.	Addressing the misconceptions: By Giving examples of bacteria and humans .

- Home Assignments: [5min]
NCERT pg no 83-Q.1- Which organisms are called primitive and how are they different from the so- called advanced organisms? .
Q2- Will advanced organisms be the same as complex organisms. Why?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-4	October	Diversity in living organisms	5 kingdom classification
Expected Learning Outcome: Students will be able to- *Identify and compare characteristics like body design/presence of cell wall/mode of nutrition of Monera, Protista, Fungi, Plantae and Animalia. *Represent diagrams and identify organisms belonging to each kingdom.						
Expected skill development: * Reading skills while comprehending the question asked. *Comprehension of the text while asking questions and writing answers. *Critical thinking through open ended questions . Communication with scientific vocabulary, global citizenship Creativity while drawing diagrams.						

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -. Students would be asked a few questions to review their knowledge about the concept discussed in the previous class through some questions as-[5 min]

NCERT pg 85 Q1-What is the criteria for classification of organisms as belonging to kingdom Monera or Protista?(c.w)

Q3. In the hierarchy of classification, which grouping will have the smallest number of organisms with a maximum of characteristics in common and which will have the largest number of organisms?(c.w)

Content

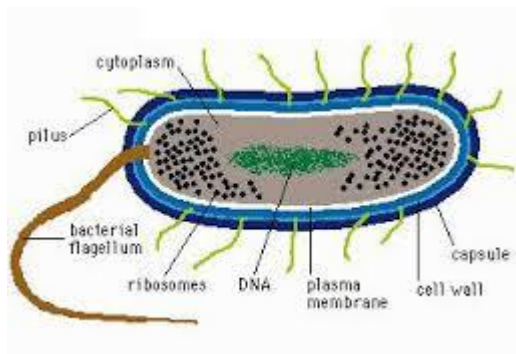
Compare all kingdoms on the basis of-[15 min]

- Type of nucleus
- presence or absence of cell wall
- mode of nutrition
- presence / absence of locomotory appendages

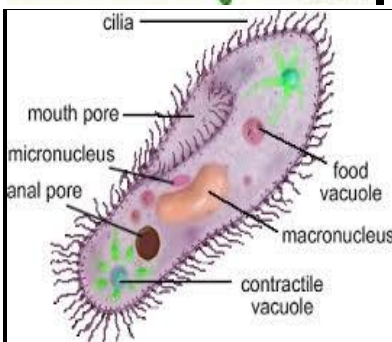
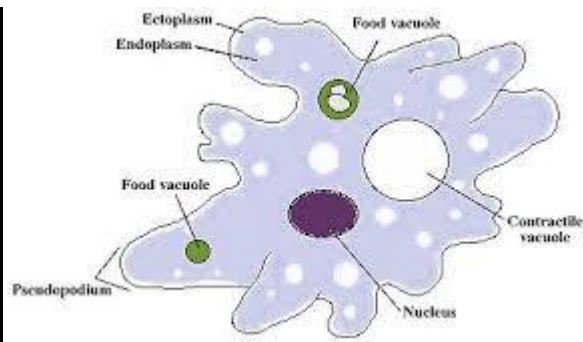
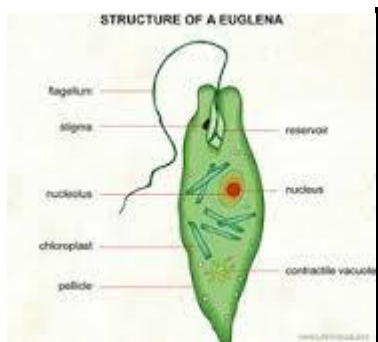
To be discussed along with examples and diagram

Students will be called to draw the diagrams on board and the corrections to be done by the facilitator.(as they have already done them in lower classes)

Kingdom Monera-



Kingdom Protista-



Kingdom Fungi-
Kingdom Plantae
Kingdom Animalia

Word wall to be created for the 5 kingdom classification.[5min]

Thinkline- Yeast is a unicellular organism place in Fungi. Can you think why?

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-The concept would be summarized asking students to answer these questions-

Q. Compare Protista, Monera and fungi on the basis of nutrition and cell wall.

Proposed Questions Q1. The cell wall of fungi is made of which chemical? Q2. Identify the locomotory appendages in Protista. Q3. Mycoplasma should be placed under which group?	
Evaluation/Assessment: Asking to summarize at the end of through a flowchart showing comparison of various kingdoms and drawing neat labeled diagrams.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q.In which kingdom will you place an organism which is single celled, eukaryotic and photosynthetic?(C.W)	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Create a word wall for 5 kingdoms.
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: Difficulty in terminology	Addressing the misconceptions . Ask students to remember one example for each group and create a word wall for everyday reminder.

Home Assignments: [5min]

- Q . Compare characteristic features of Monera, Protista and fungi and represent one diagram for each kingdom.
- Pg 97- Q3- Explain the basis of grouping organisms into five kingdoms.

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-5	October	Diversity in living organisms	Plant Kingdom

Expected Learning Outcome:

Students will be able to-

Identify concrete characteristics and Classify plant kingdom into various divisions as- Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms(Monocot/dicot) .

* Identify and compare each division of plant kingdom on the basis of body differentiation/vascular nature/habitat/reproductive structures.

*Differentiate between cryptogamae and phanerogamae.

*Identify organisms belonging to each division.

Expected skill development:

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

* Communication skills by Developing scientific vocabulary and it's proper usage.

*Critical thinking by Systematic approach to classify organisms on the basis of concrete characteristics.

*Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction - Students would review their knowledge about the concept discussed in the previous class through questions mentioned below-[5min]

Q1. Compare the cell wall of fungi and plants.

Q2. Give any two examples of organisms belonging to kingdom Monera.

Q3. Identify organisms which are eukaryotic, multicellular, with cell wall and autotrophic mode of nutrition?

Content

Students will be asked to identify characteristics which can be used for classifying plant kingdom-[20 min]through **TPS**

After discussions the following characteristics will be deduced for the classification-

*Spore/ Seed bearing plants

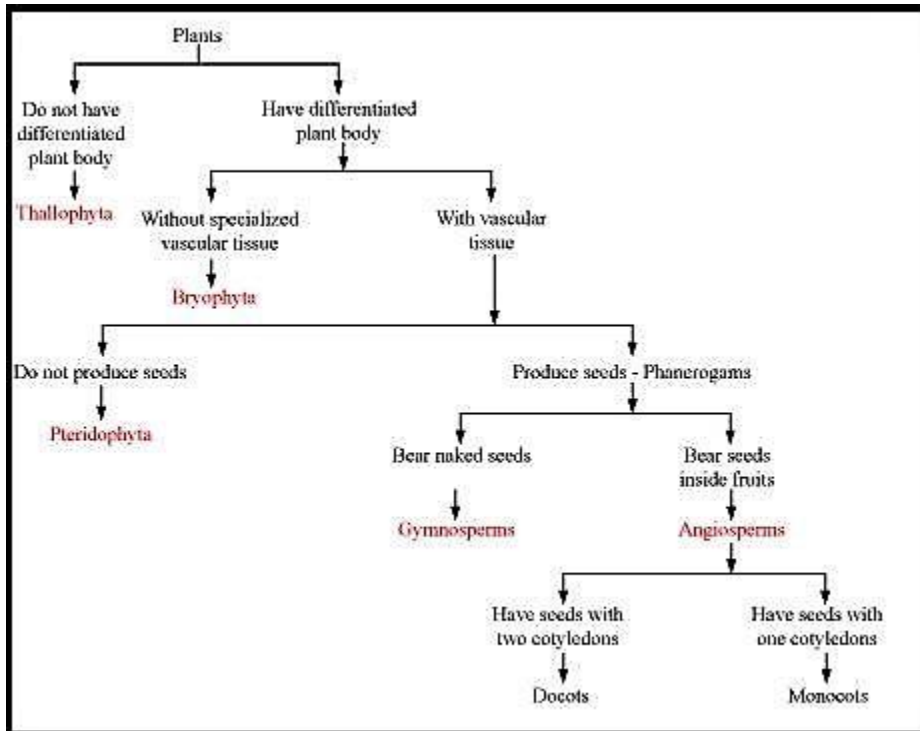
*Body differentiation

*Presence /Absence of vascular tissue

*Seeds naked/covered seeds

*Number of cotyledons

Based on these characteristics plant kingdom is classified in following **Divisions** as-



Differentiate cryptogamae and phanerogamae on the basis of-

- Presence of seeds
- Type of reproductive structures

Thinkline – Can we use shape of leaf as a criteria for classification of plants. Why or why not?

Can you think of some plants which do not bear flowers?

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-

The topics will be summarized asking questions such as-[5min]

Q1. What is the criteria to classify Thallophyta from Bryophyta?

- **Proposed Questions**
Q1. Draw a flowchart to classify plant kingdom(c.w)
(Questions already mentioned above)

Evaluation/Assessment: Oral recapitulation of the topics discussed in the previous class. Asking to summarize by redrawing the flowchart to classify plants on the board.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Which division of plantae would you put plants like rose? Q. Enlist the criteria for classifying plant kingdom?	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Identify characters of plantae with their occurrence in evolution and the placement of organisms in classification. Q. Is it important for classification to follow a set sequence of criteria to be used?[5 min]
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: Random criteria are used as characteristics of classification	Addressing the misconception . Classify plants on the mentioned basis and see the classification.

- Home Assignments:
Q . Compare Cryptogams and phanerogams.

Pg 97- Q4- What are the major divisions in the Plantae? What is the basis for these divisions?

Q. Which division includes vascular cryptogams?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-6	October	Diversity in living organisms	Plant Kingdom- Cryptogams

Expected Learning Outcome:

Students will be able to-

- * Identify and compare various characteristics of each division of plant kingdom of Cryptogams (Thallophyta, Bryophyta, Pteridophyta) such as body differentiation/vascular nature/habitat/reproductive structures.
- *Illustrate and identify organisms belonging to each division.

Expected skill development:

- * Reading skills while comprehending the question asked.
- *Comprehension of the text while asking questions and writing answers.
- * Communication skills by Developing scientific vocabulary and it's proper usage.
- *Critical thinking by Systematic approach to classify plants on the basis of concrete characteristics.
- *Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -. Students would be asked a few questions to review their knowledge about the concept discussed in the previous class through some questions as-[5min]

Q1. What are cryptogams?

Q2. Which division of plant kingdom has naked seeds in it?

Q3. Identify plant division which includes vascular cryptogams.

Content

*Students will compare various characteristics of each division of plant kingdom of Cryptogams (Thallophyta, Bryophyta, Pteridophyta) such as body differentiation/vascular nature/habitat/reproductive structures.[15 min]

*Represent diagrams with accuracy

Division Thallophyta –

Diagram of spirogyra to be drawn on board

Division Bryophyta- Funaria(diagram to be drawn)

Practicals-[Slide to shown]

[Museum specimen to be shown]

Examples of THALLOPHYTA

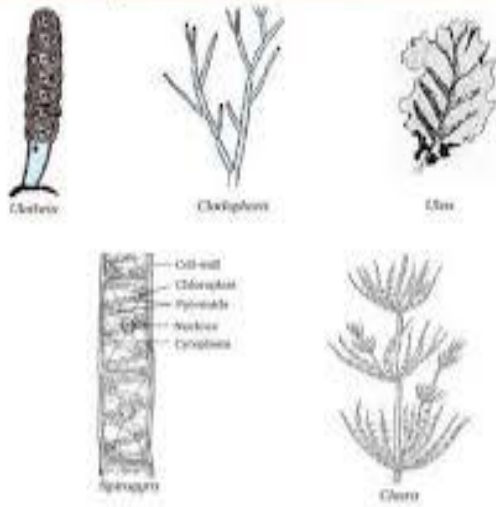


Fig. 8: Thallophyta - Algae

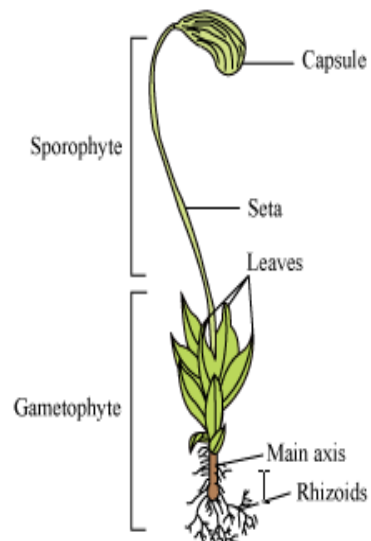
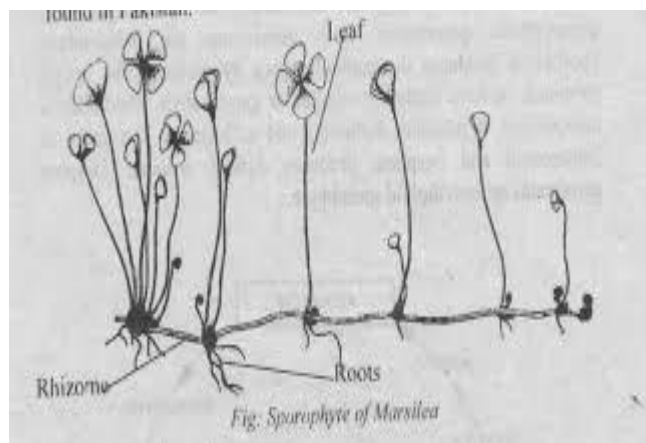


Diagram of Bryophyta

Division Pteridophyta-



Thinkline – Can we place fungi in the division Thallophyta? Give reasons for your answer

Closure-

The topics will be summarized asking questions such as-[5min]

Q1. Why are bryophytes called as amphibians of plant kingdom?

Q2. Which division of cryptogams has vascular bundles for transportation?

Proposed Questions Q1. Why are bryophytes called as amphibians of plant kingdom? (C.W) Q2. Algae are placed in which division? Q3. How are the organisms placed in Thallophyta different from Bryophyta? Q. How are ferns different from mosses?	
Evaluation/Assessment: Oral recapitulation of the topics discussed in the previous class. Asking to summarize at the end of each topic	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Give two examples of Thallophyta.	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Identify the advancements shown by Pteridophytes over Bryophytes due to presence of vascular system in them. Q. Which types of water transporting units would be present in pteridophytes?(vessels/tracheids) [5 min]
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk *Slides and museum specimen to be shown for practicals	
Common Misconceptions: *Thallophyta and algae are different organisms. *Cryptogams do not have reproductive structures. *Bryophytes live in water as they need water for fertilization.	Addressing the misconception . Re-explaining that algae are thallophytes. They live near water. Showing them the specimens of sporophylls through museum specimen.

- Home Assignments: [5min]
- Q . Compare characteristic features of Mosses with Ferns .
- Q. Draw a well labeled diagram of Spirogyra and mention why it is classified as a thallophyta?

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-7	October	Diversity in living organisms	Plant Kingdom- Phanerogams

Expected Learning Outcome:

Students will be able to-

- * Identify and compare various characteristics of each division of plant kingdom of Phanerogams (Gymnosperms, angiosperms-) such as body differentiation/vascular nature/habitat/reproductive structures (identify male and female cones)
- * Differentiate between monocots and dicots.

Expected skill development:

- * Reading skills while comprehending the question asked.
- * Comprehension of the text while asking questions and writing answers.
- * Communication skills by Developing scientific vocabulary and its proper usage.
- * Critical thinking by Systematic approach to classify plants on the basis of concrete characteristics.
- * Citizenship
- * Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -. Students would be asked a few questions to review their knowledge about the concept discussed in the previous class through some questions as-[5min]

Q1. What are phanerogams?

Q2. Which division of plant kingdom has naked seeds in it?

Q3. Identify plant division which are vascular in nature?

Content

*Students will compare various characteristics of each division of plant kingdom of Phanerogams (Gymnosperms/Angiosperms) such as body differentiation/vascular nature/habitat/reproductive structures.[15 min]

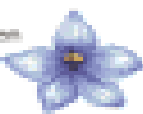
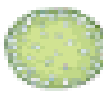
* Division Gymnosperms -

Gymnosperms



Specimens of male and female cones to be shown.

Division Angiosperms-Monocot/Dicot

Characteristics of Monocots and Dicots				
	Monocots		Dicots	
Seeds	Single cotyledon		Two cotyledons	
Leaves	Parallel veins		Branched veins	
Flowers	Floral parts often in multiples of 3		Floral parts often in multiples of 4 or 5	
Stems	Vascular bundles scattered throughout stem		Vascular bundles arranged in a ring	
Roots	Fibrous roots		Taproot	

Thinkline – Can you correlate the presence of needle shaped leaves in gymnosperms as their adaptation to their habitat?

Q. Considering the characteristics of various divisions of plant kingdom which two divisions are-

i) a) most diverse to each other and

b) more closely related?

ii) Can you correlate your answer with the classification flowchart and deduce the relation between the placement of divisions and the similarity in their characteristics?

Teaching methodology- discussion through examples from life , Question answer through open ended situation

Closure-

The topics will be summarized asking questions such as-[5min]

Q1. Do gymnosperms bear seeds?

Q2Which division of phanerogams shows presence of vascular bundle?

Q3. Which division must have evolved earlier-Gymnosperms/ Angiosperms? Give reason for your answer.

- Proposed Questions - How are cryptogams different from phanerogams? - Differentiate between gymnosperms and angiosperms? - Without seeing the seeds how will you differentiate between monocots and dicots? NCERT pg no 88 Q2- How are pteridophytes different from the phanerogams? (c.w)	
Evaluation/Assessment: .Oral questionnaire Asking to summarize at the end by comparing gymnosperms and angiosperms.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Differentiate between root of rose plant and grasses.	Advanced Learners *Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Why do the stem of dicot plants become woody as it grows old?[5 min]
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk *Specimen of male and female cone , dicot and monocot leaf and flower to be shown.[5min]	
Common Misconceptions: Gymnosperms donot bear reproductive structures or seeds. Cones are fruits.	Addressing the misconception . Naked seeds(show museum specimen of cone) To be clarified that cones bear gametes.

- Home Assignments:

Q1.Compare a) Gymnosperms and angiosperms b) Dicot and monocot

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-8	October	Diversity in living organisms	Introduction of Animal kingdom.

Expected Learning Outcome:

*Students will be able To Acknowledge new terms such as- coelom, germ layers, notochord, vertebral column, body symmetry with reference to animal kingdom.

Expected skill development:

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

* Communication skills by Developing scientific vocabulary and it's proper usage.

*Critical thinking by Systematic approach to classify organisms on the basis of concrete characteristics.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction- Recapitulation of the classification of Kingdom- Plantae through flow chart

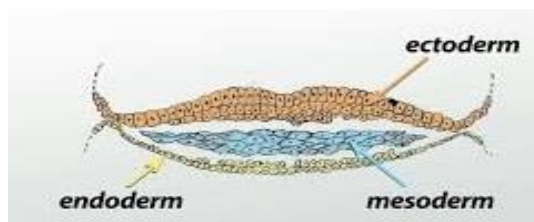
(5 min)

Content

Students will be introduced with some new terms which help us to identify and classify animals as mentioned below- [20 min]

Germ layers- functions and

Classification of organisms on its basis as - diploblastic and triploblastic.

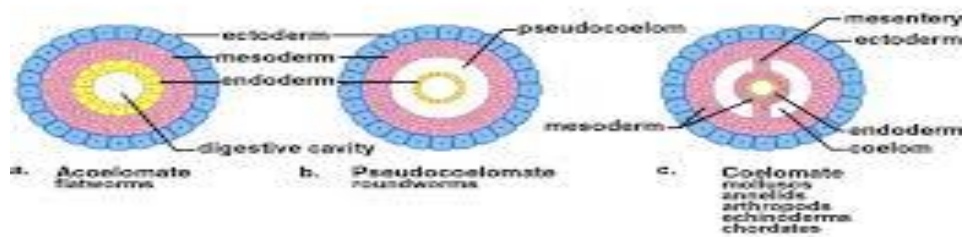


Q. Which type of organisms are more developed- diploblastic and triploblastic? Justify.

Coelom (body cavity) Functions and its types as- False/ pseudo/True coelom.

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Acoelomate, pseudocoelomate, coelomate comparison

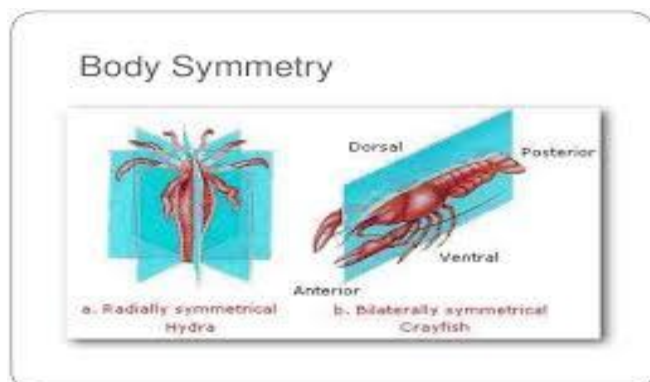


Body symmetry – line dividing organism in equal halves

Q. Which type of symmetry is present in human beings and few examples as earthworm and starfish?

Explain its types of symmetry as - radial / bilateral.

Q. what should be the probable shape of organisms showing radial symmetry?



Notochord- structure and function and its modification as vertebral column

Thinkline- If the notochord in vertebrates is not replaced by a vertebral column, what could be the possible consequences in such animals with respect to their body structure and movement? [5min]

Teaching methodology- discussion through examples from life, Question answer through open ended situations

Closure-The concepts would be summarized asking students questions as mentioned.-

Q. Differentiate between notochord and vertebral column. (H.W) [5min]

Q. How are animals with radial symmetry different from bilateral symmetry?

Proposed Questions [5min] Q1. What is symmetry? Q2. What name is given to organisms with two germ layers? Q3. Which structure forms the skeletal system for vertebrates? Q4. Which group of organisms has notochord?	
Evaluation/Assessment: *Oral questionnaire *Asking to summarize at the end by discussing examples of organisms showing the different germ layers/ body cavity and symmetry.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Name one organism which shows bilateral symmetry.	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. What is present in the cavity in diploblastic organisms?
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk	
Common Misconceptions: *Unable to acknowledge the concept of coelom and germ layers. *Germ layers and germ cells are confused.[5min]	Addressing the misconceptions: Explain from zygote to germ layers. Explain germ layers as reproductive cells.

- Home Assignments:

Q1. Define the following- Germ layers, coelom, symmetry, notochord.

Q2. Differentiate between-1) Diploblastic and triploblastic organisms

2) Radial and bilateral symmetry

LESSON PLAN [2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-9	October	Diversity in living organisms	Classification of Animal kingdom.

Expected Learning Outcome:

*Students will be able To Classify Animal kingdom into various phyla on the basis of concrete characteristics.

Expected skill development:

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

* Communication skills by Developing scientific vocabulary and it's proper usage.

*Critical thinking by Systematic approach to classify organisms on the basis of concrete characteristics.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction-

Students would be asked a few question s to review their concepts taught in the last class as-[5min]

Q1. What are triploblastic organisms?

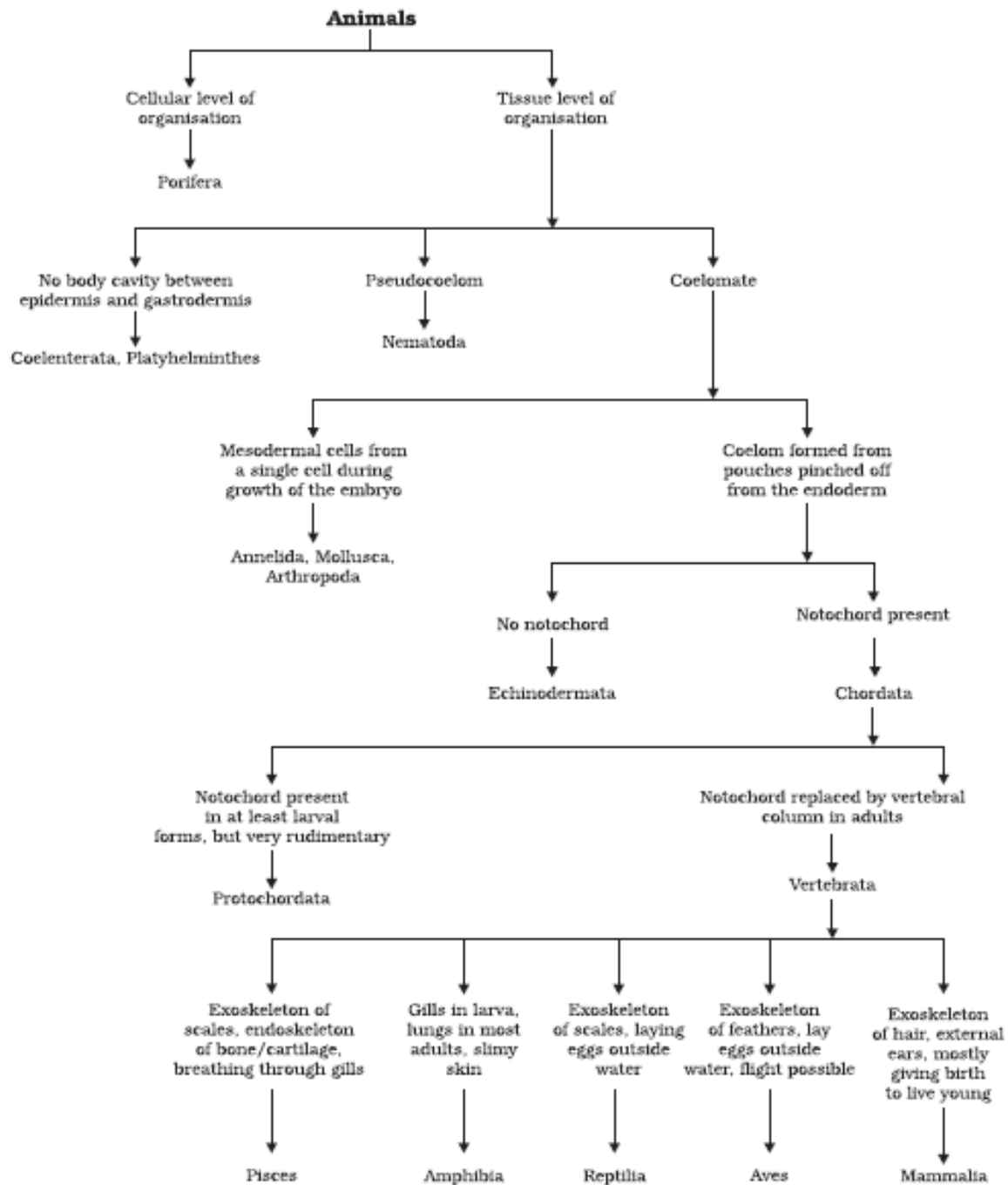
Q2. Which symmetry is shown by starfish?

Q3. What is pseudocoelom?

Content

Students will be asked to identify various characteristics which can be used to classify animal Kingdom as- [20 min]

Level of organization/body cavity/ germ layers/presence or absence of notochord



Thinkline- Q. Differentiate between the type of coelom in Annelida and Echinodermata

Q. Which level of organization is present in Chordates?

Teaching methodology- Discussion through examples from life, Question answer through open ended situations

Closure-The concepts would be summarized asking students questions as mentioned.-

Q. Identify the organism which shows presence of-

a) Coelom derived from mesoderm and shows presence of soft skin?

b) Notochord in the larva stage only

Proposed Questions [5min] Q1. Classify animal kingdom using a flow chart.(c.w) Q2. Which phylum consist of diploblastic organisms? Q3. Which phylum is more represents higher forms of animals- Platyhelminthes or Arthropoda?	
Evaluation/Assessment: *Oral questionnaire * Identification of phylum by observing the flowchart.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Identify group of organism which develop from two germ layers.	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Make the word wall on important terms learnt.
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk.	
Common Misconceptions: Usage of incorrect scientific vocabulary.	Addressing the misconceptions: On discussion key words to be written on the board.(through word wall)

- Home Assignments:
NCERT Pg no. 97 Q5- How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?

LESSON PLAN [2019 -- 2020]



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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-10	October	Diversity in living organisms	Phylum Porifera and Coelenterata

Expected Learning Outcome:

*Students will be able To compare the characteristics features of phylum Porifera and phylum Coelenterata on the basis of their - coelom, germ layers, notochord, vertebral column, body symmetry and presence of any special character.

Expected skill development:

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

* Communication skills by Developing scientific vocabulary and it's proper usage.

*Critical thinking by Systematic approach to compare organisms on the basis of concrete characteristics.

*Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction -.

Students would be asked a few question s to review their concepts taught in the last class as-[5min]

Q1. Which phylum for the first time shows presence of a notochord?

Q2. Which phylum shows animals with triploblastic body for the first time?

Q3. Fishes are placed in which phylum?

Content

Students will be comparing the characteristic features of phylum Porifera and Coelenterate on the basis of-[20 min]

coelom,

germ layers,

notochord,

vertebral column,

body symmetry and presence of any special character.

Phylum Porifera (sponges)

Discuss the above mentioned characters and habitat and presence of peculiar canal system.

Diagram of sycon showing the canal system

<Name of fresh water sponge>

Phylum Coelentrata

Discuss above mentioned characters and discuss their habitat, presence of gastro vascular cavity in them, their economic importance

Diagram of hydra

Other known examples of Coelentrata- jelly fish/ corals

Thinkline- Q. Why are poriferans commonly called as sponges? (5 min)

Q. Why is jelly fish placed in coelenterates.(C.W)

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-

The concepts would be summarized asking students questions as mentioned.-(5 min)

Q. Compare the characteristic features of Poriferans with coelenterates.(using parameters)

Proposed Questions [5min] Q1. What is body symmetry in coelenterates? Q2.Which phylum shows diploblastic organisms? Q3. Which phylum shows the presence of a peculiar canal system?	
Evaluation/Assessment: *Oral questionnaire * Through tabular comparison of phylum Porifera and Coelenterate.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Which type of symmetry is present in starfish?	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Find out more about coral reefs, their structures, formation, damage and revival techniques.

Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk Specimen shown for observation	
Common Misconceptions: Hydra is a plant, corals are plants, Jelly fish is a true fish [5min]	Addressing the misconceptions: Discuss about the movement of hydra/ characteristics to be discussed.

- Home Assignments:
- Q. Compare the characteristic features of Poriferans with coelenterates and represent one diagram for each of them.(using parameters)

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Expected Learning Outcome:
 *Students will be able To identify and compare the characterstics features of phylum Platyhelminthes and phylum Nematoda on the basis of their - coelom, germ layers, notochord, vertebral column, body symmetry and presence of any special character.

- . * Reading skills while comprehending the question asked.
- *Comprehension of the text while asking questions and writing answers.
- * Communication skills by Developing scientific vocabulary and it's proper usage.
- *Critical thinking by Systematic approach to compare organisms on the basis of concrete characteristics.
- *Creativity while drawing diagrams with accuracy.

Introduction-

Q1. What does the word porifera signify?

Q2. Which phylum shows animals with stinging cells for defensive mechanism?

Q3. Name a fresh water poriferon?

O4. What is the significance of the canal system in porifera?

Q5. Differentiate between Hydra and Sycon on the basis of a) level of organization b) germ layers

Content

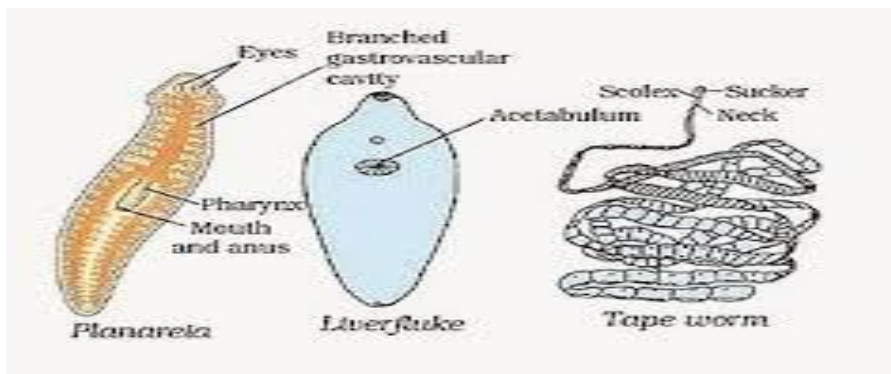
Students will be comparing the characteristic features of phylum Platyhelminthes and Nematoda on the basis of- [20 min]

coelom, germ layers,
notochord, vertebral column,
body symmetry and presence of any special character.

Phylum Platyhelminthes-(flat worms)

Discuss the above mentioned characters and presence of triploblastic germ layers.

With examples- ,Tape worm, Planaria, Liver fluke and represent diagrams for them



Phylum nematode-(round worms)

Discuss above mentioned characters and discuss presence of false coelom (pseudocoelom) and discuss few examples of pathogenic round worms. (Ascaris, Waucheria) and represent diagram of Ascaris.



Thinkline- What type of organ differentiation will be observed in flatworms due to presence of triploblastic germ layers?

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-The concepts would be summarized asking students questions as mentioned.-

Q. Compare the characteristics of platyhelminthes and nematode. (5 min)

Proposed Questions [5min] Q1. What is the body symmetry in flatworms? Q2. which phylum shows triploblastic organisms for the first time? Q3. Ascaris shows separate sexes. What does this signify?	
Evaluation/Assessment: *Oral questionnaire *Asking to summarize by comparing characteristics of Platyhelminthes and coelenterates with examples.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Why are Platyhelminthes called as flatworms? Q. Why are Nematods called as round worms?	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. Identify parasitic adaptations in tapeworms?[5 min] Q. Identify few parasitic Nematods commonly seen in India.
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk *Museum specimens of Flatworms and roundworms.	
Common Misconceptions: confusion in phylum of Flat worms or round worms. Worms donot have sensory organs or systems.	Addressing the misconceptions: On discussion key words to be written on the board. Explain the meaning of platyhelminthes as Flat worms. List and identify various organs of flatworms in the diagram.

- Home Assignments: [5 min]

Q1. Compare Characteristics of phylum Platyhelminthes and Nematoda and represent one diagram for each of them.

LESSON PLAN [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min. Pd-12	November	Diversity in living organisms	Animal kingdom- Phylum Annelida and Arthropoda.

Expected Learning Outcome:

*Students will be able To compare the characteristics features of phylum Annelida and phylum Arthropoda on the basis of their - coelom, germ layers, notochord, vertebral column, body symmetry and presence of any special character.

Expected skill development:

- * Reading skills while comprehending the question asked.
- *Comprehension of the text while asking questions and writing answers.
- * Communication skills by Developing scientific vocabulary and its proper usage.
- *Critical thinking by Systematic approach to compare organisms on the basis of concrete characteristics.
- * Citizenship
- *Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction-

Students would be asked a few questions to review their concepts taught in the last class as- [5min]

Q1. Which phylum has pseudocoelom?

Q2. Which phylum shows animals which are dorsoventrally flattened?

Q3. Tapeworm and fluke belong to which phylum?

Content

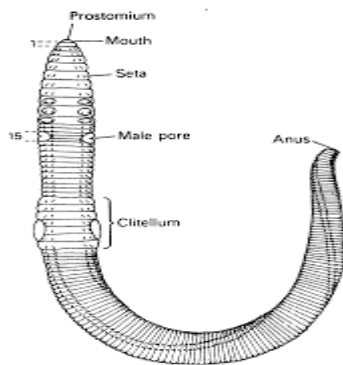
Students will be comparing the characteristic features of phylum Annelida and Arthropoda on the basis of-[15 min]

coelom, germ layers,
notochord, vertebral column,
body symmetry and presence of any special character.

Phylum Annelida (segmented worms)

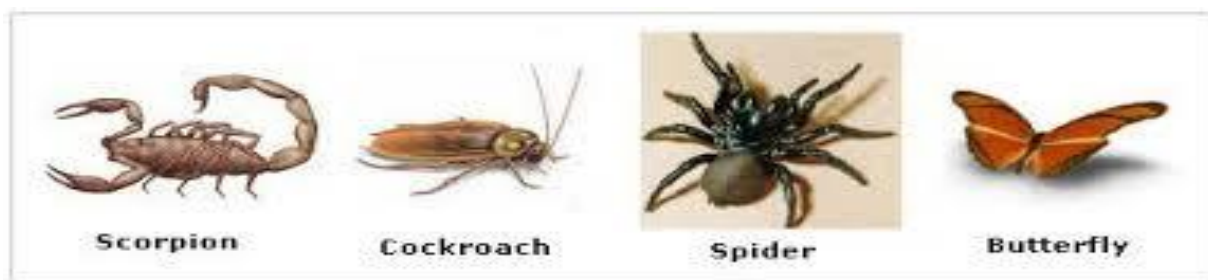
Discuss the above mentioned characters and presence of metameric segmentation in the body., special excretory structures and represent diagrams showing segmentation.

With examples.-Earthworm, Leech



Phylum Arthropoda (presence of jointed appendages)

Discuss above mentioned characters and adaptations to survive, type of circulatory and respiratory system and few examples of various arthropods with specific characters and and represent diagrams displaying specific features.



Thinkline- Butterfly and crabs are placed in the same phylum. Justify the statement.[5min]

Teaching methodology- discussion through examples from life, Question answer through open ended situations

Closure-The concepts would be summarized asking students questions as mentioned.-

Q. Compare characteristics of Annelida and Arthropoda. (5 min)

- Proposed Questions [5min]

Q1. What is the name given to special segmentation in annelids?

Q2.Name an annelid which shows bisexual nature?

Q3.Arthropoda is largest phylum of invertebrates. Identify their adaptations which help them to live and show wider adaptability on Earth ?

- Evaluation/Assessment:

*Oral questionnaire

*Asking to summarize through tabular comparison between annelids and arthropods. * identifying adaptations of arthropods.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Identify any two arthropods which show presence of six legs.	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Annelida and arthropoda both show segmentation. What is the difference between them.(c.w [5 min])
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk Specimen shown for observation	
Common Misconceptions: Usage of incorrect scientific vocabulary like confusion in phylum names. Butterfly and crabs cannot be placed together.	Addressing the misconceptions: On discussion key words to be written on the board and on the word wall. Explain the meaning of names for better understanding. List and identify common features for putting them in one group.

- Home Assignments: [5 min]

Q1. Compare characteristics of phylum Annelida and Arthropoda and represent one diagram for each of them.

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FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Students would be asked a few questions to review their concepts taught in the last class as-[5min]

Q2. Name any blood sucking organism belonging to Annelida?

Q3. Honeybee and cockroach belong to which phylum?

Students will be comparing the characteristic features of phylum Mollusca and Echinodermata on the basis of -[15 min]

coelom, germ layers,
notochord, vertebral column,
body symmetry and presence of any special character.

Phylum Mollusca (soft bodied)

Discuss the above mentioned characters and presence of soft body and hard covering shells, with a foot for locomotion and represent diagrams.

With examples.- Unio, pila, Octopus

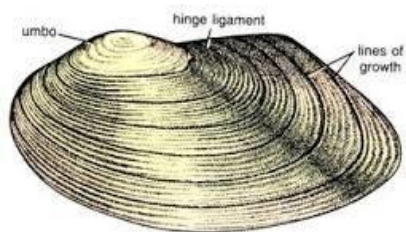


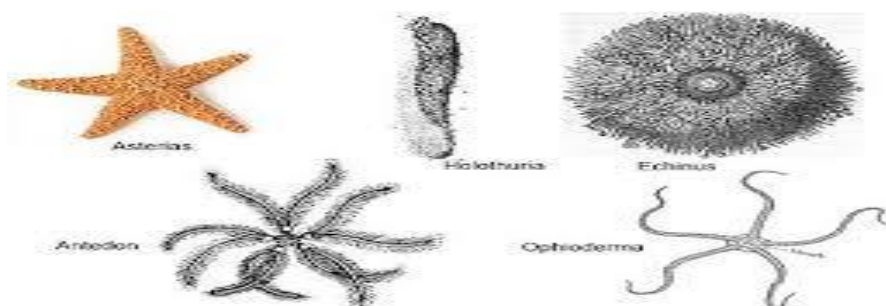
Fig. 61.1. *Umbra*. Entire animal with shell (Lateral view)



picture: E.G. Alderson

Phylum Echinodermata (spiny skinned)

Discuss above mentioned characters and presence of tube feet for locomotion and few examples of various echinoderms and represent diagrams.



Thinkline- Starfish being a fish is placed in echinodermata. Justify the statement.(c.w)(5 min)

Teaching methodology- discussion through examples from life , Question answer through open ended situations

Closure-The concepts would be summarized asking students question as mentioned.-

Q. Compare characteristics of Mollusca and Echinodermata.[5min]

Proposed Questions

Q1. Which phylum shows presence of tube feet for locomotion?

Q2.Name a molluscan which does not have shell?

Q3.Identify an economically beneficial molluscs?

Evaluation/Assessment:

*Oral questionnaire

*Asking to summarize at the end through tabular comparison between Mollusca and Echinodermata.

Learners on the way

Advanced Learners
Assist the peers in comprehending the

*Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. What is the symmetry in a star fish?	questions and writing answers with scientific vocabulary. Q. Which characters of octopus enables it to be placed in Mollusca?
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk Specimen shown for observation	
Common Misconceptions: Mollusca and echinodermata both have rough skin Octopus is not a mollscan as it is not having shell. Water vascular system and canal system are confused[5min]	Addressing the misconceptions: key words to be written on the board/ word wall. Explain the meaning of names for better understanding. List and identify common features for putting octopus in this group.

- Home Assignments: [5 min]
Q1. Compare characteristics of phylum Mollusca and Echinodermata and represent one diagram for each of them.

LESSON PLAN [2019 -- 2020]



DLF Public School

THE LEARNING ACADEMY

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Teacher Name	Class	Subject	Time slot	Date	Lesson	Topic
	IX	Biology	35 min.+35 min. Pd-14, 15	November	Diversity in living organisms	Animal kingdom- Phylum chordate

Expected Learning Outcome:

*Students will be able To identify the characteristics features of phylum Chordata on the basis of their - coelom, germ layers, notochord, vertebral column, body symmetry and presence of any special character.

*classify vertebrata and compare its various classes.

Expected skill development: Reading skills while comprehending the question asked.

* Reading skills while comprehending the question asked.

*Comprehension of the text while asking questions and writing answers.

* Communication skills by Developing scientific vocabulary and it's proper usage.

*Critical thinking by Systematic approach to classify organisms on the basis of concrete characteristics.

*Creativity while drawing diagrams with accuracy.

FLOW OF LESSON WITH RESPECT TO TIME (Introduction/warm-up, Content, Think Line, Closure)

Introduction-

Students would be asked a few questions to review their concepts taught in the last class as-[5min]

Q1. Which phylum has soft bodied animals?

Q2. Which phylum shows animals which have tube feet for locomotion?

Q3. Octopus belongs to which phylum?

Content

Students will be identifying the characteristic features of phylum Chordata on the basis of - [15 min]

coelom, germ layers,

notochord, vertebral column,

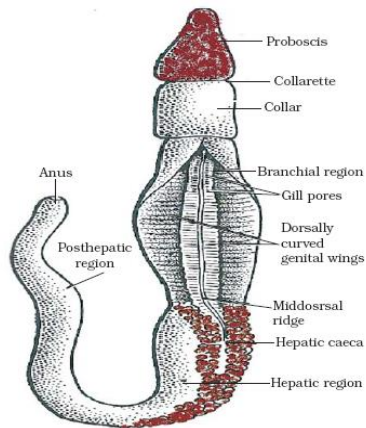
body symmetry and presence of any special character.

Phylum chordata

Discuss the above mentioned characters and presence of notochord in the body ,Functions and importance of notochord

Discuss about two subgroups as –

- Protochordata (notochord atleast in the larval stages.) With examples. -
Balanoglossus



- Vertebrata(notochord replaced with a vertebral column) with examples[10 min]



Classification of vertebrates

Vertebrates are animals with backbones (part of an internal skeleton).

Vertebrates are divided into five groups called classes.

Details of each group are given in the table below.

Vertebrate class	Body covering	Movement	Reproduction	Sense organs	Other details	Examples
Fish	Scales	Fins (also used for balance)	Usually produces jelly-covered eggs in water	Eyes but no ears, lateral line along body for detecting vibrations in water	Cold-blooded, gills for breathing	Herring, perch, shark
Amphibians	Moist skin	Four limbs, back feet often webbed to make swimming more efficient	Produces jelly-covered eggs in water	Eyes and ears	Cold-blooded, lungs and skin for breathing	Frog, toad, salamander
Reptiles	Dry, with scales	Four legs (apart from snakes)	Eggs with rubbery, waterproof shell – laid on land	Eyes and ears	Cold-blooded, lungs for breathing	Crocodile, python
Birds	Feathers, scales on legs	Wings, two legs	Eggs with hard shell	Eyes and ears	Warm-blooded, lungs for breathing, beak	Flamingo, pigeon
Mammals	Fur	Four limbs	Live young	Eyes, ears with pinna (external flap)	Warm-blooded, lungs for breathing, females have mammary glands to produce milk to feed young, four types of teeth	Elephant, mouse

Also compare the circulatory system (no of chambers in heart) for all the classes.

- Discuss about Binomial Nomenclature and conventions followed while writing scientific names.

Thinkline- Snake and turtle are placed in the same phylum. Justify the statement.

Which is the most important characteristic for classifying vertebrata.?

Teaching methodology- discussion through examples from life, Question answer through open ended situations

Closure-The concepts would be summarized asking students questions as mentioned.-

Q. Compare characteristics of classes of vertebrata.

Proposed Questions [5min] Q1. What do the word protochordata signify? Q2.Enlist the functions of notochord/ vertebral column? Q3.Name an egg laying mammal ?	
Evaluation/Assessment: *Asking to compare the classes through a flowchart.	
Learners on the way *Individual attention within the class. *Extra input time outside the class. *Peer learning through appropriate seating arrangement. Q. Identify features used for classifying vertebrata in various classes?	Advanced Learners Assist the peers in comprehending the questions and writing answers with scientific vocabulary. Q. What would be the consequence if notochord is not replaced by vertebral column? [5 min]
Materials needed/Resources: *Class IX NCERT textbook *Blackboard, chalk Specimen shown for observation	
Common Misconceptions: Usage of incorrect scientific vocabulary like confusion in phylum names. Horse, rat and cat cannot be placed in the same phylum	Addressing the misconceptions: On discussion key words to be written on the board/ word wall. Explain the meaning of names for better understanding. List and identify common features for putting them in one group.

- Home Assignments: .[5min]

NCERT

Pg 94, Q3- Q. What are the differences between amphibians and reptiles?

Q4- What are the differences between animals belonging to Aves group and those in mammalia group?

Pg 97 Q6- Explain how animals in vertebrates are classified into further subgroups?