

Delhi Public School Ghaziabad
Class XI
Biology Lesson plan based on DOL
Chapter 13 – Photosynthesis

Unit	Plant Physiology (Chapter 13 Photosynthesis)
Class Transaction	Total: 4 periods
Pre-requisite for the course	This lesson requires • Basic knowledge of early experiments of photosynthesis • Knowledge of site of photosynthesis i.e. chloroplast • Knowledge of pigments that are involved in photosynthesis • Light reaction and dark reaction
Assessment of qualifying knowledge	• Written test • Lab activity • Oral questioning
Objective	Students would be able to understand • Where does photosynthesis take place? • Role of pigments in photosynthesis • Mechanism of light reaction • Mechanism of dark reaction (C3 and C4 cycle) • Photorespiration • Factors affecting photosynthesis
Learning Outcomes	<u>KNOWLEDGE</u>- <i>Students will know and understand</i> • How simple experiments led to a gradual development in the understanding of photosynthesis. • Mechanism of light and dark reaction • Factors affecting rate of photosynthesis <u>SKILLS</u>- <i>Students would be able to</i> • Differentiate between C3 and C4 cycle • Mechanism of chemiosmosis for ATP synthesis • Understand importance of formation of proton gradient and breakdown of proton gradient Competencies developed in students: collaborative learning, critical thinking and problem solving, character building, communication, citizenship
Transaction Methodology (The teacher can use the mentioned techniques, wherever applicable, and can use any other too.)	Transaction would proceed in the following manner- <i>Brain Storming</i>-The class would start with a discussion on what the students have already learnt in the previous classes and hence what is it that they would learn now. They would also be told the significance of the topic that they would be studying. <i>Introduction of the topic</i>- ppt and Digital Content would be shared <i>Guided practice followed by Independent Practice</i>- NCERT questions to be discussed in the classroom. Techniques to be used: Quiz, MCQ, Peer Assessment, Case Studies, Lab Activities, Any Other
Resources	NCERT text book, Reference Book, CBSE Exemplar, DPSG Spiral www.learncbse.in/cbse-notes/

	https://mycbseguide.com www.examfear.com
Self Study, Home Work, Assignments	Independent Practice: Students would do the given questions in their spirals. It is also advised that the students come to the class with proper background knowledge of the topic under discussion. They can refer to the resources stated above.
Assessments	UNIT TESTS , HALF YEARLY EXAMINATION, ANNUAL EXAMINATION
Addressing Classroom Diversity	Due to various social backgrounds and multiple intelligences, the classroom might be a diverse arena. The following techniques can be used for various groups: <i>For high scoring students:</i> High order thinking questions to be done Encouragement for referring other resources <i>For low scoring students:</i> Spiral questions Peer education PCC classes <i>For differently abled students:</i> Call parents at regular intervals Provide grade-up classes Encourage and motivate them at every level.
Marks	The weightage of whole unit is 18 marks and is given by CBSE.

Day 1:

- Students will be shown a ppt and will be made aware of the site of photosynthesis.
- Students will be told about the involvement of pigments in photosynthesis.
- Students will be told about the absorption spectrum and action spectrum.

Guided practice:

- Students will be made to list all the early experiments that led to the development of understanding of photosynthesis.
- Students will be made to describe and discuss in groups how photosynthesis is affected by quality and quantity of light.

Communication and brainstorming: Students develop effective communication skills and learn to put across their views.

Collaboration: Students learn to work in collaboration to achieve a common goal. They learn to manage time and divide and delegate work and responsibilities.

Summarize and check for understanding:

- Oral questioning based on the day's teaching.

Independent practice:

- Students will be asked to revise the work done in class.

Day 2:

- Students will be shown a ppt and will be made aware of photosystems and light harvesting complexes.
- Students will be told about the electron transport chain.
- Students will be made aware of mechanism of cyclic and non-cyclic photo-phosphorylation.

- d. Students will be told about chemiosmotic hypothesis.

Guided practice:

- a. Students will be made to recall all the intermediates of light reaction.
- c. Students will be asked to describe and discuss in groups about the importance of splitting of water.
- d. Students will be asked to make diagram to show maintaining proton gradient and role of ATP synthase in breakdown of proton gradient.
- e. Students will be asked to describe and discuss in groups about the use of ATP and NADPH use in photosynthesis.

Critical thinking and problem solving: Helps students to think critically and solve the given problem

Communication and brainstorming: Students develop effective communication skills and learn to put across their views.

Summarize and check for understanding:

- a. Oral questioning based on the day's teaching
- b. Discussion on the topic in groups – Why are we so interested in proton gradient?.

Character and citizenship: Group discussion helps to develop interpersonal skills, respecting and valuing views of others

Independent practice:

- a. Students will be asked to revise the work done in class.
- b. Students will be asked to describe flow of electrons and protons in electron transport chain.

Day 3:

- a. Students will be shown a ppt and will be made aware of the Calvin cycle.
- b. Students will be told about the importance of RUBISCO.
- c. Students will be made aware of C₄ cycle.
- d. Students will be made aware of Kranz anatomy.

Guided practice:

- a. Students will be made to differentiate between C₃ and C₄ cycle.
- c. Students will be asked to list all the events of C₃ and C₄ cycle.
- d. Students will be asked to describe and discuss in groups about the specialty of C₄ plants and how are they adapted to dry tropical regions.

Collaboration: Students learn to work in collaboration to achieve a common goal. They learn to manage time and divide and delegate work and responsibilities.

Communication and brainstorming: Students develop effective communication skills and learn to put across their views.

Summarize and check for understanding:

- a. Oral questioning based on the day's teaching
- e. Discussion on the topic in groups – number of ATP and NADPH molecules required for synthesis of one molecule of glucose by Calvin cycle.

Communication: Involves sharing of ideas and information to advance scientific understanding, processes, theories and discoveries

Independent practice:

- a. Students will be asked to revise the work done in class.
- b. Students will be asked to make flow chart to show Calvin cycle.

Day 4:

- a. Students will be shown a ppt and will be made aware of the Photorespiration.
- b. Students will be told about the factors affecting rate of photosynthesis.
- c. Students will be made aware of Law of limiting factors.
- d. Students will be made to observe vertical sections of leaves of plants in school garden and look for the presence of bundle sheath cells.

Guided practice:

- a. Students will be made to differentiate between C3 and C4 plants.
- b. Students will be asked to list all the factors affecting rate of photosynthesis.
- c. Students will be asked to describe and discuss in groups about the law of limiting factors.

Collaboration: Students learn to work in collaboration to achieve a common goal. They learn to manage time and divide and delegate work and responsibilities.

Communication and brainstorming: Students develop effective communication skills and learn to put across their views.

Summarize and check for understanding:

- a. Oral questioning based on the day's teaching
- b. Discussion on the topic in groups – Can increased CO₂ concentration in environment lead to higher yields.

Communication: Involves sharing of ideas and information to advance scientific understanding, processes, theories and discoveries

Independent practice:

- a. Students will be asked to revise the work done in class.
- b. Students will be asked to make a graph to show relationship between light intensity and rate of photosynthesis.

Closure of the lesson

Summarizing the lesson by mind mapping
Giving them revision worksheets