CLASSROOM / SELF STUDY

Explore photosynthesis. Keep the questions.

Suggested activity for upper-secondary biology and introductory university courses. Allow 20–30 minutes after studying chloroplasts and redox reactions. This is a teaching proposal, not a validated curriculum resource.

01

Light-dependent reactions: photosystems II and I

Follow the electron journey from water oxidation at photosystem II through cytochrome b_6f and photosystem I towards NADPH. Light supplies energy at both photosystems; the electron and proton routes are not interchangeable.

TASK: Locate PSII and PSI. Where does the electron come from, and what receives it at the end?

02

Proton gradient and ATP synthase

Compare the stroma and thylakoid lumen. Proton accumulation in the lumen helps drive ATP synthesis as protons return through ATP synthase. Visible particles and speeds explain relationships, not measured kinetics.

TASK: Follow the proton route. On which side do protons accumulate, and through which complex do they return?

03

Molecular structures: the PDB atlas

Inspect PSII, cytochrome b_6f, PSI and ATP synthase at a shared scale. The atlas uses experimental PDB structures; its simplified representations are distinct from the explanatory scene.

TASK: Compare two complexes and record their PDB identifiers. What can their shapes show, and what cannot be inferred from a static structure?

Before using it in class

Use a browser with WebGL and test your classroom devices first. Audio is optional. The landing and dossiers remain readable without loading the 3D engine; a complete non-visual equivalent is still pending.

This build focuses on the light-dependent reactions. It does not offer an interactive Calvin cycle, SCORM packages or LTI integration. For Moodle, Canvas or Blackboard, add a link to this page; external iframe embedding is currently blocked.

Finish by drawing the electron and proton routes separately, marking lumen and stroma, and noting two limits of the model. Check your explanation against the sources in the dossier.