

Name: _____ Period: _____ Date: _____

Open **peebedu.com** and navigate to **Electron Jumper**. Click the **Start Adventure!** button to begin. You will follow Ellie, a single electron, from a water molecule through the light reactions. Use the **Notepad** to collect an entry at each stage.

Free Response Questions

Question 1 — Conceptual Analysis

Simulation Task: Play through the game until Ellie reaches the NADPH stage. At Photosystem I, note what happens to the electron when it absorbs a second photon, and note the molecule the electron is handed to at the end of its journey. Open the Notepad and read the Photosystem I and NADPH entries.

(A) (1 pt) **Describe** the molecule that accepts the electron at the end of the light reactions.

(B) (1 pt) **Explain** why the electron must absorb light energy a second time at photosystem I.

(C) (1 pt) **Predict** what will happen to the amount of NADPH produced if photosystem I can no longer absorb light.

(D) (1 pt) **Justify** your prediction.

Question 2 — Analyze Model / Visual Representation

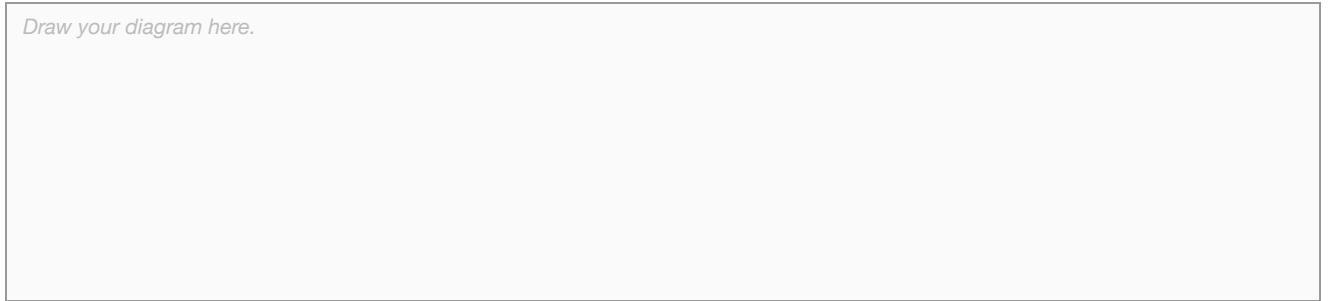
Simulation Task: *Replay the game from the beginning. At the Water Molecule stage, note what is released when the water molecule is split. Follow Ellie from Photosystem II through the Electron Transport Chain to Photosystem I, watching the proton pumps as she passes each one.*

(A) (1 pt) **Describe** the gas released when the water molecule is split at photosystem II.

(B) (1 pt) **Explain** how the proton pumps along the electron transport chain change the proton concentration across the thylakoid membrane.

(C) (1 pt) **Represent** the route Ellie travels by drawing a labeled diagram of the thylakoid membrane showing the water molecule, photosystem II, the electron transport chain, photosystem I, and NADP⁺.

Draw your diagram here.



(D) (1 pt) **Explain** why the protons that build up on one side of the thylakoid membrane cannot diffuse back across it on their own.

3.4.B.2, 3.4.B.3, 3.4.B.4