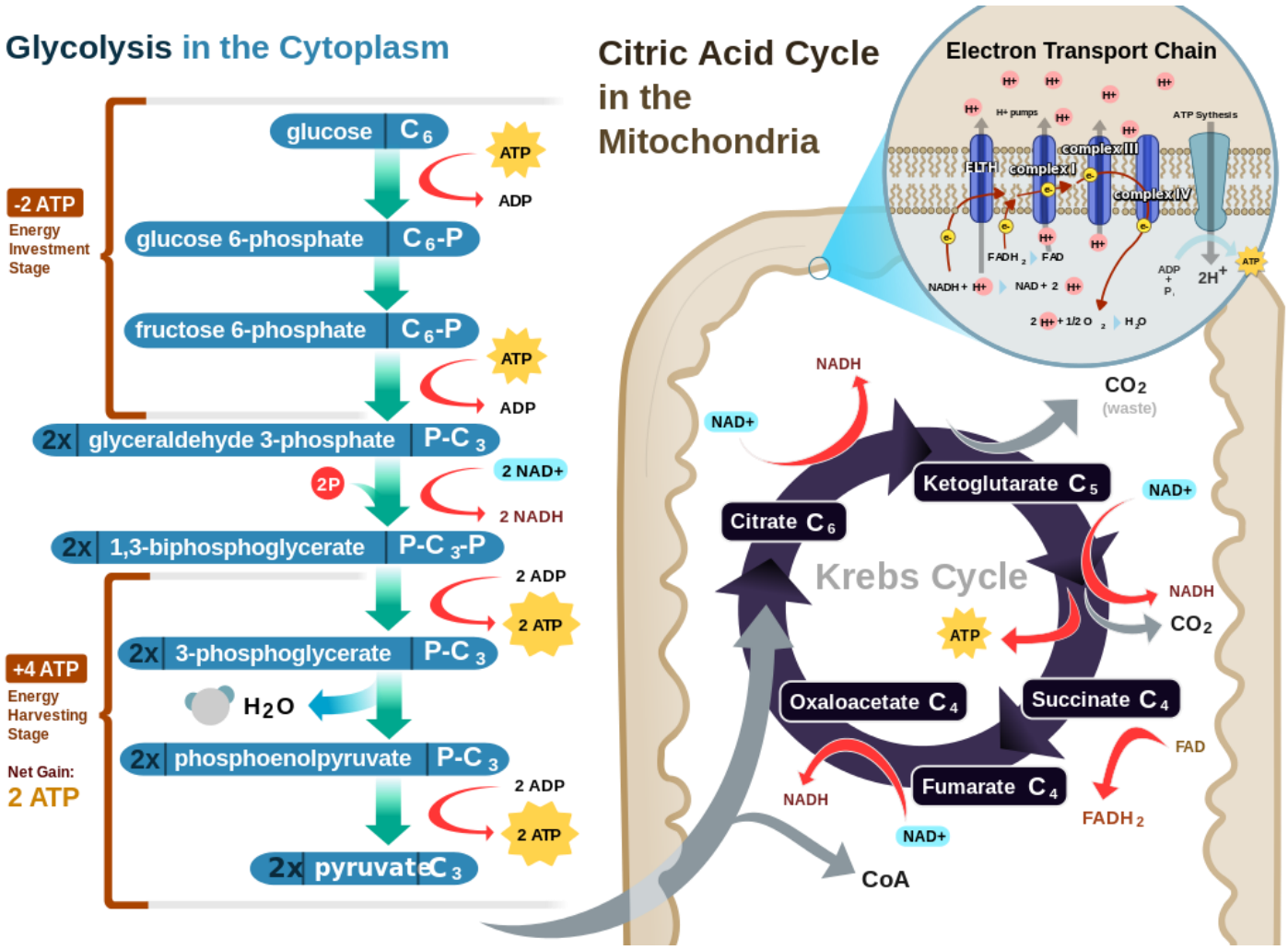
CONCEPT: OVERVIEW OF AEROBIC RESPIRATION

- **Cellular respiration** is a series of reactions involving electron transfers to breakdown molecules for _____ (ATP)
    1. Glycolytic pathway: Glycolysis and Fermentation
    2. Pyruvate (end product of glycolysis) is oxidized (loss of electrons) to create *acetyl CoA*
    3. Tricarboxylic cycle (Krebs cycle or citric acid cycle) oxidizes acetyl CoA to create CO_2
    4. Electrons are transferred through the *electron transport chain*
    5. ATP synthesis occurs

EXAMPLE: Steps of cellular respiration



● **Oxidative phosphorylation** is the series of reactions that oxidizes molecules and uses electrical energy to generate ATP

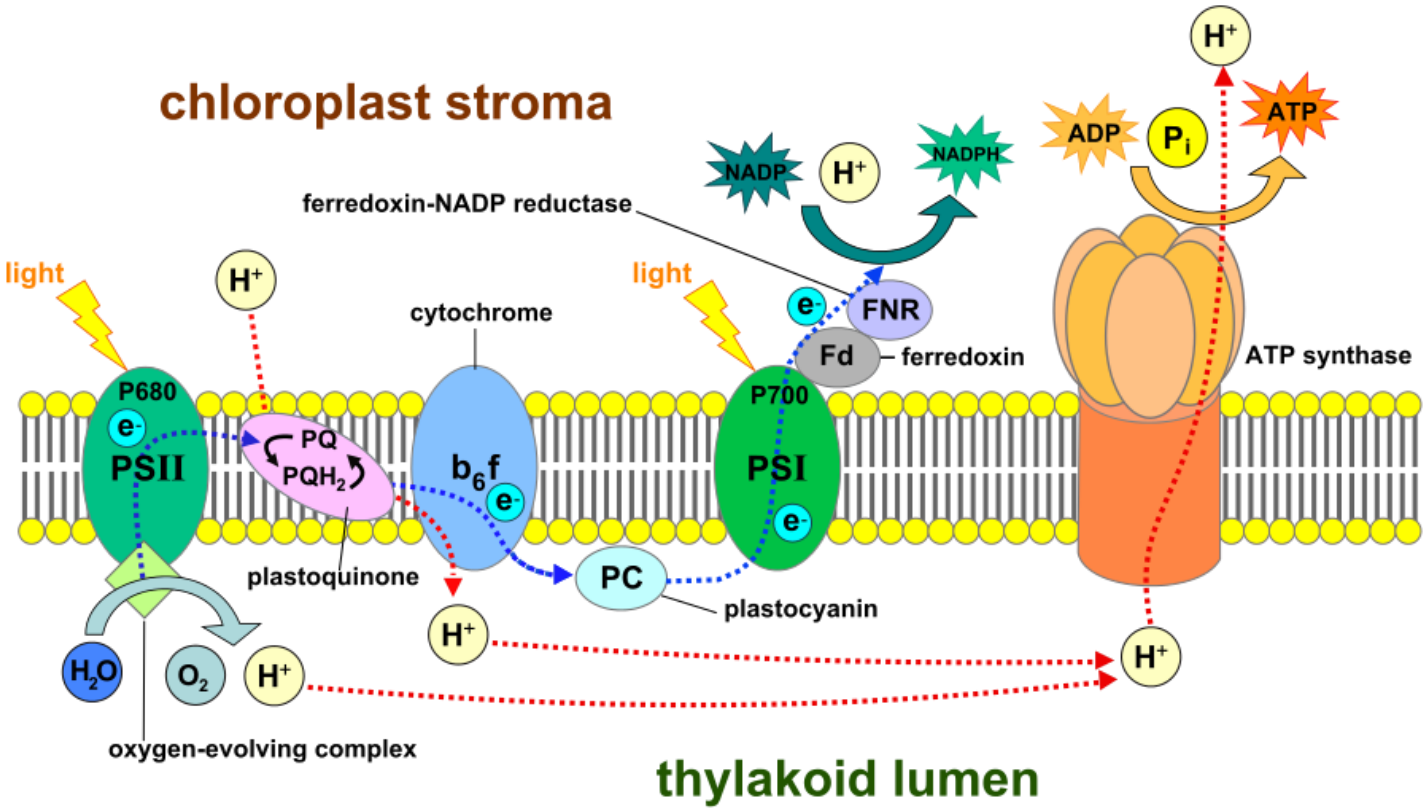
□ Involves **chemiosmotic coupling** of a proton electrochemical gradient and ATP synthesis

- Stage 1: Electron transport chain (#4) pumps H^+ across a membrane creating electrochemical gradient

- Stage 2: ATP synthesis (#5 above) allows H^+ to flow down their gradient through proteins that create ATP

- **Proton motive force** is the H^+ electrochemical gradient used to drive ATP synthesis

EXAMPLE: Process of oxidative phosphorylation



PRACTICE

1. Which of the following shows the correct steps of cellular respiration?
    a. Glycolysis → Pyruvate Reduction → TCA → ATP Production → ETC
    b. Pyruvate Reduction → Glycolysis → TCA → ATP Production → ETC
    c. Glycolysis → TCA → Pyruvate Reduction → ATP Production → ETC
    d. Glycolysis → Pyruvate Reduction → TCA → ETC → ATP Production

2. Oxidative phosphorylation includes all but which of the following?
    a. Chemiosmotic coupling of a proton electrochemical gradient and ATP synthesis
    b. Electron transport chain
    c. ATP synthesis
    d. Glycolysis