

Biology 10

Chapters 8-1, 8-2

“Energy and Life”

“Photosynthesis: An Overview”

p 226-234

Objectives

- Describe the role of ATP in organisms.
- Give the overall equation for photosynthesis.
- Describe the role of light and chlorophyll in photosynthesis
- Describe the main phases of photosynthesis

ATP

- ATP stands for _____
- ATP _____ for a cell
- Whenever a cell needs energy for an activity, it “burns” an ATP
- The energy comes from the high energy bonds between the adjacent _____ groups (PO_4^{3-})

ATP and ADP

- When a phosphate group is removed from an ATP, a molecule of _____ (**adenosine diphosphate**) is formed, and energy is released.
- A cell may re-form ATP by _____ group back on to the ADP
- This is the role of photosynthesis and respiration!

The Photosynthesis Equation

copy the net equation for photosynthesis below!

Light, the Energy Source

- To convert carbon dioxide and water into a high energy molecule like sugar, you need _____!
- Plants capture the energy of _____ by absorbing it
- The light is absorbed by _____
 - there are two types of chlorophyll
 - **chlorophyll a**: absorbs _____ light
 - **chlorophyll b**: absorbs _____ light
 - The light energy is transferred to the electrons in chlorophyll, which _____ them (raises them to higher energy levels)
 - As the electrons “fall” to their _____, the energy they release is converted to chemical energy by the cell

Diagram of Excited Electrons

Draw a quick sketch of an atom with excited electrons below

Electron Carriers

- Once the electrons are excited, they are harvested by a molecule called an _____
- In photosynthesis, the electron carrier is called _____ (nicotinamide adenine dinucleotide phosphate)
- Electron carriers are important because they capture the electron before it can return to ground state, and then _____ to transfer that energy
- an analogy is an _____, it allows you to transport a hot potato to a plate without losing heat (fig 8-6, p232)

Photosynthesis: An overview

- Photosynthesis has two main phases
 - **light dependent reactions:** in this phase:
 - light energy is used to _____, where they are used to make _____ (the reduced form of NADP^+)
 - _____ is also formed, which is used to make the glucose in the second phase
 - **light independent reactions (The Calvin Cycle)**
 - in this phase, _____ is turned into _____ using the NADPH and ATP produced in the light dependent reactions

Overview of Photosynthesis (see Fig 8-7, p233)