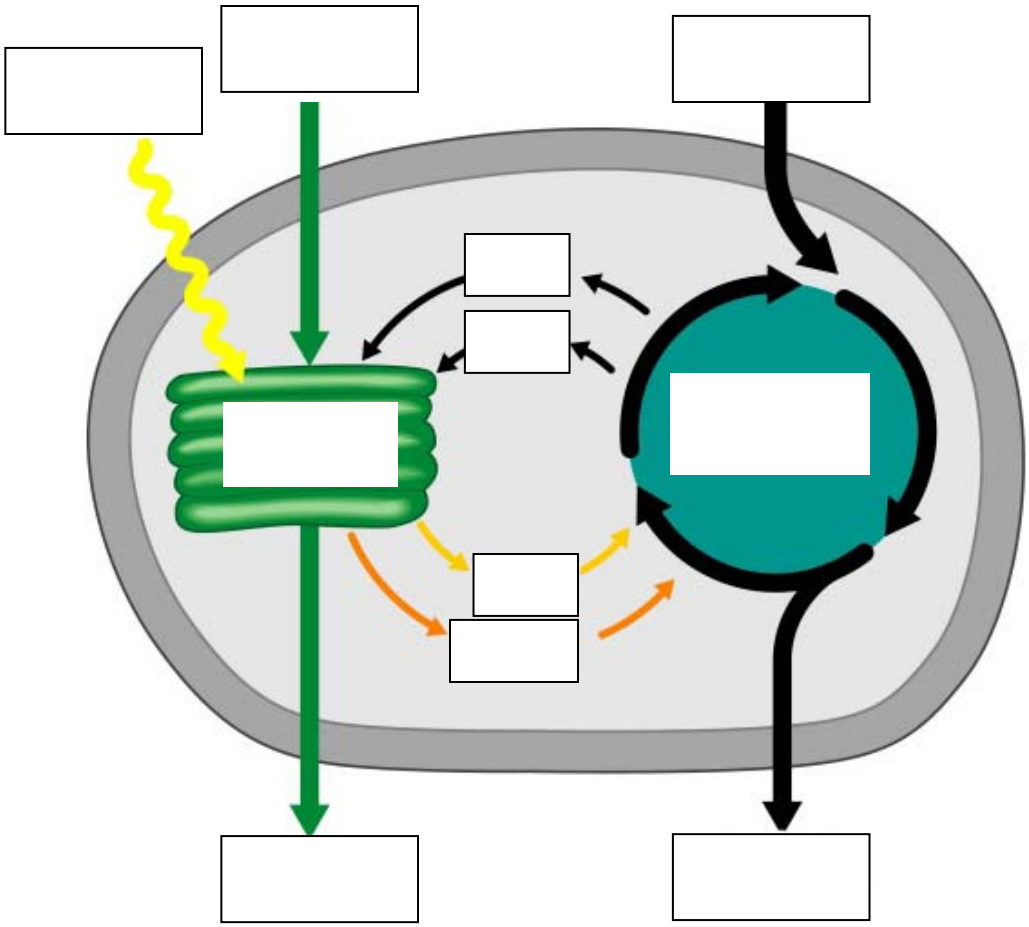
Chapter 7; Photosynthesis

Photosynthesis; Making food

- Ultimately, the energy to power all organisms comes from the _____
- _____, algae, and some bacteria have a special chemical called _____ to capture _____.
- The sunlight is converted into _____.
- The ATP is then used to make covalent _____ energy in _____ molecules.
- In eukaryotic organisms, these reactions take place in _____.

Photosynthesis; the reactions

- When light hits the chloroplast, _____ become excited.
- The excited electrons are used to make _____
- Water is split into _____ and _____ (released as waste)
- The ATP is then used to convert _____ into sugar molecules that can then be used in _____.



_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

- The _____ reactions convert solar energy to _____ energy
- The _____ cycle makes sugar from __

A quick overview of the parts of a chloroplast

●Inside each chloroplast are _____, or pancake-like membranous structures in which _____ takes place.

●A stack of thylakoids is called a _____ (or _____, plural)

●The _____ is the liquid part of the chloroplast (like the matrix in the _____)

The steps in photosynthesis; The light-dependant reactions

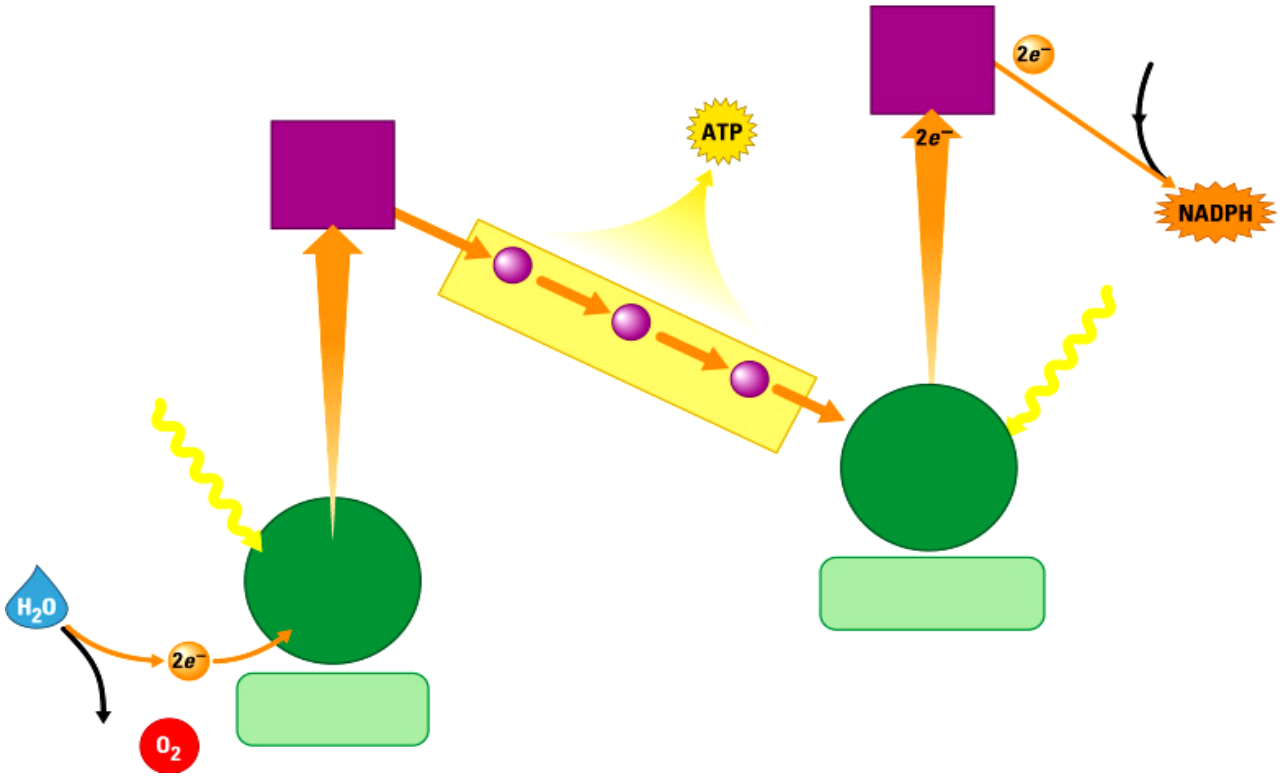
●The light dependant reactions require _____ and occur in the _____

●H_2O and _____ must enter the thylakoids in order to start the process.

●Individual units of light that can be captured are called _____

●_____ and NADPH are the main products of these reactions.

●_____ is a waste product (how handy for us!)



The light-independent reactions

●The light independent reactions don't require _____ and occur in the _____.

●_____(from the air - our waste) must enter the process here, as well as the _____ and NADPH (a _____ carrier) from the light dependant reactions.

•Many CO_2 molecules are combined (or _____) with the H molecules from the _____ and turned into glucose and other food molecules.

•The plant then uses these molecules for energy (_____) or offers them as a reward to animals that might help move _____ or _____.

The Overall Reaction:

●**(Light energy) + CO_2 + H_2O → _____ + O_2**

●Energy + _____ + water turns into (→) sugar, with _____ as a waste product

●The equation for respiration is:

_____ + O_2 → CO_2 + H_2O + (ATP energy)

Review Questions;

1. Where did the energy inside your body originate (originally come from)?
   A. Cows
   B. Plants
   C. Sunlight
   D. In-N-Oout
   E. None of the above are correct

2. What is the name of the special chemical that captures sunlight?
   A. Chloroplasts
   B. Mitochondria
   C. Chlorophyll
   D. ATP
   E. None of the above are correct

3. Plants convert sunlight into;
   A. ATP
   B. Carbon dioxide
   C. Water
   D. Sugar
   E. Both A and D above are correct

4. Plants use ATP, CO_2 and water to make;
   A. ATP
   B. Glucose/food
   C. Carbon dioxide
   D. Electron transport
   E. None of the above are correct

5. What is the name of the organelle responsible for photosynthesis?
   A. Chloroplasts
   B. Mitochondria
   C. Chlorophyll
   D. ATP
   E. None of the above are correct

6. What happens to electrons in chloroplasts when sunlight hits them?
   A. They are converted into ATP
   B. They become excited
   C. They become depressed
   D. Nothing
   E. None of the above are correct

7. Plants use excited electrons to make;
   A. ATP
   B. Carbon dioxide
   C. Mitochondria
   D. Their motors run
   E. None of the above are correct

8. How do plants make oxygen for us to breathe? (what do they make it from);
   A. From splitting carbon dioxide
   B. From splitting water
   C. From splitting sugar
   D. From splitting air
   E. None of the above are correct

9. What is the overall reaction for photosynthesis? (chemicals only)
   A. $CO_2 + H_2O \rightarrow C_6H_{12}O_6$
   B. $C_6H_{12}O_6 + O_2 \rightarrow CO_2 + H_2O$
   C. Water + air → sugar
   D. A + B → C
   E. None of the above are correct

10. How does the reaction for photosynthesis compare to the one for aerobic respiration?
    A. Similar
    B. Exactly the same
    C. Slightly different
    D. Almost exactly opposites
    E. None of the above are correct

11. What are the 2 main products of the light reactions?
    A. Glucose and carbon dioxide
    B. Glucose and oxygen
    C. ATP and Glucose
    D. ATP and NADPH
    E. None of the above are correct

12. What 2 things are required for the light reactions to proceed?
    A. Light and ATP
    B. Light and water
    C. Carbon dioxide and NADPH
    D. ATP and NADPH
    E. None of the above are correct

13. For most plants, the light reactions only occur during the day; True (A) or False (B)

(which plants can photosynthesize at night? Think……)

14. Where (in the chloroplast) do the light reactions occur?
    A. Thylakoids
    B. Grana
    C. Stroma
    D. Cytoplasm
    E. None of the above are correct

15. What is the waste product of the light reactions?
    A. Light
    B. Water
    C. ATP
    D. Oxygen
    E. None of the above are correct

16. What chemical is required to be brought in from outside of the cell for the Calvin cycle to occur?
    A. Oxygen
    B. Carbon dioxide
    C. Water
    D. Light
    E. None of the above are correct

17. What is the main (useful) product of the Calvin cycle?
    A. Sugar
    B. Carbon dioxide
    C. Sugar/glucose
    D. Oxygen
    E. None of the above are correct

18. Where (in the chloroplast) does the Calvin cycle occur?
    A. Thylakoids
    B. Grana
    C. Stroma
    D. Cytoplasm
    E. Both A and B above are correct

19. What materials are recycled back to the light reactions after the Calvin cycle?
    A. NADP and CO_2
    B. NADP and ADP + P
    C. Water and oxygen
    D. NADPH and ATP
    E. None of the above are correct

20. What are the pancake-like membranous structures in which the light reactions occur?
    A. Thylakoids
    B. Grana
    C. Stroma
    D. Cytoplasm
    E. None of the above are correct

21. A stack of thylakoids is called a;
    A. Thylakoids
    B. Grana
    C. Stroma
    D. Cytoplasm
    E. None of the above are correct

22. An individual unit of light is called;
    A. An electron
    B. A proton
    C. An atom
    D. A chloroplast
    E. None of the above are correct

23. Where do the carbon atoms that are in our sugar come from?
    A. From glucose
    B. From water
    C. From carbon dioxide in the air
    D. From oxygen in the air
    E. None of the above are correct

Essay; Why does a plant bother to convert its ATP from the light reactions to complex carbon molecules? (4 reasons; ASK if you don't know!!!)

Hey!! Can you tell me about **all** of the diagrams in the notes above? (Especially those that are a series of steps?) If no, then **STUDY THEM. THEY WILL BE ESSAYS ON THE NEXT TEST**

FIGURES = ESSAYS