Name:_____ Per._____

Photosynthesis WebQuest

Prior Knowledge: In this lesson you will discover the chemical processes that occur during photosynthesis. Before beginning, use the Learning Scale below to rate your knowledge of photosynthesis. Place a check in the before box. You will re-rate yourself in the after box after the lesson.

Rating Before Lesson	$6CO_2$ (Carbon dioxide) + $6H_2O$ (Water) $\xrightarrow{Light}$ $C_6H_{12}O_6$ (Sugar) + $6O_2$ (Oxygen) **Learning Scale** $6CO_2$ (Carbon dioxide) + $6H_2O$ (Water) $\xrightarrow{Light}$ $C_6H_{12}O_6$ (Sugar) + $6O_2$ (Oxygen)	Rating After Lesson
	4 I can teach others about how photosynthesis uses the energy of sunlight to convert reactants to products during the Light-Dependent reactions and the Light-Independent Calvin Cycle.	
	3 I can explain how photosynthesis uses the energy of sunlight to convert reactants to products during the Light-Dependent reactions and the Light-Independent Calvin Cycle.	
	2 I can identify the reactants and products of photosynthesis and define light-dependent and light independent photosynthetic reactions.	
	1 With help, I can identify the reactants and products of photosynthesis and define light-dependent and light independent photosynthetic reactions.	
	0 I do not understand the reactants and products of photosynthesis and cannot describe light-dependent and light independent photosynthetic reactions.	

Task 1: Introduction Photosynthesis

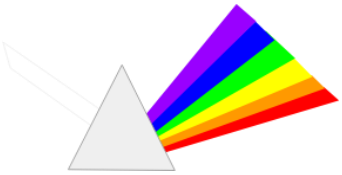
Click on the following link to watch the "Photosynthesis" video by the Amoeba Sisters. As you watch, answer the questions below. Short URL: http://tinyurl.com/omkuh4k
Full URL: https://www.youtube.com/watch?v=uixA8ZXx0KU

1. What type of sugar do plants and animals need? _____

2. Plants and animals use glucose to create ATP energy in what process? _____

3. What are pigments? _____

4. Different wavelengths of light have different _____



5. What color of light does chlorophyll reflect? _____

6. What two colors of light does chlorophyll absorb? _____

7. Where in the chloroplast do the light dependent reactions occur? _____

8. Where in the chloroplast do the light independent reactions occur?_____

9. Stop the video at 6:23. Copy what you see on the screen in the space below.

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10. Stop the video at 6:31. Copy what you see on the screen in the space below.

Task 2: Light & Plant Growth Virtual Lab

Click on the link below to complete the Light & Plant Growth Virtual Lab from the Glencoe Website. Follow the directions on this sheet to complete the lab.
Short URL: http://tinyurl.com/4soq36p
Full URL: http://www.glencoe.com/sites/common_assets/science/virtual_labs/LS12/LS12.html

11. Click on the video button on the bottom left of the virtual lab screen. Watch the video and write 2 facts you learned from the video here.

- _____
- _____

12. Make a hypothesis about what color of light will cause the *most* plant growth and what color of light will cause the *least* plant growth. Assume that all other factors, such as fertilizer, water, temperature, etc., are controlled and constant. You can choose from red, violet, blue, green, or orange wavelengths of light.

_____

_____

Procedure:

1. Click on the seed.
2. Manipulated the wavelength color with the arrows on the bottom of the lab screen.
3. Turn on the light with the switch at the bottom of the lab screen.
4. Wait for plant growth and move the ruler on lab screen to measure your plant growth.
    a. Measure Middle Plant at Its Highest Point!
5. Record Your Data On The Table Below.
6. Click "Reset" to begin again with new colors or plants.

Filter Color	Spinach (cm)	Radish (cm)	Lettuce (cm)
13.			
14.			
15.			
16.			
17.			

18. Does your data support your hypothesis? Why or Why Not? _____

_____

_____

19. Which colors of light were most successful in growing taller plants? _____

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20. Which color of light grew the shortest plants? Why? _____

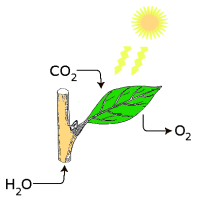
_____

_____

Task 3: Photosynthesis Interactive Game

Click on the link to access the Photosynthesis Interactive Game from BioMan Bio. Follow the directions to complete the game. Be sure to answer the questions or fill in the blanks on this handout as you go. If you need to go back in the game, click the arrow on the upper left hand side of the game screen.
Short URL: http://tinyurl.com/jozmxhn
Full URL: https://biomanbio.com/HTML5GamesandLabs/PhotoRespgames/photointeractivehtml5page.html

Click "Start A New Game"



A. Leaf Anatomy
-Double Click on "Leaf Anatomy" Button
(Steer your ship with the arrow keys on your keyboard.)

21. The _____ cells near the top of the leaf are most responsible for doing _____.

22. Which cell organelle performs photosynthesis? _____

23. Inside the chloroplast, the green disks are called _____. The _____ _____reactions happen here.

24. Stroma is the fluid surrounding the thylakoids. The _____ happens here.

B. Light Dependent Reactions
– Return to Main Menu & Double Click on "Light-Dependent Reactions" Button

25. The light dependent reactions happen in the thylakoid _____ of the chloroplast.

26. Photolysis Step 1: _____ strikes chlorophyll in _____. The causes _____ _____ to become excited (gain energy)

27. The _____ electrons then leave Photosystem II and travel down the _____ of the _____ _____

28. Photolysis Step 2: Water is _____ to replace electrons lost from Photosystem II. This produces _____ Ions (H+) and _____

29. The excited electrons continue their journey down the _____

30. As the electrons travel down the chain, their energy is used to _____ hydrogen ions (protons) across the membrane into the _____ space.

31. The result is a _____ concentration of H+ in the thylakoid space and a _____ concentration of H+ in the _____.

32. The H+ will naturally move from a high to a low concentration by _____. The only place on the membrane that lets H+ through is a protein called _____

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33. The diffusion of H+ ions through ATP Synthase causes the ATP Synthase to _____ This rotation allows ATP Synthase to produce _____.

34. The ATP will be used during the _____ as an energy source to help produce _____. The Calvin Cycle takes place in the _____ of the chloroplast.

35. The electrons continue down the electron transport chain to _____

36. Light strikes Photosystem I causing electrons to get excited again. These electrons continue down a _____ _____ electron transport chain.

37. The electrons are used to reduce _____ to form _____. NADPH is an _____ carrier.

38. NADPH _____ the electrons to the stroma where they will be used in the Calvin Cycle to make organic _____ like sugar.

39. Notice that the light-dependent reactions use _____ and make _____

C. Calvin Cycle
- Return to Main Menu. Double Click on "Calvin Cycle" Button

40. Phase 1: Carbon Fixation
During carbon _____, carbon dioxide is attached to RuBP by the _____ rubisco.

42. Phase 2: Reduction
During the _____ phase, each molecule of 3-phosphoglycerate is _____ to form G3P. This requires energy from ATP and electrons from _____.

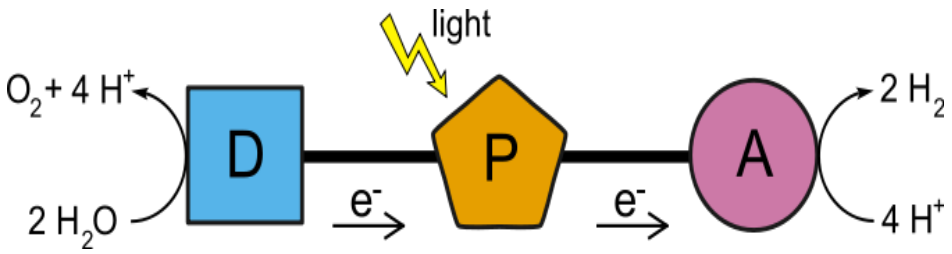
43. G3P is the final product of the _____. One molecule of G3P will leave the Calvin Cycle and be used to form organic compounds like _____.

44. Phase 3: The reactions that regenerate RuBP require energy to occur. This energy comes from _____ _____, a _____ of the light reactions.

45. The Calvin Cycle will _____ over again with carbon _____.

D. Quiz – Return to Main Menu. Double Click on "Quiz" Button

46. Take the quiz as many times as needed to score an 80% or higher.
Write down this score here_____
Take a screen shot of the scoring summary to show your teacher later as proof of your achievement.



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