Life Science 11 Name: _____

Project: Drawing Photosynthesis

OBJECTIVE: To familiarize yourself with the process of photosynthesis from the very first step to the last. To make a clear visual that will help you remember the complex steps of photosynthesis.

GUIDELINES:

- 11x17 paper will be provided – you may use this or paper of your own (2 regular sheets of paper taped together). Final product must not be larger than 11x17.
- All visuals must be original and hand drawn
- Draw in pencil, then outlined in colour markers or pencil crayons

INSTRUCTIONS:

1. Either divide your paper into sections (you decide how many are necessary) and draw each step of the process in a separate box or draw a chloroplast and add all steps to the diagram in the appropriate location(s). No matter which option you choose, number the boxed sections or the steps.
2. Show the light-dependent and dark (Calvin cycle) reaction
3. Include photosystem 1 and 2 and the electron transport chain.
4. Show the movement of energy
5. Show the movement of electrons
6. Show the movement of hydrogen atoms
7. Show the conversion of carbon molecules (including $C0_2$, 3 carbon molecules, 5 carbon molecules)
8. Show how the reactants are involved – carbon dioxide and water (highlight these)
9. Show how the products are made – oxygen and glucose (highlight these)
10. Show the reactions involving NADPH/$NADP^+$ and ATP/ADP

Before submitting, self-evaluate your work using the criteria sheet on the back side of this handout and then staple it to the front of your project.

Remember, this assignment is for your benefit and to help you understand the steps of a photosynthesis.

ROUGH COPY DUE: _____ **GOOD COPY DUE: _____**

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Performance based assessment:

	Beginning	Developing	Accomplished	Exemplary
CONTENT (STRUCTURE)	Many of the components are missing or incorrectly used	The majority of structural components are correctly used, while some components are missing or incorrect	Almost all structural components are correctly used, with some minor errors.	All structural components are correctly used
Photosystem 1, photosystem 2, electron transport chain, electron carriers, ATP synthase, thylakoid membrane, stroma, inner thylakoid space, chloroplast, grana, 3 carbon molecules, 5 carbon molecules, oxygen, glucose, carbon dioxide, water, hydrogen ions, electrons,				
CONTENT (PROCESS)	Many processes are incorrect or not included.	The majority of processes are correct and accurate, with some processes missing or incorrect	Almost all processes are correct and accurate, with some minor errors.	Entire process is correct and accurate
H_2O converted to H^+ and O_2, hydrogen moving across the thylakoid membrane, H^+ + $NADP^+$ converted to NADPH, ADP converted to ATP, CO_2 converted to 3-carbon molecules, 3 carbon molecules converted into higher energy forms, ATP converted to ADP, NADPH converted to NADP+, removal of (2) 3-carbon molecules to make glucose, 3 carbon sugars converted to 5 carbon sugars. All equations are balanced.				
CLARITY	Lack of colour or highlighting Although an attempt is made, it is difficult to understand most of the diagram.	Somewhat effective use of colour Most of the diagram is well organized with clear written communication, but some sections are not.	Effective use of colour Entire diagram is organized and clear; a few details take effort to decipher, and so could not be used as a teaching tool.	Original and highly effective use of colour Entire diagram is effectively organized with logical flow; diagram can be used as a teaching tool.