Name:
Date:
Period:

Photosynthesis Review

The leaves of plants are the organs responsible for photosynthesis. Within leaves, the _____ tissue contains cells in which there are many _____. These are organelles responsible for photosynthesis. Within these organelles pigment molecules are embedded in the membranes of _____, which are arranged in stacks called _____. Two green pigments called _____ and _____, as well as a group of reddish-orange pigments called _____, absorb _____ of sunlight and convert their kinetic energy into the chemical energy of _____ and _____. This stage of photosynthesis is referred to as the _____. The chemical energy from this stage is used to produce a sugar called _____ during the _____ which occurs in the _____ of the chloroplast.

In photosystem I of the light reactions, groups of pigment molecules, known as _____ absorb photons of light, which excites their electrons. One molecule of chlorophyll *a,* called the _____ has its energized electrons boosted up to a _____. This compound then passes the electrons to an electron transport chain. _____ is the eventual recipient of these high energy electrons and it is reduced to form _____.

The electrons lost from photosystem I are replaced by electrons from _____. This occurs when photons strike its antenna molecules, which boosts electrons from it _____ to a primary electron acceptor. This compound then passes electrons down an _____ to photosystem I. The ultimate source of electrons for this process come from _____, which is split using the energy of photons in this same photosystem.

As electrons move from _____ to _____ along an electron transport chain they lose energy. This energy is used to pump _____ from the _____ into the _____. This creates a concentration gradient, which allows H+ to leave the _____ by the process of facilitated diffusion through _____ which phosphorylates _____ to form ATP. Production of ATP in this way is called _____.

_____ and _____ are energy rich products of the _____ and are used to create sugars in a cyclical series of reactions known as the _____, which occurs in the _____ of chloroplasts. During these reactions the plant must also take in_____, which it binds to _____ using the enzyme _____. This forms a six-carbon compound that immediately splits into two three-carbon molecules. Next the plant cell invests _____ to phosphorylate these three-carbon compounds and _____ to reduce them. Eventually, one three-carbon sugar known as _____ exits the cycle as the product of these reactions. The remaining molecules are phosphorylated by _____ and _____ is regenerated to start the cycle again with more molecules of CO_2. The production of one three-carbon sugar molecule by this cyclical process requires _____molecules of CO_2, _____

molecules of ATP and _____ molecules of NADPH. Plants may use this three-carbon sugar to form _____, which can be used immediately in the plants _____ for cellular respiration. This sugar may also be stored for later use as molecules of _____ or converted to _____, a structural polysaccharide used in the construction of the plants cell walls.

Directions: Summarize photosynthesis by completing the table below

	Inputs	**Outputs**
Light Reactions		
Calvin Cycle		

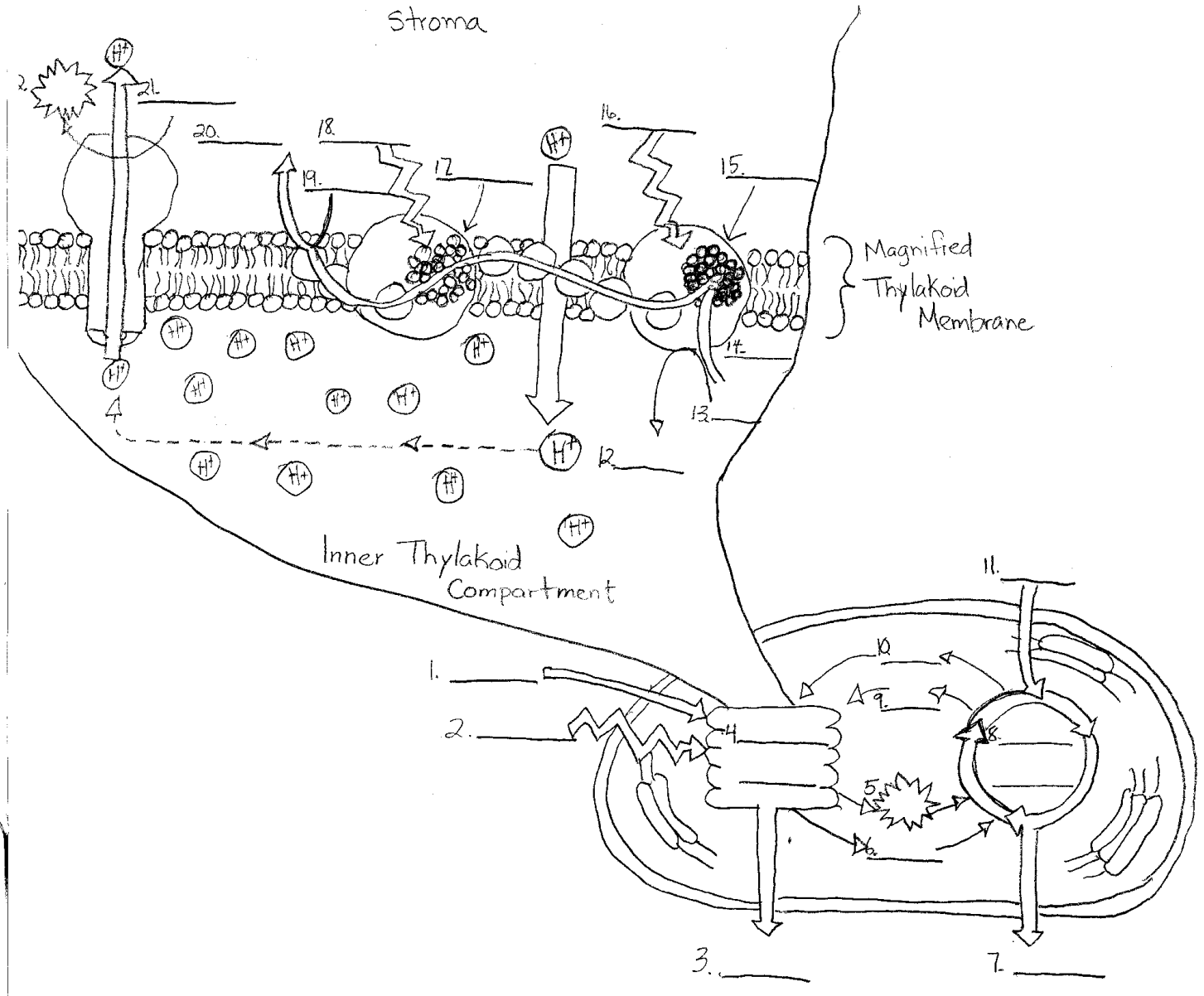
Directions: Correctly label the numbered blanks on the attached diagram and use the following instructions to color the picture.

1. Color the thylakoid membrane and photosystems dark green
2. Color the stroma light green.
3. Color the arrows indicating light energy red.
4. Color and highlight the arrows indicating the input of water and output of O_2blue.
5. Color and highlight the arrows indicating the movement of electrons and production / use of ATP gold.
6. Color ATP synthase gold.
7. Color the proteins of the electron transport chains purple.
8. Color or highlight the arrows indicating the use of CO_2 and production of G3P black.

****Continue to Next Page****

Directions: Put a check in each column that is described by the statement in the left most column.

	Photosystem I	Photosystem II	Calvin Cycle
Use water as a reactant			
Supplies electrons for photophosphorylation			
Catalyzed by rubisco			
Oxididation of NADPH			
Produces NADPH			
Reaction Center P700			
Reaction Center P680			
Produces NADPH			
Fixes Carbon			
Produces G3P			
Produces O_2			
Occurs in the thylakoids			
Requires sunlight			
Occurs in the Stroma			
Directly affected by closing of stomata			
Recycles $NADP^+$ and ATP			
Contain Antenna Molecules			
Causes H+ to accumulate in the thylakoid			
Make Chemical Energy from sunlight			


Stroma
21.
20.
18.
19.
17.
16.
15.
14.
13.
12.
4
Magnified
Thylakoid
Membrane
Inner Thylakoid
Compartment
11.
10
9.
8.
5
6.
1.
2.
4
3.
7.