

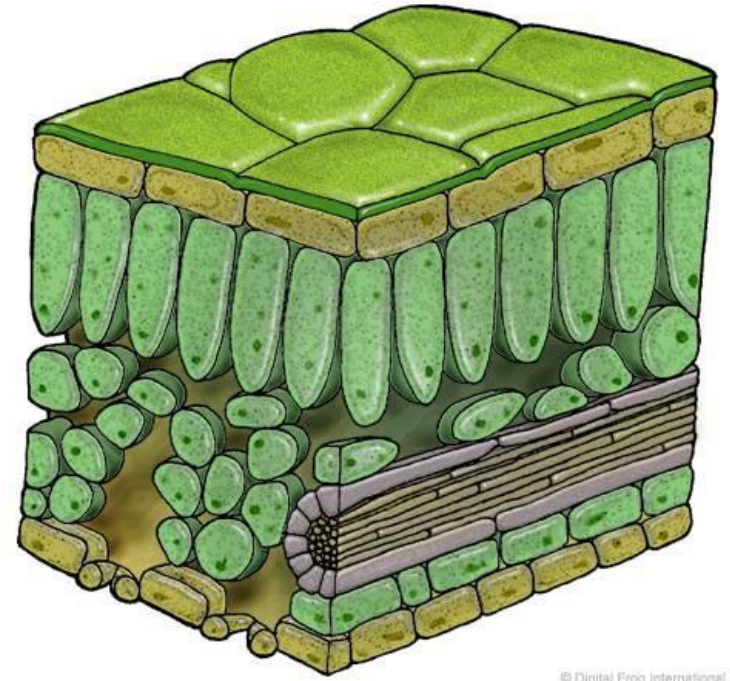
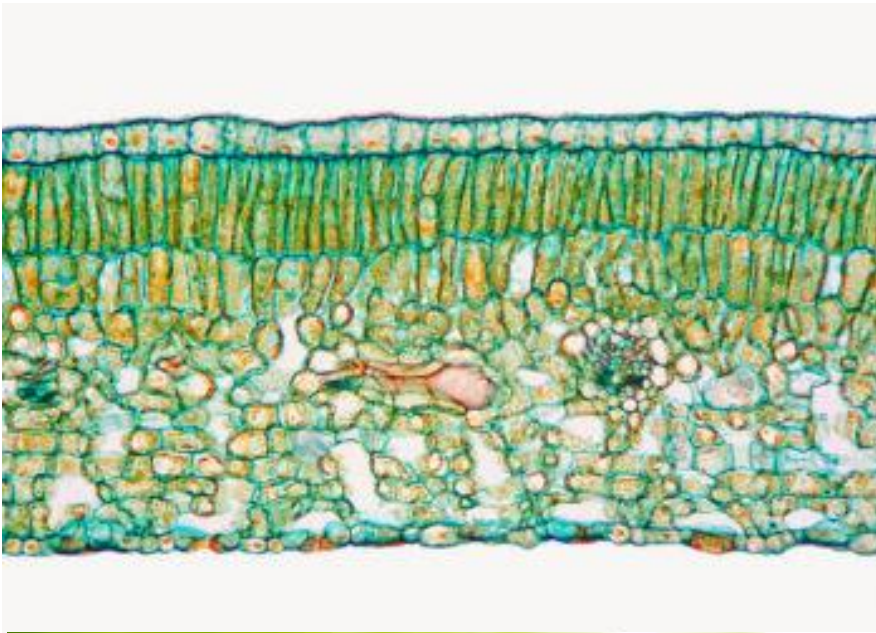
DAY 1

Leaf Structure

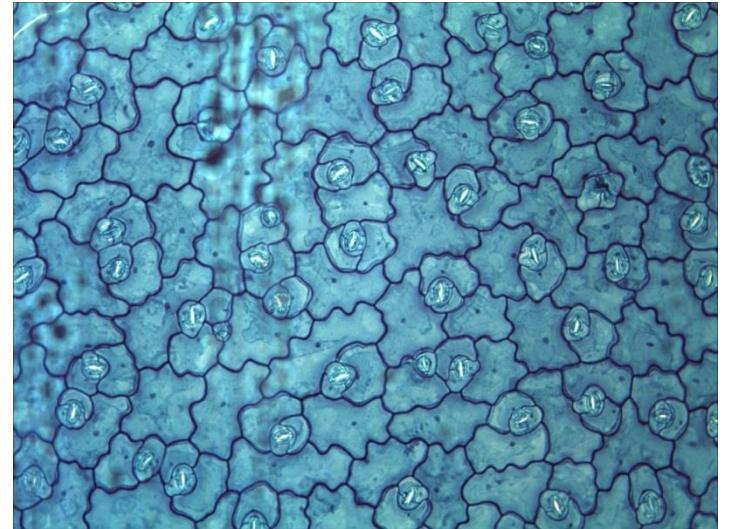
Design a Leaf!!

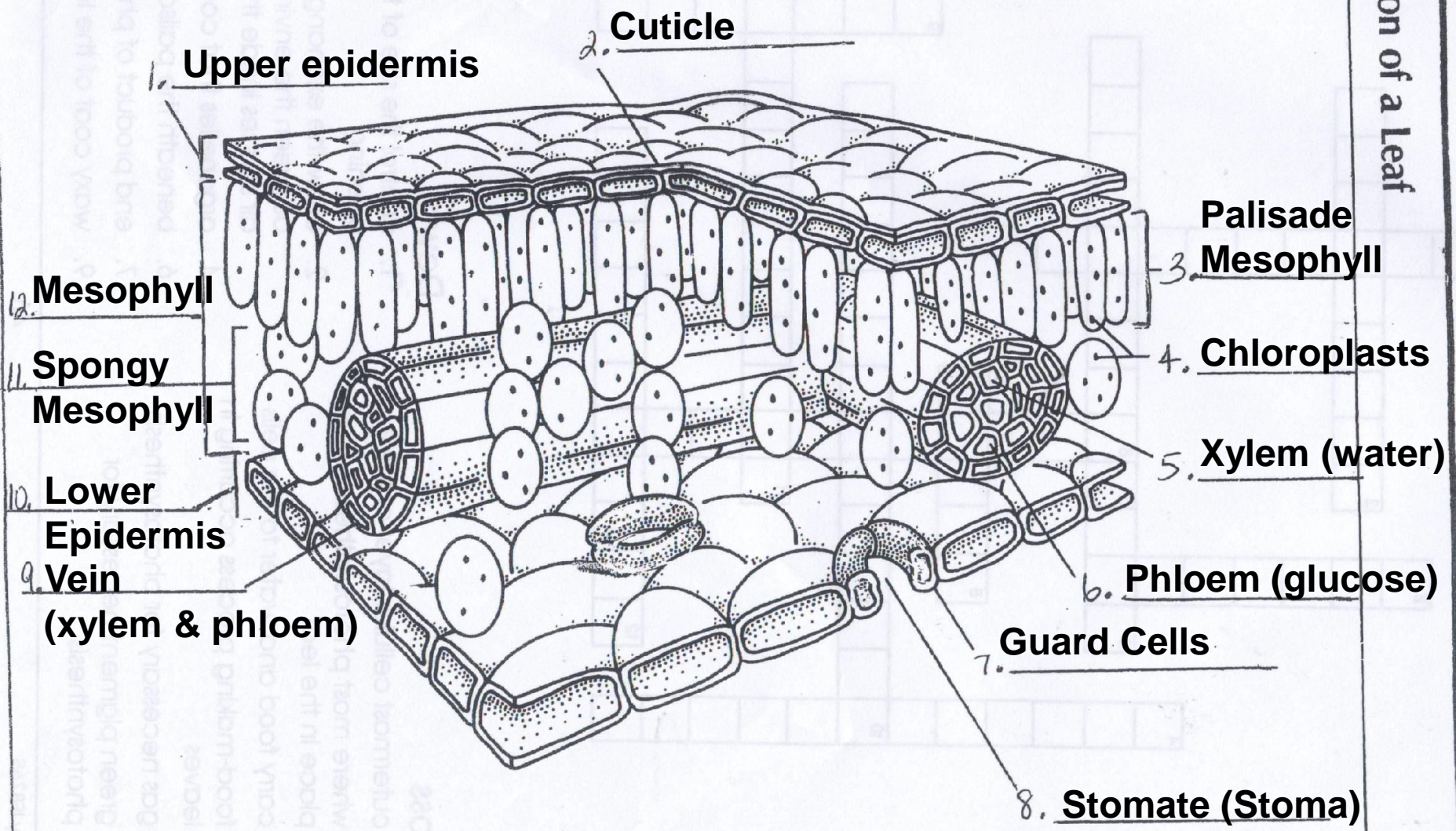


- What would be the best structure for a leaf to carry out its major function...PHOTOSYNTHESIS!!!?
- Place the following in order from the top of the leaf to the bottom.
 - Spongy layer allowing gases to flow to the chloroplasts
 - Thick, waxy layer
 - Layer of cells with the MOST chloroplasts
 - Layer of cells that includes holes for gases to enter or “leave” the leaf
 - Layer with veins to carry glucose and water to and



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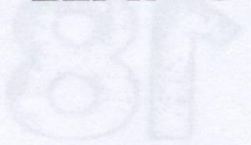


Parts of a Leaf

1. Upper Epidermis: **Outer layer, only 1 cell thick, allows light to enter**
2. Cuticle: **Waxy, protective transparent waterproof covering**
3. Palisade Mesophyll: **Tightly packed, MOST photosynthesis here**
4. Chloroplast: **Sites of photosynthesis (contain pigment chlorophyll)**
5. Xylem: **Vascular tissue that carries water up from roots to leaves**
6. Phloem: **Vascular tissue that carries glucose from leaf to rest of plant**
7. Guard Cell: **Control (REGULATE) the opening and closing of stomata**
8. Stomates: **Holes on bottom of leaf, allow gas exchange & water loss**
9. Vein: **TRANSPORTS water and glucose through plant**
10. Lower epidermis: **Bottom layer, contains guard cells and stomates**
11. Spongy Mesophyll: **Air spaces allow gases to circulate (O₂ & CO₂)**
12. Mesophyll: **Middle layers of leaf (spongy & palisade)**

LEAF CROSSWORD

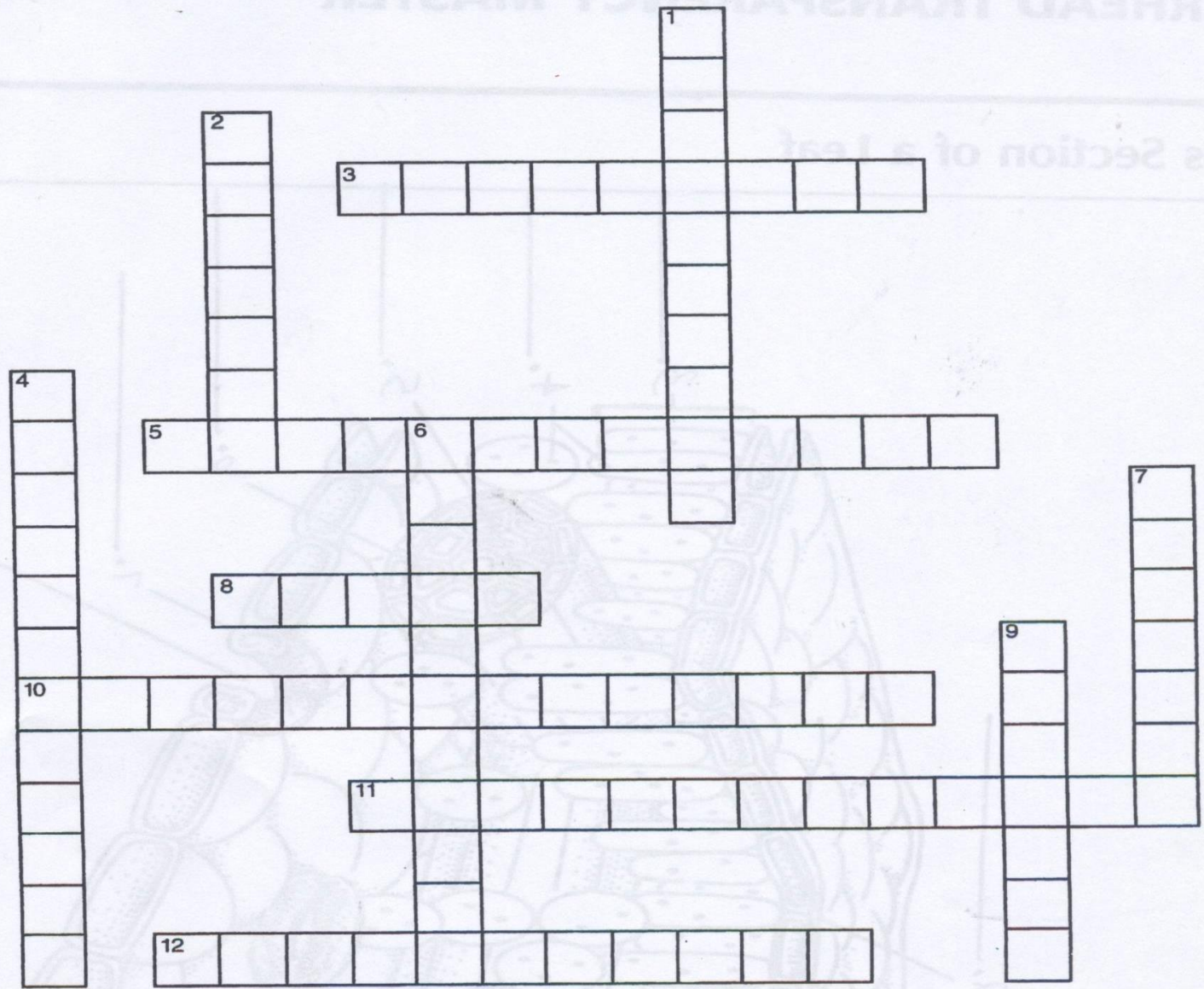
Name _____



CHAPTER

OVERHEAD TRANSPARENCY MASTER

Cross Section of a Leaf



DAY 2

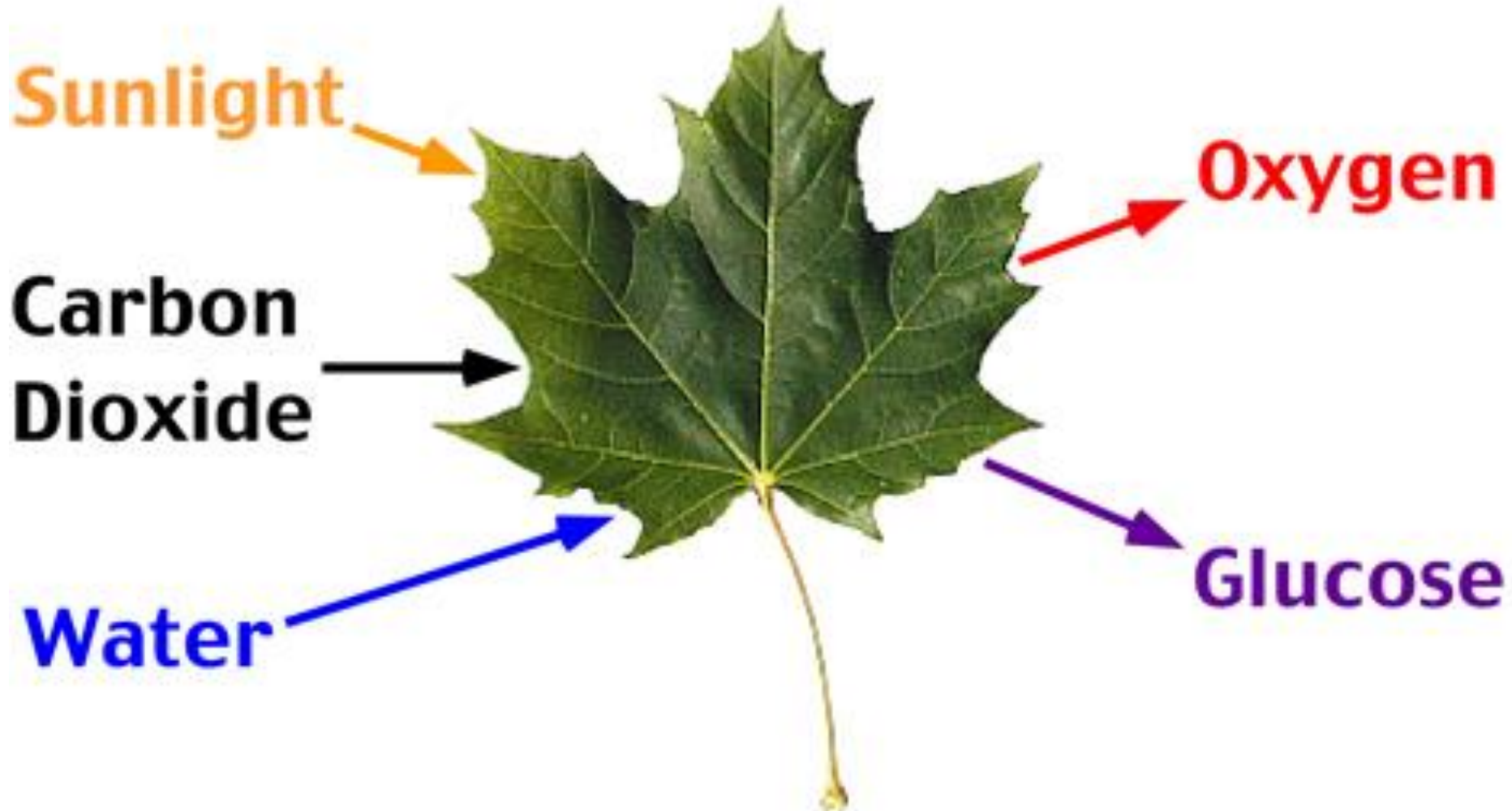
Photosynthesis

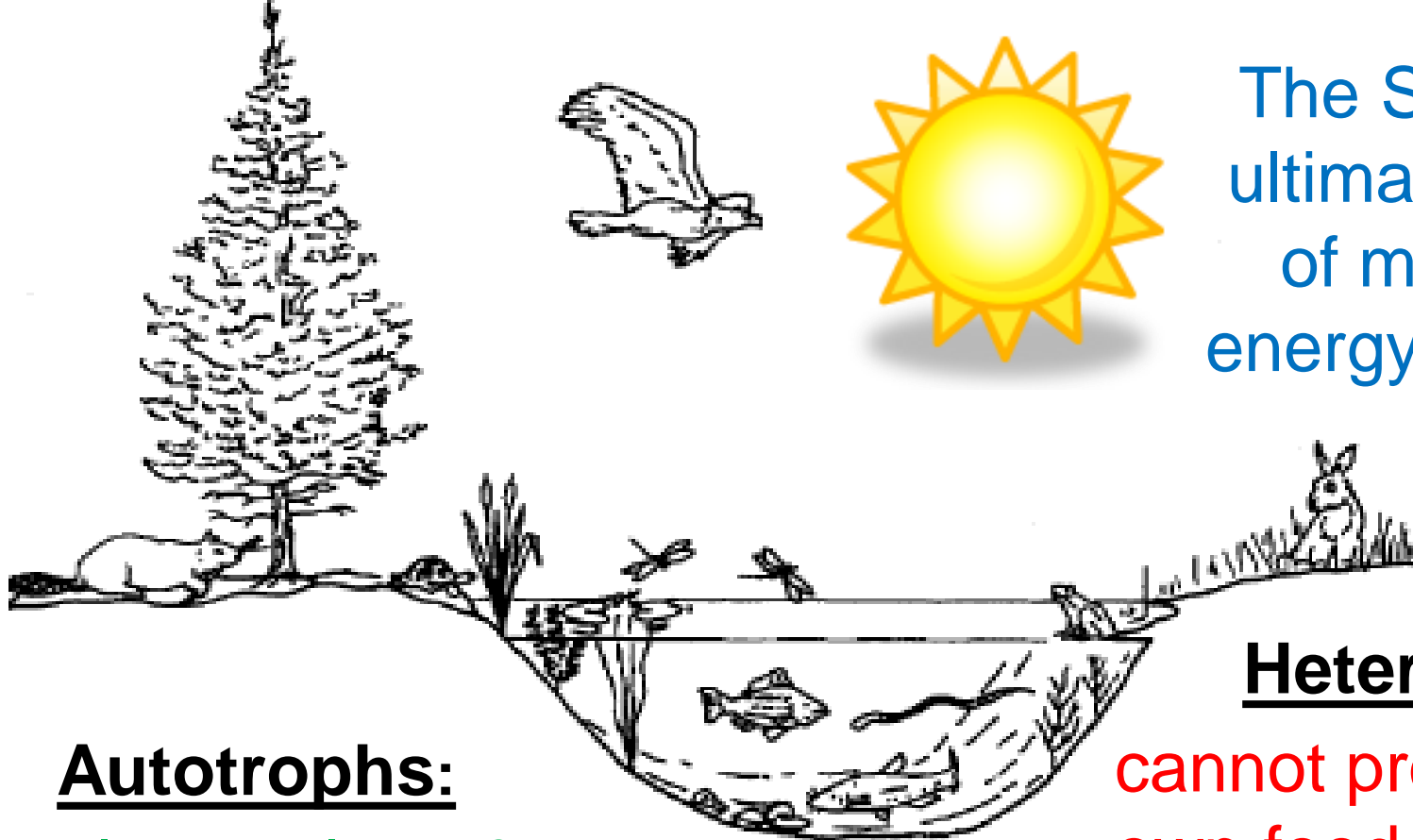
Bellwork

- Transport, Nutrition, Regulation and Respiration are 4 of the life functions carried out by all living things! How does the leaf carry these out in plants?
- In Greek, “stomata” means “mouth” ...why do you think the holes in the bottom of the leaf are called *stomates*?

Photosynthesis

Photosynthesis Song
Brainpop





The Sun is the ultimate source of mostly all energy on Earth!

Autotrophs:

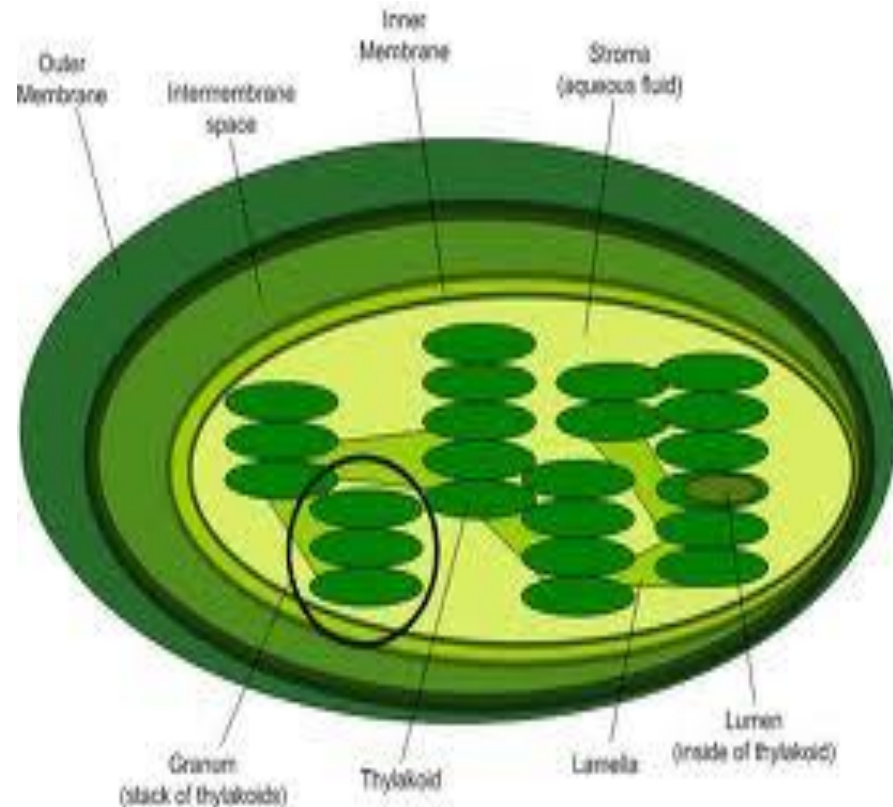
plants, algae & some bacteria that are able to use light energy from the sun to produce food

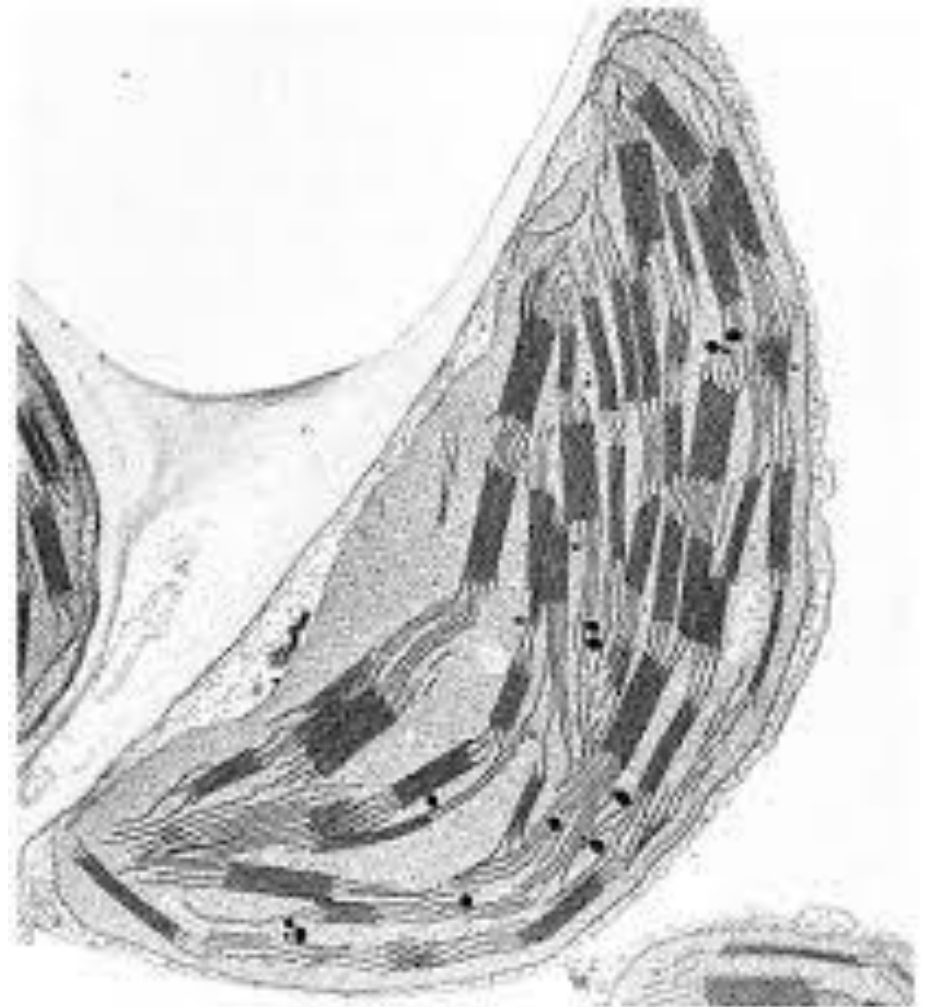
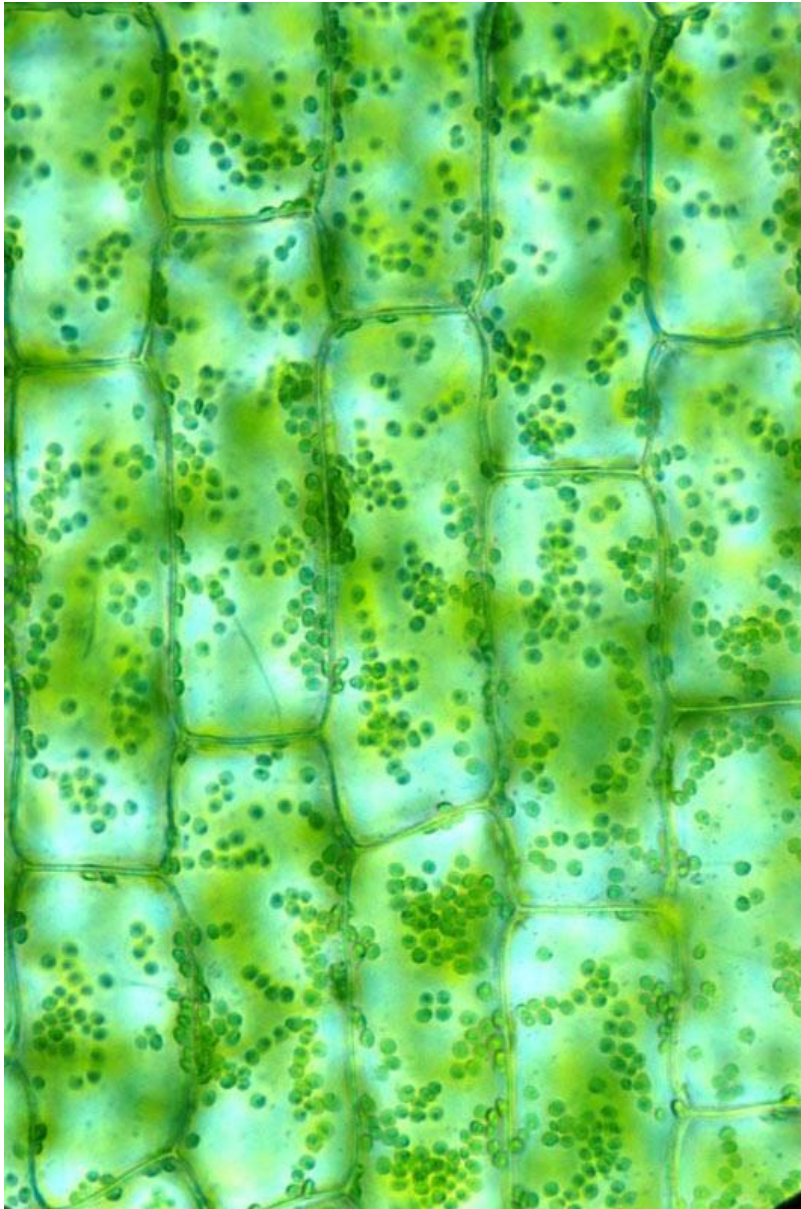
Heterotrophs:

cannot produce their own food, obtain energy from the foods they consume (ex. animals, fungi, most bacteria)

Photosynthesis: process when plants use the energy from sunlight to convert water and carbon dioxide into oxygen and high-energy sugars (a.k.a. “autotrophic nutrition”)

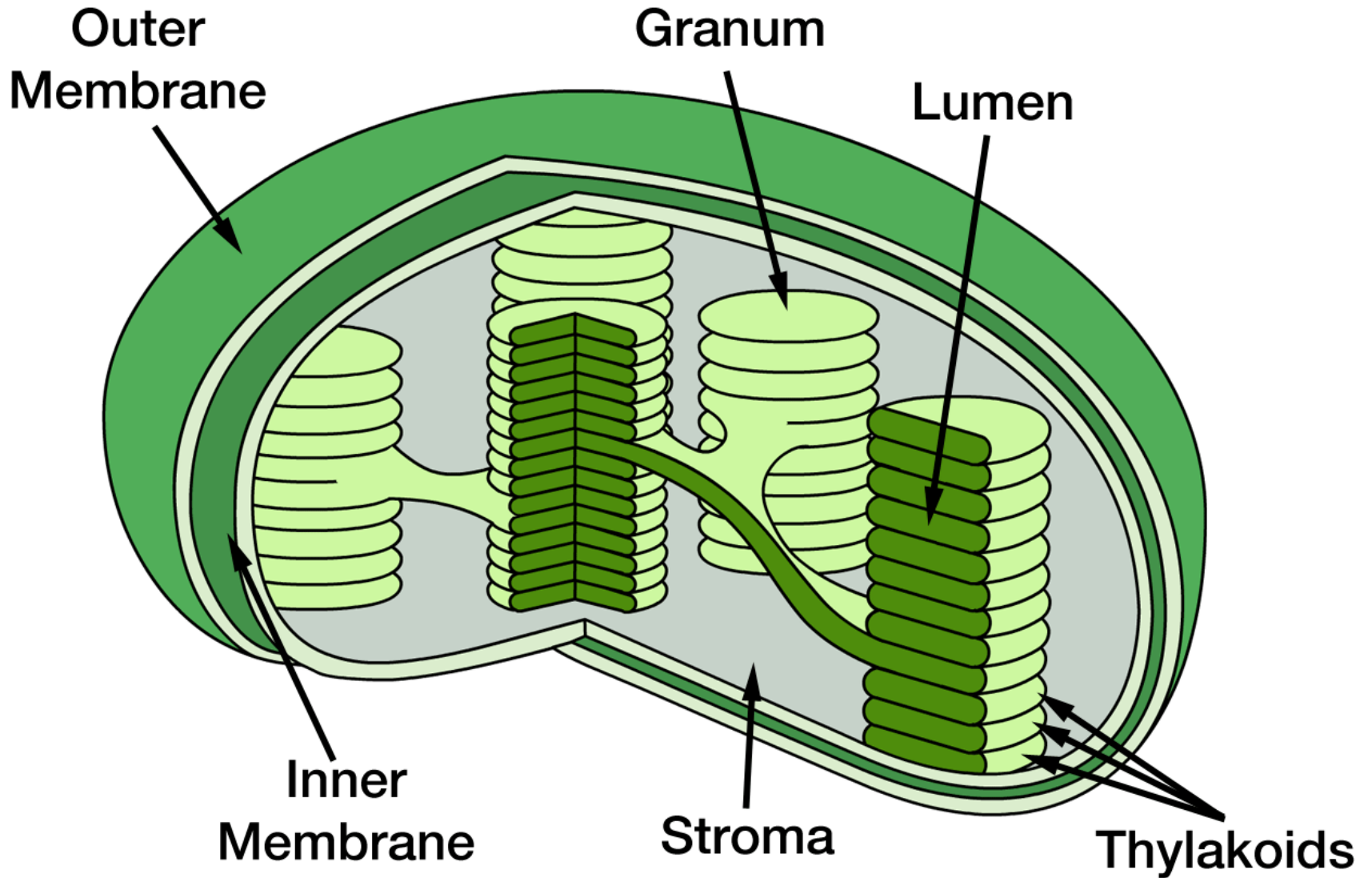
- Chloroplasts – site of photosynthesis within the cell
- Chlorophyll – a green pigment found in the chloroplast, absorbs light energy



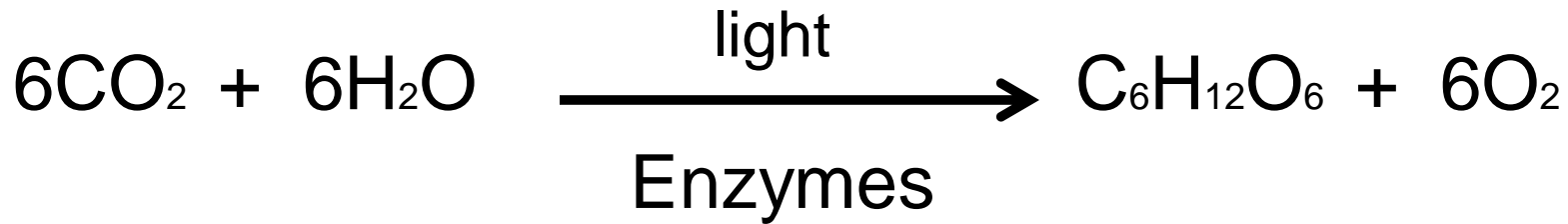


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Chloroplast

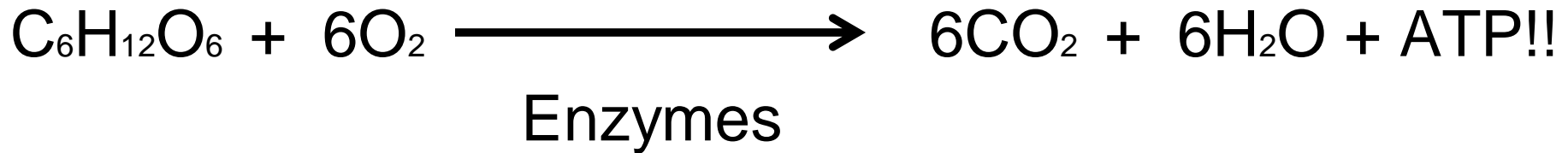


Photosynthesis Equation



carbon dioxide + water \longrightarrow glucose + oxygen

Opposite of Respiration



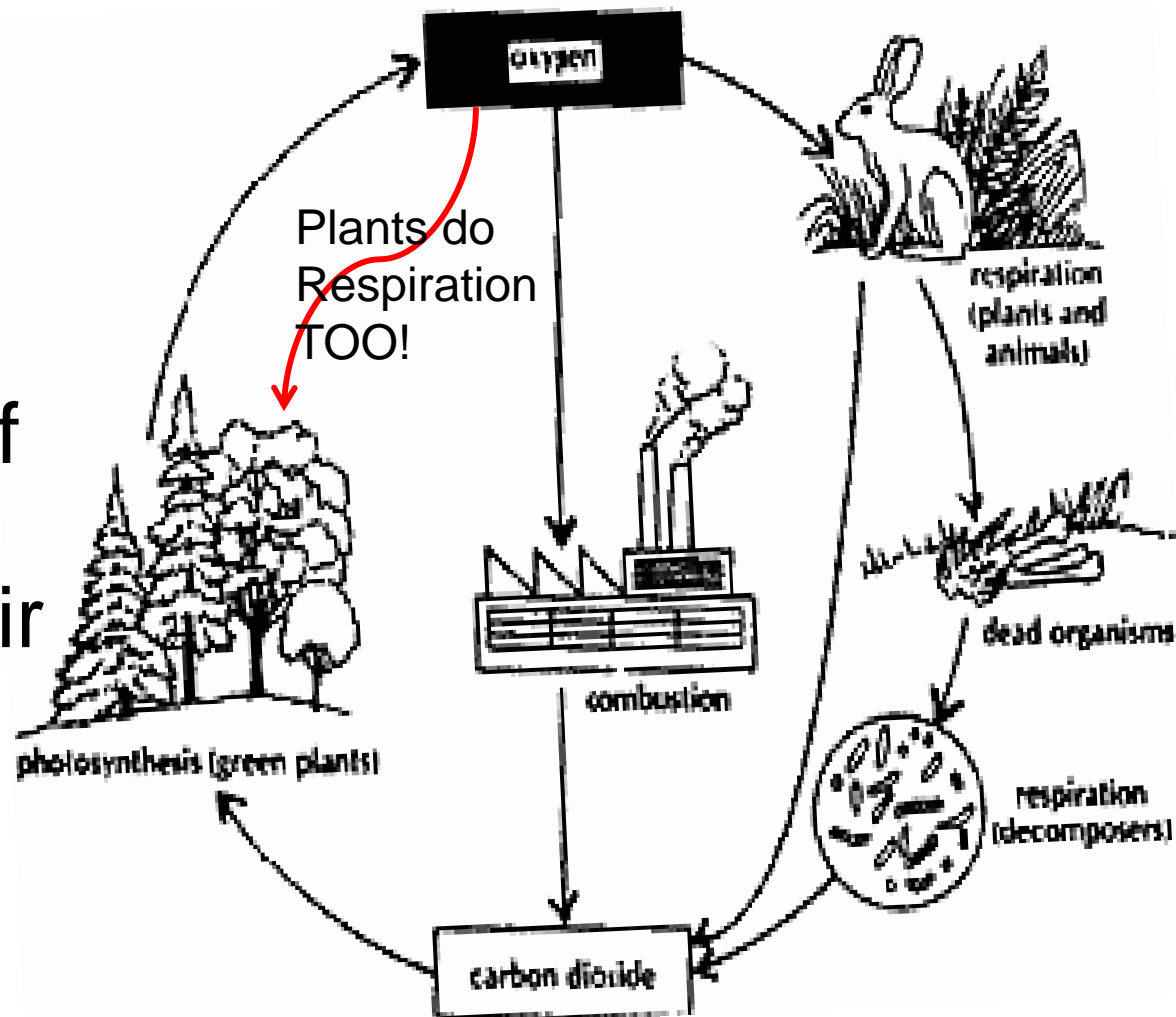
Uses for Glucose Produced

- Energy source for cellular respiration
- Can be converted into more complex starches (like cellulose) & stored by plants



Uses for Oxygen being Produced

- required by most living things for aerobic cellular respiration!
- Plants can transfer some of the oxygen produced to their own mitochondria to perform aerobic respiration!



Photosynthesis

Respiration

Main Job:

Main Job:

BOTH

Who does it?:

Who does it?:

Reactants (what it needs):

Reactants (what it needs):

Products (what it makes):

Products (what it makes):

Where?

Where?

DAY 3

Factors Affecting
Photosynthesis

Light Dependent & Independent
Reaction

Practice Questions

Which process is directly used by autotrophs to store energy in glucose?

- (1) diffusion**
- (2) respiration**
- (3) photosynthesis**
- (4) active transport**

Practice Questions

What does the process of photosynthesis produce?

- 1) starch, which is metabolized into less complex molecules by dehydration synthesis**
- 2) protein, which is metabolized into less complex molecules by dehydration synthesis**
- 3) glycerol, which is metabolized into more complex carbohydrates by dehydration synthesis**
- 4) glucose, which is metabolized into more complex carbohydrates by dehydration synthesis**

Practice Questions

- Which process provides most of the oxygen found in Earth's atmosphere?
 - 1) photosynthesis
 - 2) aerobic respiration
 - 3) dehydration synthesis
 - 4) fermentation

What factors can affect the Rate of Photosynthesis??

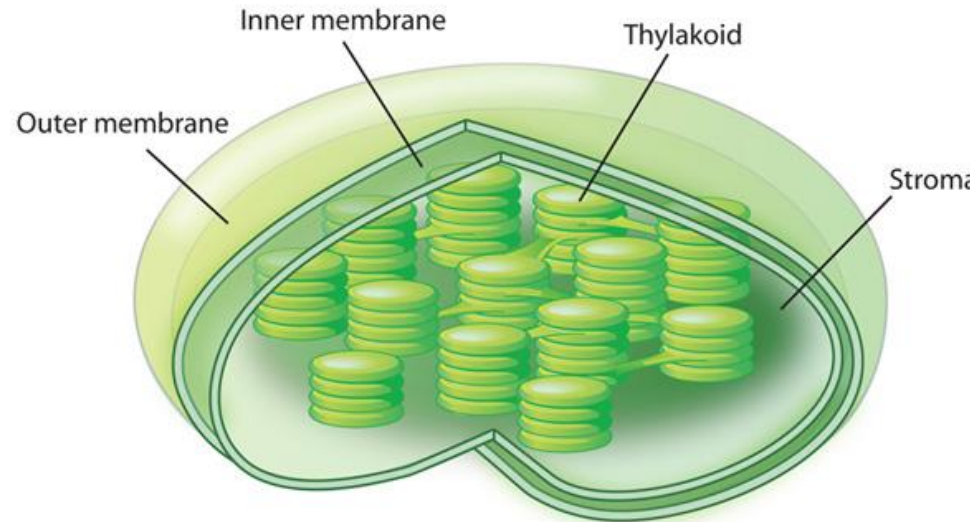
- Amount of light (more light, more photosynthesis)
- Availability of water
- Temperature (enzymes that work best between 0 – 35 degrees Celcius)
- pH of soil/water (can affect enzyme action)



2 Major Sets of Photosynthetic Reactions

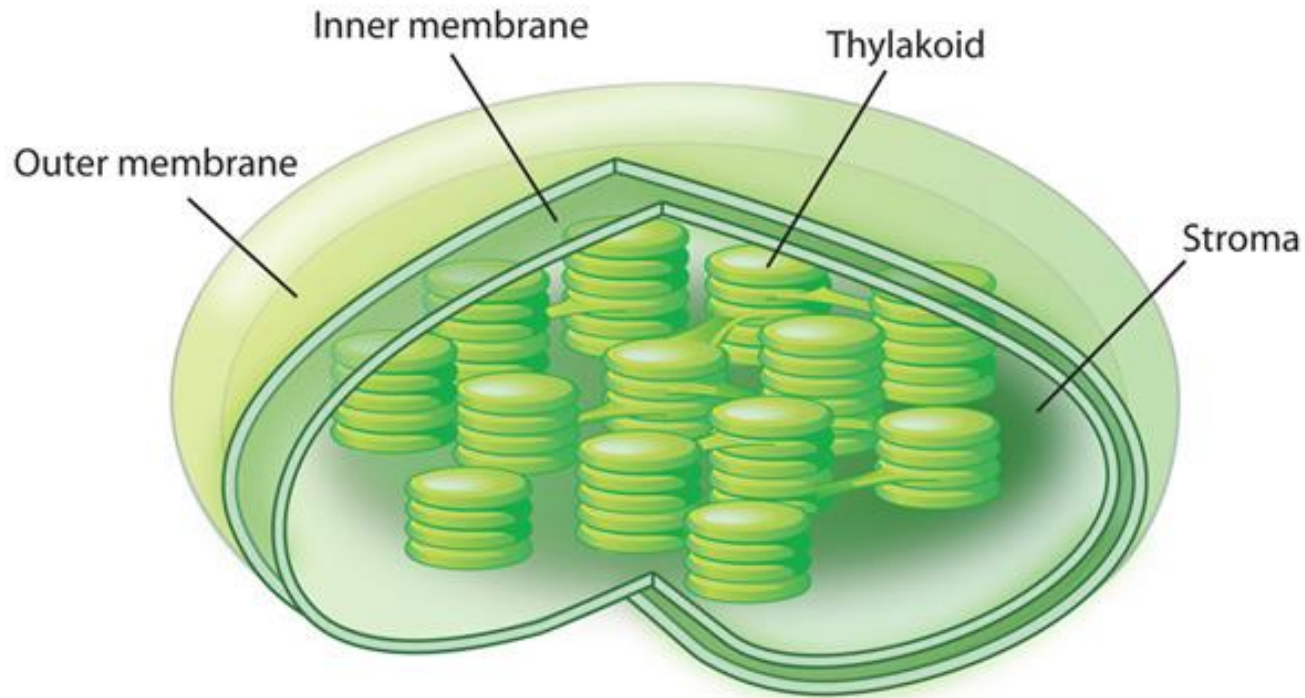
1. Light Dependent Reactions

- Take place in the grana
- Requires light
- Photolysis takes place,
(splitting water molecules to
produce hydrogen atoms
& oxygen gas)
- ATP is produced

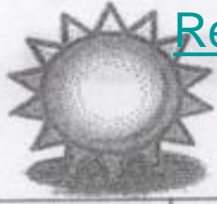


2. Light Independent / (Carbon-Fixation)

- Occur in the stroma
- Does not require light
- Also known as the Calvin cycle



Photosynthesis (Light Reactions) - YouTube

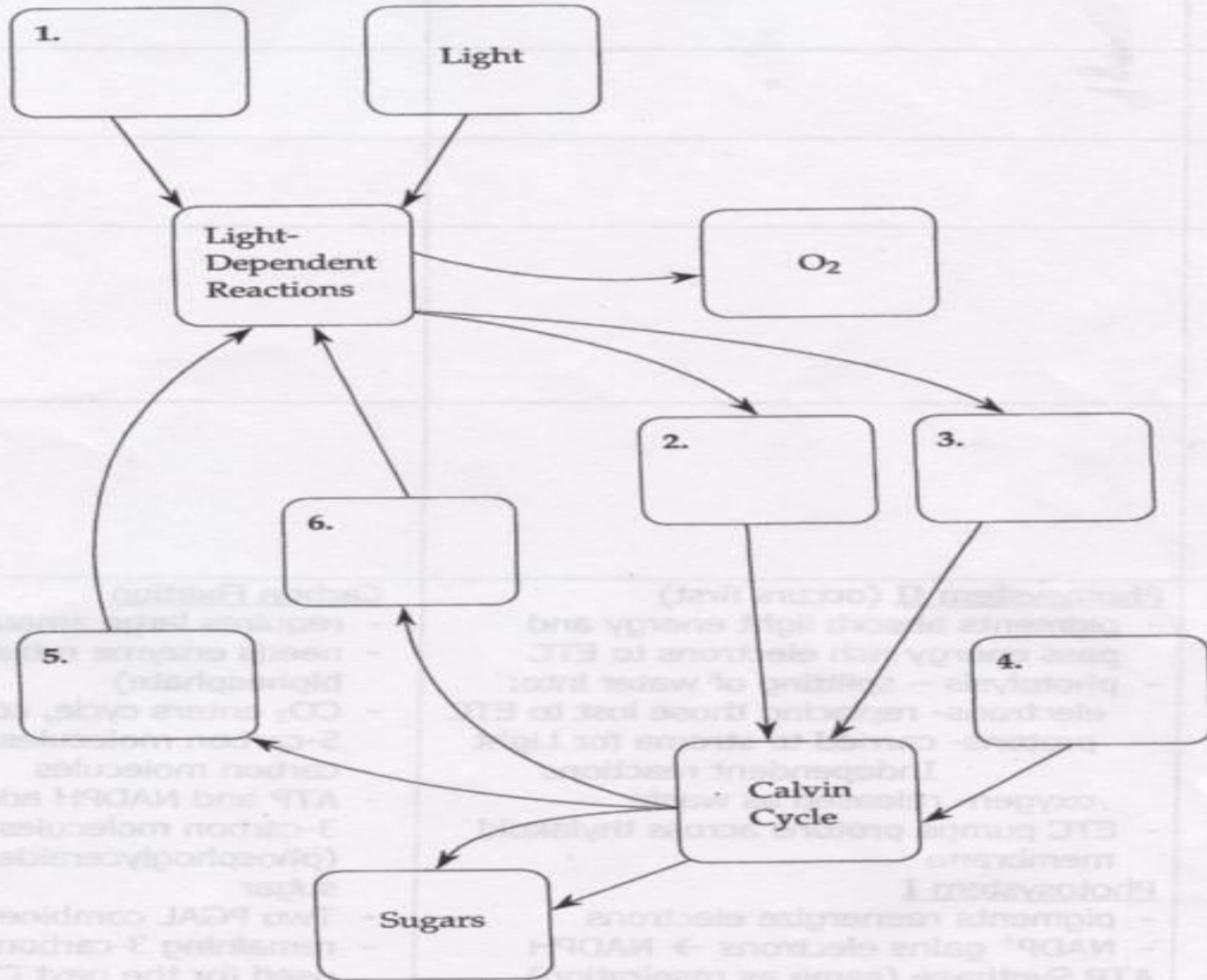


Photosynthesis Reactions

	Light-Dependent Reactions	Light-Independent Reactions / Calvin Cycle
Main Function		
Location		
Occurs when?		
Reactants		
Products		
Highlights	<p>Photosystem II (occurs first)</p> <ul style="list-style-type: none"> - pigments absorb light energy and pass energy rich electrons to ETC - splitting of water into: 	<p>Carbon Fixation</p> <ul style="list-style-type: none"> - requires large amounts of ATP to run - needs enzyme rubisco (ribulose biphosphate)

The following flowchart represents the reactions of photosynthesis. Fill in the missing information using the formulas listed below.

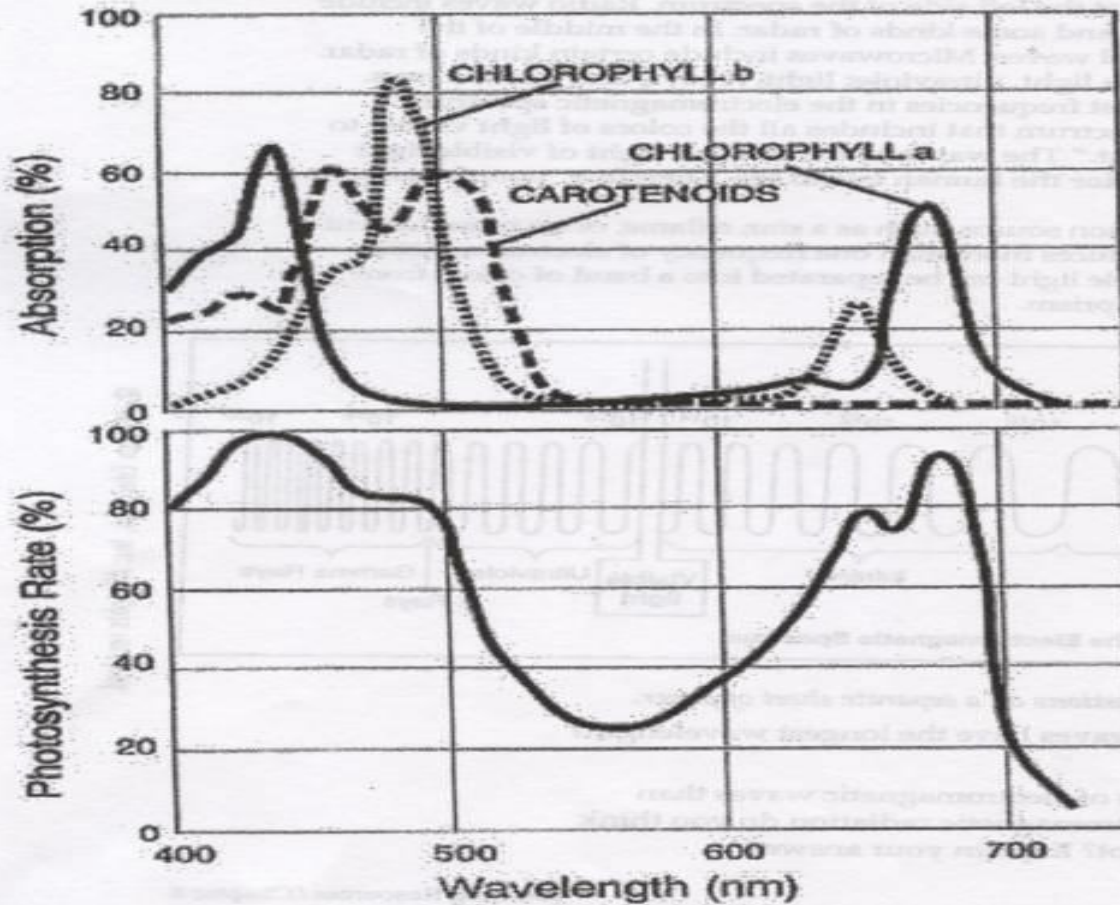
$NADP^+$ ATP $ADP + P$
 H_2O CO_2 $NADPH$



Light and Photosynthetic Pigments

Name of pigment	Pigment Color (light reflected)
Chlorophyll a	
Chlorophyll b	
Carotenoids (carotene, lycopene)	
Phycobilins	

Absorption Spectrum of Photosynthetic Pigments



Analysis Questions:

- Which pigment participates directly in the light dependent reactions?
- Which pigments are antennae or accessory pigments, assisting in photosynthesis?
- Why is chlorophyll green?
- Which wavelength (color) of light is *least* useful for photosynthesis? Why?

DAY 4