Kscience photosynthesis lab answer key

Punnett Square
Practice Problems

Name Key

Hour ______

Monohybrid Crosses

1. In rabbits the allele for black coat color (B) is dominant over the allele for brown coat color (b). What is the genotypic ratio and phenotypic ratio be for a cross between an animal homozygous for black coat color and one homozygous for brown coat color?

Key
B_ = Black
bb = brown

BB × bb

	B
b	Bb

Genotype: 100% Bb
Phenotype: 100% Black

2. White (W) hair in sheep is caused by the dominant gene while black (w) hair is recessive. A heterozygous white male and a black female are parents of a black lamb. What is the probability that their next lamb will be white? What are the genotypic and phenotypic ratios?

→ 50%

Key
W_ = white
ww = black

ww × Ww

	w
W	Ww
w	ww

Genotype: Ww : ww
1 : 1
Phenotype: white : Black
1 : 1

3. Albinism is recessive in humans. An albino man marries a woman who is not albino, but had an albino father. What is the probability of this couple having a child that is not an albino? What are the genotypic and phenotypic ratios?

Key
A_ = not albino
aa = albino

Aa × aa → 50%

	A	a
a	Aa	aa

Genotype: Aa : aa
1 : 1
Phenotype Albino : normal
1 : 1

4. Todd and Melissa are college students who are planning to get married. They are currently taking a genetics course and decided to determine the eye color of any possible children they might have. Blue eyes are recessive to brown eyes. Todd has brown eyes, like his three brothers. His mother and grandmother have blue eyes, but his father and all other grandparents have brown eyes. Brown eyed Melissa has one blue eyed sister and one brown eyed sister and a mother with blue eyes. Her father and all of her grandparents have brown eyes. Construct an accurate punnett square to determine the possible eye colors of their yet to be born children. What are the genotypic and phenotypic ratios?

Key
B_ = brown eyes
bb = blue eyes

Bb × Bb

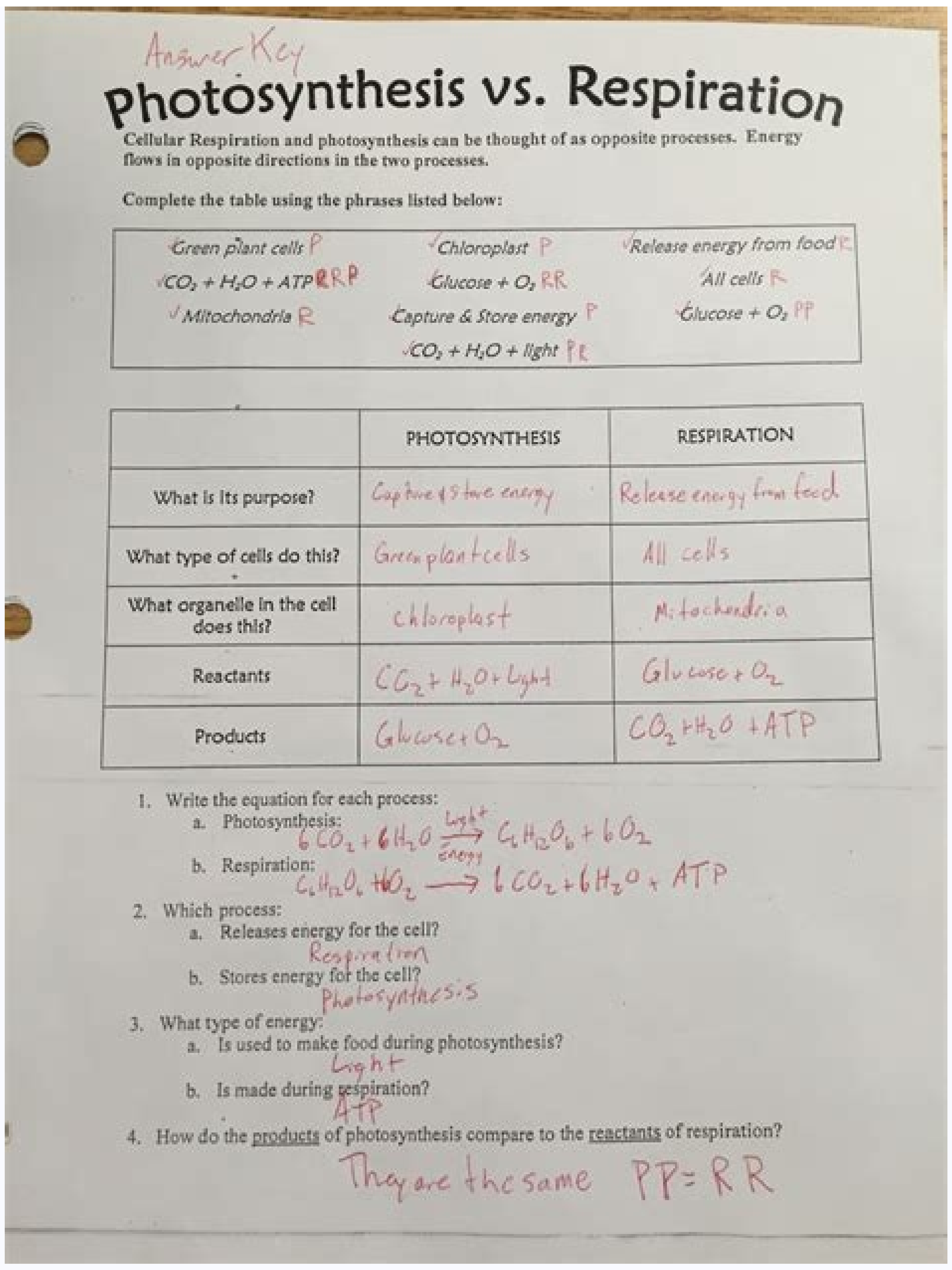
	B	b
B	BB	Bb
b	Bb	bb

Genotype:
BB : Bb : bb
1 : 2 : 1

Phenotype:
Brown : blue
3 : 1

Measurement
Which colors of the light spectrum are most important for plant growth?

Filter Color	Spinach Avg. Height (cm)	Raddish Avg. Height (cm)	Lettuce Avg. Height (cm)
Red			
Orange			
Green			
Blue			
Violet			



Answer Key

Photosynthesis vs. Respiration

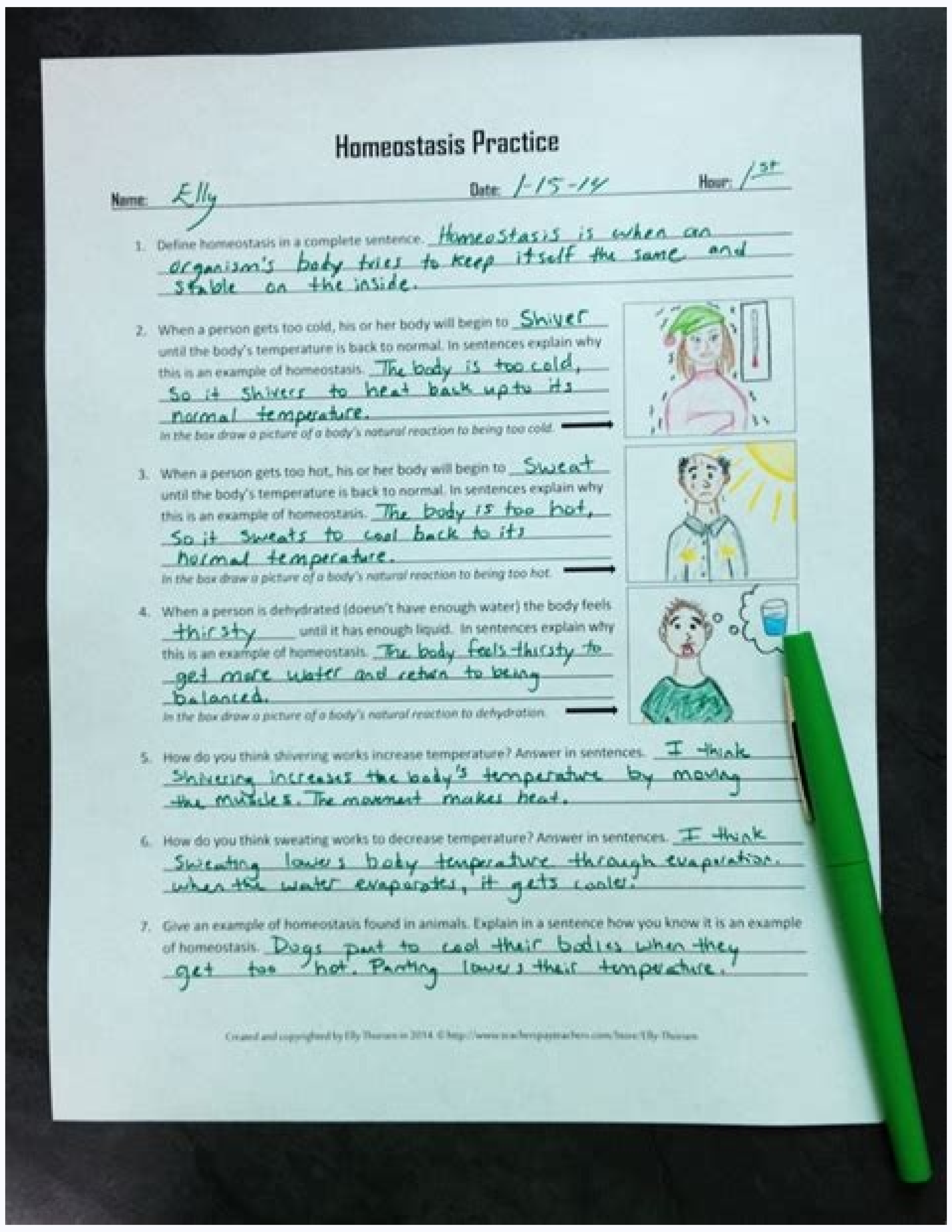
Cellular Respiration and photosynthesis can be thought of as opposite processes. Energy flows in opposite directions in the two processes.

Complete the table using the phrases listed below:

√Green plant cells P	√Chloroplast P	√Release energy from food R
√$CO_2 + H_2O + ATP$ RRP	√Glucose + O_2 RR	√All cells R
√Mitochondria R	√Capture & Store energy P	√Glucose + O_2 PP
	√$CO_2 + H_2O$ + light PR	

	PHOTOSYNTHESIS	RESPIRATION
What is its purpose?	Capture & Store energy	Release energy from food
What type of cells do this?	Green plant cells	All cells
What organelle in the cell does this?	Chloroplast	Mitochondria
Reactants	$CO_2 + H_2O$ + Light	Glucose + O_2
Products	Glucose + O_2	$CO_2 + H_2O$ + ATP

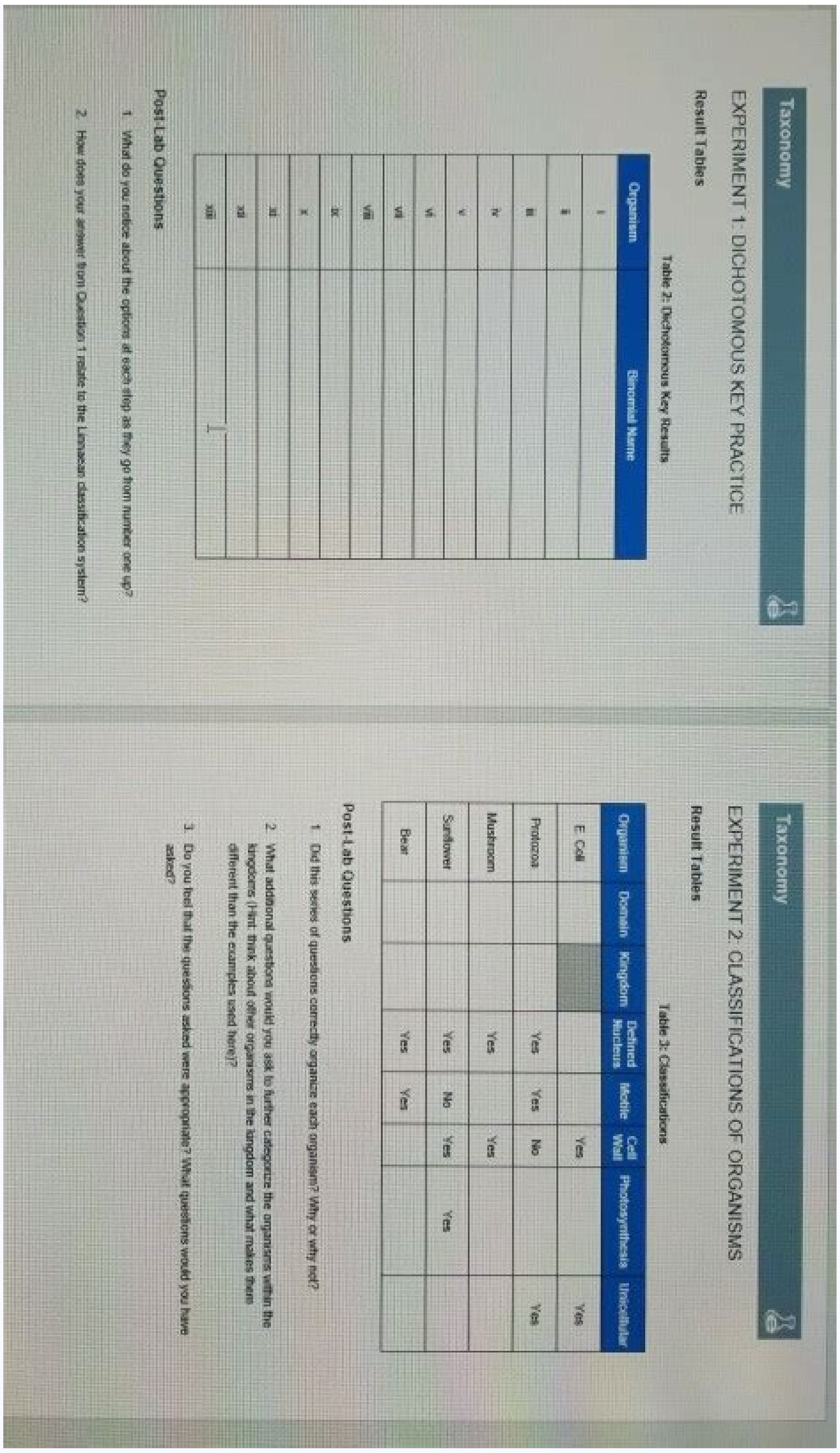
1. Write the equation for each process:
   a. Photosynthesis: $6CO_2 + 6H_2O \xrightarrow[\text{Energy}]{\text{Light}} C_6H_{12}O_6 + 6O_2$
   b. Respiration: $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O + ATP$
2. Which process:
   a. Releases energy for the cell? Respiration
   b. Stores energy for the cell? Photosynthesis
3. What type of energy:
   a. Is used to make food during photosynthesis? Light
   b. Is made during respiration? ATP
4. How do the products of photosynthesis compare to the reactants of respiration?
   They are the same PP = RR



Homeostasis Practice

Name: Elly Date: 1-15-14 Hour: 1st

1. Define homeostasis in a complete sentence. Homeostasis is when an organism's body tries to keep itself the same and stable on the inside.
2. When a person gets too cold, his or her body will begin to Shiver until the body's temperature is back to normal. In sentences explain why this is an example of homeostasis. The body is too cold, so it shivers to heat back up to its normal temperature.
   In the box draw a picture of a body's natural reaction to being too cold. →
3. When a person gets too hot, his or her body will begin to Sweat until the body's temperature is back to normal. In sentences explain why this is an example of homeostasis. The body is too hot, so it sweats to cool back to its normal temperature.
   In the box draw a picture of a body's natural reaction to being too hot. →
4. When a person is dehydrated (doesn't have enough water) the body feels thirsty until it has enough liquid. In sentences explain why this is an example of homeostasis. The body feels thirsty to get more water and return to being balanced.
   In the box draw a picture of a body's natural reaction to dehydration. →
5. How do you think shivering works increase temperature? Answer in sentences. I think shivering increases the body's temperature by moving the muscles. The movement makes heat.
6. How do you think sweating works to decrease temperature? Answer in sentences. I think sweating lowers body temperature through evaporation. When the water evaporates, it gets cooler.
7. Give an example of homeostasis found in animals. Explain in a sentence how you know it is an example of homeostasis. Dogs pant to cool their bodies when they get too hot. Panting lowers their temperature.



Taxonomy

EXPERIMENT 1: DICHOTOMOUS KEY PRACTICE

Result Tables

Table 2: Dichotomous Key Results

Organism	Binomial Name
i	
ii	
iii	
iv	
v	
vi	
vii	
viii	
ix	
x	
xi	
xii	
xiii	

Post-Lab Questions

1. What do you notice about the options at each step as they go from number one up?
2. How does your answer from Question 1 relate to the Linnaean classification system?

Taxonomy

EXPERIMENT 2: CLASSIFICATIONS OF ORGANISMS

Result Tables

Table 3: Classifications

Organism	Domain	Kingdom	Defined Nucleus	Motile	Cell Wall	Photosynthesis	Unicellular
E. Coli					Yes		Yes
Protozoa			Yes	Yes	No		Yes
Mushroom			Yes		Yes		
Sunflower			Yes	No	Yes	Yes	
Bear			Yes	Yes			

Post-Lab Questions

1. Did this series of questions correctly organize each organism? Why or why not?
2. What additional questions would you ask to further categorize the organisms within the kingdoms (Hint: think about other organisms in the kingdom and what makes them different than the examples used here)?
3. Do you feel that the questions asked were appropriate? What questions would you have asked?

Photosynthesis lab answer key pdf. Photosynthesis lab answer key.

Plants occupy a fundamental part of the food chain and the carbon cycle due to their ability to carry out photosynthesis, the biochemical process of capturing and storing energy from the sun and matter from the air. At any given point in this experiment, the number of floating leaf disks is an indirect measurement of the net rate of photosynthesis. In photosynthesis, plants use energy from the sun, water, and carbon dioxide (CO_2) from the air to store carbon and energy in the form of glucose molecules. Oxygen gas (O_2) is a byproduct of this reaction. Oxygen production by photosynthetic organisms explains why earth has an oxygen-rich atmosphere. The equation for photosynthesis can be written as follows: $6CO_2 + 6H_2O + \text{light energy} \rightarrow C_6H_{12}O_6 + 6O_2$ In the leaf-disk assay, all of the components necessary for photosynthesis are present. The light source provides light energy, the solution provides water, and sodium bicarbonate provides dissolved CO_2. Plant material will generally float in water. This is because leaves have air in the spaces between cells, which helps them collect CO_2 gas from their environment to use in photosynthesis. When you apply a gentle vacuum to the leaf disks in solution, this air is forced out and replaced with solution, causing the leaves to sink. When you see tiny bubbles forming on the leaf disks during this experiment, you're actually observing the net production of O_2 gas as a byproduct of photosynthesis. Accumulation of O_2 on the disks causes them to float. The rate of production of O_2 can be affected by the intensity of the light source, but there is a maximum rate after which more light energy will not increase photosynthesis. To use the energy stored by photosynthesis, plants (like all other organisms with mitochondria) use the process of respiration, which is basically the reverse of photosynthesis. In respiration, glucose is broken down to produce energy that can be used by the cell, a reaction that uses O_2 and produces CO_2 as a byproduct. Because the leaf disks are living plant material that still require energy, they are simultaneously using O_2 gas during respiration and producing O_2 gas during photosynthesis. Therefore, the bubbles of O_2 that you see represent the net products of photosynthesis, minus the O_2 used by respiration. When you put floating leaf disks in the dark, they will eventually sink. Without light energy, no photosynthesis will occur, so no more O_2 gas will be produced. However, respiration continues in the dark, so the disks will use the accumulated O_2 gas. They will also produce CO_2 gas during respiration, but CO_2 dissolves into the surrounding water much more easily than O_2 gas does and isn't trapped in the interstitial spaces. Mr. Andersen shows you how to sink leaf chads in preparation for the AP Biology photosynthesis lab. An empty syringe is used to remove gas from the leaves before the lab. As the chloroplasts absorb light they produce oxygen bubbles which eventually cause the leaves to float. This is a fool-proof lab to demonstrate photosynthesis and respiration in aquatic plants. This lab works great when teaching about the carbon cycle as well. In this lab students will learn that plants only do photosynthesis in the light and in the dark cellular respiration occurs. Materials needed (per group): 4 test tubes with lids or parafilm, water, bromothymol blue, straw, elodea or other aquatic plant, test tube rack, aluminum foil, light source, and a goldfish is optional for an extensionPage 2 Plants carry out photosynthesis to make food from the raw materials they gather from their environment. We can investigate the conditions needed for this process and the factors which affect its rate. This investigation is a visual way to introduce students to photosynthesis. As Elodea uses carbon dioxide from the initial solution, a change in pH occurs, causing a color change in the solution. The change is detectable in as little as 30 minutes to an hour. The investigation may be used as an introductory guided inquiry or a student-led inquiry investigation. In the latter, students devise a way to quantify the CO_2 concentration (pH) over a set amount of time. Save & Print Teacher Notes Save & Print Student Worksheet This investigation is a visual way to introduce students to photosynthesis. As Elodea uses carbon dioxide from the initial solution, a change in pH occurs, causing a color change in the solution. The change is detectable in as little as 30 minutes to an hour. The investigation may be used as an introductory guided inquiry or a student-led inquiry investigation. In the latter, students devise a way to quantify the CO_2 concentration (pH) over a set amount of time. Save & Print Teacher Notes Save & Print Student Worksheet What is photosynthesis, and what substances are used (reactants) and created (products) during the process? Investigation Objectives Describe the process of photosynthesis and the indicators that it takes place. Explain how carbon dioxide use during photosynthesis can be quantified. Science and Engineering Practices Developing and Using Models Use a model based on evidence to illustrate the relationships between systems or between components of a system. Disciplinary Core Ideas LS.1.C: Organization for Matter and Energy Flow in Organisms The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen. Crosscutting Concepts Energy and Matter Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system. Bromothymol blue will stain your hands and clothing. Wear gloves and goggles, and practice safe laboratory procedures when performing this activity. Bromothymol blue is categorized as non-hazardous. Dispose in a manner consistent with federal, state, and local regulations. Let Elodea dry out completely and dispose of it on dry land. Rinse the Elodea in spring water or conditioned tap water to remove any small leaf pieces or sediment. Use scissors to cut two 6-cm sprigs of Elodea for each group. Place the Elodea in a bowl of spring water or conditioned water for easy student access. Prepare or purchase a diluted 0.04% bromothymol blue solution. Shortly before the lab starts, add carbon dioxide to the bromothymol blue. Pour the diluted bromothymol blue solution into a beaker. Place a straw in the liquid and exhale gently into it. Allow the exhaled air to bubble through the liquid until the solution turns yellow-green. This will take 15 to 30 minutes. Important: Do not inhale through the straw, and never bring the fluid toward your mouth. Blowing too vigorously may splash liquid into your face or onto your skin. Wear protective goggles. To prevent splashing, cover the beaker containing the liquid with a piece of cardboard or aluminum foil. Cut out aluminum foil pieces (20 cm × 10 cm) to wrap capped tubes. Student: With a permanent marker or wax pencil, write your initials or other mark to identify your group on the capped tubes. Toward the top of a tube, write "D" for dark. On the other tube write "L" for light. Teacher: There are many items for students to pick up. It may be helpful to place the equipment in a basket or resealable bag. Obtain two 6-cm sprigs of Elodea and place a sprig in each tube. While working over a paper towel, use the dropping pipet to fill both tubes to overflowing with the yellow-green bromothymol blue solution and cap both tightly.Clean up any spills. Make sure students keep Elodea in a strand and do not tear off leaves. Quickly make observations of both tubes. Immediately wrap the tube marked "D" with aluminum foil. Cover the entire tube to prevent any light from reaching the Elodea. Make sure the tube is completely covered by the aluminum foil. No light should penetrate the tube. Place both tubes in the sunlight or under a light bank. The time can vary to fit your schedule, but allow a minimum of 30 to 45 minutes. Record observations. Analysis & Discussion Describe and compare the color of the bromothymol blue solution in the tubes. The solution in both tubes was a yellow-green color. The one exposed to light turned dark green and then blue. Explain the chemistry behind any color change that has occurred in any tube. The tube exposed to light turned a darker green to blue depending on the amount of exposure time. This occurred because the Elodea photosynthesized, using up the carbon dioxide in the solution. Since the reactions exist in equilibrium, more carbonic acid dissociates to form more carbon dioxide and water, replacing the carbon dioxide removed from the solution by the Elodea. As the carbonic acid dissociates, the solution becomes more basic and turns more green. Over enough time it can turn blue. Bromothymol blue is a pH indicator that turns green and then blue as a solution becomes more basic. Summarize the process of photosynthesis using chemical formulas and a color coding scheme that matches lab data. *Next Generation Science Standards® is a registered trademark of Achieve. Neither Achieve nor the lead states and partners that developed the Next Generation Science Standards were involved in the production of, and do not endorse, these products.

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