**Honors Biology**

**Chapter 8: Photosynthesis**

**EQ’s:**

1. Why is the ability to undergo photosynthesis important to all life on Earth?

2. What advantageous and disadvantageous are associated with ATP and glucose when it comes to storing energy?

 The ability to **use ­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_**is one of the characteristics of life.

What are autotrophs (self-feeders).

 Give three examples:



What are heterotrophs.



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_eat \_\_\_\_\_\_\_\_\_\_\_\_\_\_directly while \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_eat animals that eat plants. Some heterotrophs decompose the remains of organisms to obtain the energy they need (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_for example).

What is Adenosine Triphosphate (ATP) and how is it used by organisms?

**Draw a simple picture of ATP in the space:**

 The last phosphate group is a high \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_bond. What happens when it is broken?

Page 203: Explain how ATP and ADP are like a battery.



Name three ways this energy released from ATP is used by organisms.

 1.

 2.

 3.

What is the advantage of ATP when it comes to energy?

What is the major disadvantage of ATP?

A single glucose molecule stores \_\_\_\_\_\_\_\_\_\_times as much chemical energy as a

molecule of ATP. Cells usually only keep enough \_\_\_\_\_\_\_\_around for a few seconds

of activity.

ATP

**Assignment #1: Section Assessment 8.1: #’s 1, 2, 3, 4**

EQ’s:

1. What is necessary for plants to be able to perform photosynthesis?

2. What factors influence the rate at which photosynthesis occurs?

 In photosynthesis plants use \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to convert \_\_\_\_\_\_\_\_ and carbon dioxide into \_\_\_\_\_\_\_\_\_ energy \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Give two examples of high energy carbohydrates:

 a.

 b.

 R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ P\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



 What did Jan van Helmont prove 400 years ago?

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Group Members: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Get a textbooks. Read about Van Helmonts experiment on page 204. Answer the following questions**.

What question was Van Helmont investigating?

What measurements did he take during the experiment?

What conclusions did he make about where the mass of the tree come from?

What was he missing in his conclusion about photosynthesis?

 Later it was discovered that plants release oxygen in the presence of light.

Write the detailed equation for photosynthesis in the space below:

In addition to the water and carbon dioxide what else is needed for photosynthesis?

There are two major types of chlorophyll: chlorophyll a and chlorophyll b.

What colors does chlorophyll absorb well:

What color does chlorophyll reflect (that’s why most plants appear green)?

What factors affect the rate of photosynthesis?

At what temperatures do the enzymes responsible for photosynthesis work best?

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(evergreens) can only conduct photosynthesis on warm sunny days.



**Assignment #2: page 207 Section Assessment 8.2 #’s 1, 2, 3, 4.**

**CHAPTER 9: Chemical Pathways**

In a single gram of sugar (\_\_\_\_\_\_\_\_\_\_\_\_\_) there are \_\_\_\_\_\_\_\_\_\_\_ calories of heat energy. Cells don’t “burn” glucose but gradually release energy from glucose and other carbohydrates.

The first step in this process is called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and ends up producing \_\_\_\_ ATP’s**.

If there is no oxygen present (**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**) glycolysis is followed by**\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

**Fermentation** gives off

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When bread is baked, yeast use sugar (glucose) to produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_which causes the bread to rise. The small amount of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is burned off during baking.

Muscles undergoing rapid exercise cannot get enough \_\_\_\_\_\_\_\_\_\_\_\_\_\_and begin making ATP through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_fermentation. Lactic acid is responsible for the burning sensation in your muscles.

**AEROBIC RESPIRATION (mitochondria)**

If oxygen is present, glucose molecules can produce far more ATP’s than fermentation.

EQUATION: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Note that this is \_\_\_\_\_X as much ATP as anaerobic respiration produces.

**Summary**:

- Spare ATP’s burned during first couple of \_\_\_\_\_\_\_\_\_\_\_\_\_of exercise (5 seconds)

- Lactic Acid fermentation takes over next (\_\_\_\_\_\_ seconds). **\_\_\_\_\_\_\_\_\_\_\_\_\_Debt**

- Longer races require **\_\_\_\_\_\_\_\_\_\_\_\_\_Respiration** and the burning of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**stored in muscles (15-20 minutes)

- after that you are burning \_\_\_\_\_\_\_\_\_\_

Compare and Contrast Photosynthesis and Respiration (page 232)